SYLLABUS

DIPLOMA IN CIVIL ENGINEERING

FULL TIME, SANDWICH & PART TIME

Course Code: 1010, 2010 & 3010

2011-2012

L - SCHEME

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

DIPLOMA COURSES IN ENGINEERING/TECHNOLOGY

(SEMESTER SYSTEM)

(Implemented from 2011- 2012)

L – SCHEME

R E G U L A T I O N S*

* *Applicable to the Diploma Courses other than Diploma in Hotel Management & Catering Technology and the Diploma Courses offered through MGR Film Institute, Chennai.*

1. Description of the Course:

a. Full Time (3 years)

The Course for the Full Time Diploma in Engineering shall extend over a period of three academic years, consisting of 6 semesters❖ and the First Year is common to all Engineering Branches.

b. Sandwich (3½ years)

The Course for the Sandwich Diploma in Engineering shall extend over a period of three and half academic years, consisting of 7 semesters❖ and the First Year is common to all Engineering Branches. The subjects of three years full time diploma course being regrouped for academic convenience.

During 4th and/or during 7th semester the students undergo industrial training for six months/ one year. Industrial training examination will be conducted after completion of every 6 months of industrial training

c. Part Time (4 years)

The course for the Part Time Diploma in Engineering shall extend over a period of 4 academic years containing of 8 semesters❖, the subjects of 3 year full time diploma courses being regrouped for academic convenience.

❖ Each Semester will have 16 weeks duration of study with 35 hrs. /Week for Regular Diploma Course and 18 hrs. / Week for Part-Time Diploma Course.

The Curriculum for all the 6 Semesters of Diploma courses (Engineering & Special Diploma Courses viz. Textile Technology, Leather Technology, Printing Technology, Chemical Technology etc.) have been revised and revised curriculum is applicable for the candidates admitted from 2011 – 2012 academic year onwards.

2. Condition for Admission:

Condition for admission to the Diploma courses shall be required to have passed in The S.S.L.C Examination of the Board of Secondary Education, Tamilnadu.

(Or)

The Anglo Indian High School Examination with eligibility for Higher Secondary Course in Tamilnadu

(Or)

The Matriculation Examination of Tamil Nadu.

(Or)

Any other Examinations recognized as equivalent to the above by the Board of Secondary Education, Tamilnadu.

Note: In addition, at the time of admission the candidate will have to satisfy certain minimum requirements, which may be prescribed from time to time.

3. Admission to Second year (Lateral Entry):

A pass in HSC (Academic)# or (Vocational) courses mentioned in the Higher Secondary Schools in Tamilnadu affiliated to the Tamilnadu Higher Secondary Board with eligibility for university Courses of study or equivalent examination, & Should have studied the following subjects

Sl. No	Courses	H.Sc Academic	H.Sc Vocational	
		Subjects Studied	Subjects Studied	
			Related subjects	Vocational subjects
1.	All the Regular and Sandwich Diploma Courses	Maths, Physics & Chemistry	Maths / Physics / Chemistry	Related Vocational Subjects Theory & Practical
2.	Diploma Course in Modern Office Practice	English & Accountancy English & Elements of Economics English & Elements of Commerce	English & Accountancy, English & Elements of Economics, English & Management Principles & Techniques, English & Typewriting	Accountancy & Auditing, Banking, Business Management, Co-operative Management, International Trade, Marketing & Salesmanship, Insurance & Material Management, Office Secretary ship.

Subject to the approval of the AICTE

- For the Diploma Courses related with Engineering/Technology, the related / equivalent subjects prescribed along with Practicals may also be taken for arriving the eligibility.

- Branch will be allotted according to merit through counseling by the respective Principal as per communal reservation.

- For admission to the Textile Technology, Leather Technology, Printing Technology, Chemical Technology and Modern Office Practice Diploma courses the candidates studied the related subjects will be given first preference.

- *Candidates who have studied Commerce Subjects are not eligible for Engineering Diploma Courses.*

4. Age Limit:No Age limit.

5. Eligibility for the Award of Diploma:

No candidate shall be eligible for the Diploma unless he/she has undergone the prescribed course of study for a period of not less than 3 academic years in any institution affiliated to the State Board of Technical Education and Training, Tamilnadu, when joined in First Year and two years if joined under Lateral Entry scheme in the second year and passed the prescribed examination.

The minimum and maximum period for completion of Diploma Courses are as given Below:

Diploma Course	Minimum Period	Maximum Period
Full Time	3 Years	6 Years
Full Time(Lateral Entry)	2 Years	5 Years
Sandwich	3½ Years	6½ Years
Part Time	4 Years	7 Years

6. Subjects of Study and Curriculum outline:

The subjects of study shall be in accordance with the syllabus prescribed from time to time, both in theory and practical subjects. The curriculum outline is given in Annexure **- I**

7. Examinations:

Board Examinations in all subjects of all the semesters under the scheme of examinations will be conducted at the end of each semester.
The internal assessment marks for all the subjects will be awarded on the basis of continuous internal assessment earned during the semester concerned. For each subject 25 marks are allotted for internal assessment and 75 marks are allotted for Board Examination.

8. Continuous Internal Assessment:

A. <u>For Theory Subjects:</u>

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

<u>i) Subject Attendance</u> **5 Marks**

(Award of marks for subject attendance to each subject Theory/Practical will be as per the range given below)

80%	- 83%	1 Mark	)
84%	- 87%	2 Marks	
88%	- 91%	3 Marks	
92%	- 95%	4 Marks	
96%	- 100%	5 Marks	)

<u>ii) Test</u> # **10 Marks**

2 Tests each of 2 hours duration for a total of 50 marks are to be conducted. Out of which the best one will be taken and the marks to be reduced to: 05 marks

The Test – III is to be the Model test covering all the five units and the marks so obtained will be reduced to : 05 marks

Total 10 marks

TEST	UNITS	WHEN TO CONDUCT	MARKS	DURATION
Test I	Unit – I & II	End of 6th week	50	2 Hrs
Test II	Unit – III & IV	End of 12th week	50	2 Hrs
Test III	**Model Examination** - **Compulsory** Covering all the 5 Units. (Board Examinations-question paper-pattern).	End of 16th week	75	3 Hrs

 # - From the Academic year 2011-2012 onwards.

Question Paper Pattern for the Periodical Test :(Test - I & Test- II)

	14 Questions X 1 mark	… …	14 marks
	6 Questions X 6 marks)	… …	36 marks
(OR)	3 Questions X 12 marks)		----------
	Total		50 marks
			----------

iii) Assignment **10 Marks**

For each subject Three Assignments are to be given each for 20 marks and the average marks scored should be reduced for 10 marks

All Test Papers and Assignment notebooks after getting the signature with date from the students must be kept in the safe custody in the Department for verification and audit. It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

B. For Practical Subjects:

The Internal Assessment mark for a total of 25 marks which are to be distributed as follows:-

a)	Attendance	:	**5**	**Marks** (Award of marks same as theory subjects)
b)	Procedure/ observation and tabulation/ Other Practical related Work	:	**10**	**Marks**
c)	Record writing	:	**10**	**Marks**
	TOTAL	:	**25**	**Marks**

- *All the Experiments/Exercises indicated in the syllabus should be completed and the same to be given for final Board examinations.*
- The Record for every completed exercise should be submitted in the subsequent Practical classes and marks should be awarded for 20 for each exercise as per the above allocation.
- At the end of the Semester, the average marks of all the exercises should be calculated for 20 marks and the marks awarded for attendance is to be added to arrive at the internal assessment mark for Practical. (20+5=25 marks)
- The students have to submit the duly signed bonafide record note book/file during the Practical Board Examinations.
- *All the marks awarded for assignments, Tests and attendance should be entered in the Personal Log Book of the staff, who is handling the subject. This is applicable to both Theory and Practical subjects.*

9. Communication and Life Skills Practical:

The Communication and Life Skills Practical with more emphasis is being introduced in IV Semester for Circuit Branches and in V Semester for other branches of Engineering.
Much Stress is given on:

- ❖ Monodic Communication
- ❖ Dyadic Communication
- ❖ Professional Communication
- ❖ Pronunciation
- ❖ Writing Resumes
- ❖ Interview Techniques

Internal Assessment Mark **….. 25 Marks**

10. Project Work:

The students of all the Diploma Courses **(except Diploma in Modern Office Practice)** have to do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamilnadu. In order to encourage students to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e. institution wise, region wise and state wise. **The Project work must be reviewed twice in the same semester.**

a) Internal assessment mark for Project Work & Viva Voce:

Project Review I	…	**10 marks**
Project Review II	…	**10 marks**
Attendance	…	**05 marks** (Award of marks same as theory Subject pattern)
Total	…	**25 marks**

Proper record to be maintained for the two Project Reviews, and It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

b) Allocation of Marks for Project Work & Viva Voce in Board Examinations:

Viva Voce	…	**25 marks**
Demonstration/Presentation	…	**20 marks**
Total	…	**45 marks**

c) Written Test Mark (from 3 topics for 1 hour duration): $

i) Entrepreneurship	5 questions X 2 marks	=	**10 marks**
ii)Environment Management	5 questions X 2 marks	=	**10 marks**
iii)Disaster Management	5 questions X 2 marks	=	**10 marks**
			30 marks

$ **-** Selection of Questions should be from Question Bank, by the External Examiner. No choice need be given to the candidates.

Project Work & Viva Voce in Board Examination	--	**45 Marks**
Written Test Mark (from 3 topics for 1 hour duration)	--	**30 Marks**
TOTAL	--	**75 Marks**

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the Project Work & Viva Voce Board examination.

11. Scheme of Examinations:

The Scheme of examinations for subjects is given in **Annexure - II.**

12. Criteria for Pass:

1. No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed course of study successfully in an institution approved by AICTE and affiliated to the State Board of Technical Education & Training, Tamil Nadu and pass all the subjects prescribed in the curriculum.
2. A candidate shall be declared to have passed the examination in a subject if he/she secures not less than *40% in theory subjects* and *50% in practical subjects* out of the total prescribed maximum marks including both the Internal Assessment and the Board Examinations marks put together, subject to the condition that he/she secures at least a minimum of *30 marks out of 75 marks in the Board Theory Examinations and a minimum of 35 marks out of 75 marks in the Board Practical Examinations.*

1. Classification of successful candidates:

Classification of candidates who passed out the final examinations from April 2014 onwards (Joined in first year in 2011-2012) will be done as specified below.

First Class with Distinction:

A candidate will be declared to have passed in **First Class with Distinction** if he/she secures not less than 75% of the aggregate marks in all semesters put together except I and II semesters and passes all the above semesters in the first appearance itself and completes all subjects including that of I & II semesters within the stipulated period of study 3/ 3½/ 4 years (Full Time/Sandwich/Part Time) without any break in study.

First Class:

A candidate will be declared to have passed in **First Class** if he/she secures not less than 60% of the aggregate marks in all semesters put together except I & II semesters and completes all subjects including that of the I & II semesters within the stipulated period of study 3/ 3½ / 4 years (Full Time/Sandwich/Part Time) without any break in study.

Second Class:

All other successful candidates will be declared to have passed in **Second Class.**

The above mentioned classifications are also applicable for the Sandwich / Part-Time students who passed out Final Examination from October 2014 /April 2015 onwards (both joined in First Year in 2011-2012)

14. Duration of a period in the Class Time Table:

The duration of each period of instruction is1 hour and the total period of instruction hours excluding interval and Lunch break in a day should be uniformly maintained as 7 hours corresponding to 7 periods of instruction (Theory & Practical).

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Chairperson

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ANNEXURE - I

(1010 – DIPLOMA IN CIVIL ENGINEERING FULL TIME)
CURRICULUM OUTLINE

THIRD SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21031	Engineering Mechanics	6			6
21032	Construction Materials and Construction Practice	5			5
21033	Surveying I	5			5
21034	Civil Engineering Drawing I		6		6
21035	Material Testing Lab I			3	3
21036	Surveying Practice I			6	6
20001	Computer Application Practical**			4	4
TOTAL		16	6	13	35

FOURTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21041	Theory of Structures	6			6
21042	Transportation Engineering	5			5
21043	Surveying II	5			5
21044	Estimating and Costing I	5			5
21045	Material Testing Lab II			3	3
21046	Surveying Practice II			6	6
21047	CAD in Civil Engineering Drawing I			5	5
TOTAL		21		14	35

(1010 – DIPLOMA IN CIVIL ENGINEERING FULL TIME)
CURRICULUM OUTLINE

FIFTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21051	Structural Engineering	6			6
21052	Environmental Engineering and Pollution Control	5			5
Elective Theory I		5			5
21071	Advanced Construction Technology				
21072	Remote Sensing and GIS				
21073	Soil Mechanics and Foundation Engineering				
21074	Water Resources Management				
21054	Civil Engineering Drawing II		6		6
21055	Construction Practice Lab			3	3
21056	CAD In Civil Engineering Drawing II			6	6
20002	Communication and Life Skills Practical**			4	4
TOTAL		16	6	13	35

SIXTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21061	Construction Management with MIS	5			5
21062	Hydraulics	6			6
Elective Theory II		5			5
21081	Steel Structures				
21082	Town Planning				
21083	Earthquake Engineering				
21084	Building Services				
21064	Estimating and Costing II	5			5
21065	Hydraulics and Plumbing Lab			3	3
21066	Computer Applications In Civil Engineering			5	5
21067	Project Work			6	6
TOTAL		21		14	35

ANNEXURE – II
(1010 – DIPLOMA IN CIVIL ENGINEERING FULL TIME)
SCHEME OF THE EXAMINATION

THIRD SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam. Marks	Total Marks		
21031	Engineering Mechanics	25	75	100	40	3
21032	Construction Materials and Construction Practice	25	75	100	40	3
21033	Surveying I	25	75	100	40	3
21034	Civil Engineering Drawing I	25	75	100	40	3
21035	Material Testing Lab I	25	75	100	50	3
21036	Surveying Practice I	25	75	100	50	3
20001	Computer Application Practical**	25	75	100	50	3
		175	525	700		

FOURTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam Marks	Total Mark		
21041	Theory of Structures	25	75	100	40	3
21042	Transportation Engineering	25	75	100	40	3
21043	Surveying II	25	75	100	40	3
21044	Estimating and Costing I	25	75	100	40	3
21045	Material Testing Lab II	25	75	100	50	3
21046	Surveying Practice II	25	75	100	50	3
21047	CAD in Civil Engineering Drawing I	25	75	100	50	3
TOTAL		175	525	700		

(1010 – DIPLOMA IN CIVIL ENGINEERING FULL TIME)
SCHEME OF EXAMINATION

FIFTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam. Marks	Total Mark		
21051	Structural Engineering	25	75	100	40	3
21052	Environmental Engineering And Pollution Control	25	75	100	40	3
Elective Theory I		25	75	100	40	3
21071	Advanced Construction Technology					
21072	Remote Sensing and GIS					
21073	Soil Mechanics and Foundation Engineering					
21074	Water Resources Management					
21054	Civil Engineering Drawing II	25	75	100	40	3
21055	Construction Practice Lab	25	75	100	50	3
21056	CAD in Civil Engineering Drawing II	25	75	100	50	3
20002	Communication and Life Skill Practical**	25	75	100	50	3
		175	525	700		

SIXTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam Marks	Total Mark		
21061	Construction Management With MIS	25	75	100	40	3
21062	Hydraulics	25	75	100	40	3
Elective Theory II		25	75	100	40	3
21081	Steel Structures					
21082	Town Planning					
21083	Earthquake Engineering					
21084	Building Services					
21064	Estimating And Costing II	25	75	100	40	3
21065	Hydraulics And Plumbing Lab	25	75	100	50	3
21066	Computer Applications in Civil Engineering	25	75	100	50	3
21067	Project Work	25	75	100	50	3
TOTAL		175	525	700		

ANNEXURE - III

3010 DIPLOMA IN CIVIL ENGINEERING (PART-TIME)
CURRICULUM OUTLINE

THIRD SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21031	Engineering Mechanics	5			5
21033	Surveying I	4			4
20016	Engineering Graphics I		3		3
21035	Material Testing Lab I			3	3
21036	Surveying Practice I			3	3
	TOTAL	9	3	6	18

FOURTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21032	Construction Materials and Construction Practice	4			4
21043	Surveying II	4			4
20026	Engineering Graphics II		3		3
21034	Civil Engineering Drawing I		4		4
21046	Surveying Practice II			3	3
TOTAL		8	7	3	18

FIFTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21041	Theory of Structures	5			5
21042	Transportation Engineering	4			4
21045	Material Testing Lab II			3	3
21047	CAD in Civil Engineering Drawing I			3	3
20001	Computer Application Practical**			3	3
TOTAL		9		9	18

3010 DIPLOMA IN CIVIL ENGINEERING (PART-TIME)
CURRICULUM OUTLINE

SIXTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21044	Estimating and Costing I	4			4
21051	Structural Engineering	5			5
	Elective Theory I	4			4
21071	Advanced Construction Technology				
21072	Remote Sensing and GIS				
21073	Soil Mechanics and Foundation Engineering				
21074	Water Resources Management				
21054	Civil Engineering Drawing II		3		3
21055	Construction Practice Lab			2	2
TOTAL		13	3	2	18

SEVENTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21052	Environmental Engineering and Pollution Control	5			5
	Elective Theory II	5			5
21081	Steel Structures				
21082	Town Planning				
21083	Earthquake Engineering				
21084	Building Services				
21056	CAD In Civil Engineering Drawing II			3	3
21066	Computer Applications In Civil Engineering			3	3
20002	Communication and Life Skills Practical**			2	2
TOTAL		10		8	18

3010 DIPLOMA IN CIVIL ENGINEERING (PART-TIME)
CURRICULUM OUTLINE

EIGHTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21061	Construction Management with MIS	3			3
21062	Hydraulics	5			5
21064	Estimating and Costing II	4			4
21065	Hydraulics and Plumbing Lab			3	3
21067	Project Work			3	3
TOTAL		12		6	18

ANNEXURE – IV
3010 DIPLOMA IN CIVIL ENGINEERING (PART-TIME)
SCHEME OF THE EXAMINATION

THIRD SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam. Marks	Total Mark		
21031	Engineering Mechanics	25	75	100	40	3
21033	Surveying I	25	75	100	40	3
20016	Engineering Graphics I	25	75	100	40	3
21035	Material Testing Lab I	25	75	100	50	3
21036	Surveying Practice I	25	75	100	50	3
		125	375	500		

3010 DIPLOMA IN CIVIL ENGINEERING (PART-TIME)
SCHEME OF THE EXAMINATION

FOURTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam Marks	Total Mark		
21032	Construction Materials and Construction Practice	25	75	100	40	3
21043	Surveying II	25	75	100	40	3
20026	Engineering Graphics II	25	75	100	40	3
21034	Civil Engineering Drawing I	25	75	100	40	3
21046	Surveying Practice II	25	75	100	50	3
TOTAL		125	375	500		

FIFTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam Marks	Total Mark		
21041	Theory of Structures	25	75	100	40	3
21042	Transportation Engineering	25	75	100	40	3
21045	Material Testing Lab II	25	75	100	50	3
21047	CAD in Civil Engineering Drawing I	25	75	100	50	3
20001	Computer Application Practical**	25	75	100	50	3
TOTAL		125	375	500		

3010 DIPLOMA IN CIVIL ENGINEERING (PART-TIME)
SCHEME OF THE EXAMINATION

SIXTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam. Marks	Total Mark		
21044	Estimating and Costing I	25	75	100	40	3
21051	Structural Engineering	25	75	100	40	3
Elective Theory I		25	75	100	40	3
21071	Advanced Construction Technology					
21072	Remote Sensing and GIS					
21073	Soil Mechanics and Foundation Engineering					
21074	Water Resources Management					
21054	Civil Engineering Drawing II	25	75	100	40	3
21055	Construction Practice Lab	25	75	100	50	3
		125	375	500		

SEVENTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam Marks	Total Mark		
21052	Environmental Engineering and Pollution Control	25	75	100	40	3
Elective Theory II		25	75	100	40	3
21081	Steel Structures					
21082	Town Planning					
21083	Earthquake Engineering					
21084	Building Services					
21056	CAD In Civil Engineering Drawing II	25	75	100	50	3
21066	Computer Applications In Civil Engineering	25	75	100	50	3
20002	Communication and Life Skills Practical**	25	75	100	50	3
TOTAL		125	375	500		

3010 DIPLOMA IN CIVIL ENGINEERING (PART-TIME)
SCHEME OF THE EXAMINATION

EIGTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam Marks	Total Mark		
21061	Construction Management with MIS	25	75	100	40	3
21062	Hydraulics	25	75	100	40	3
21064	Estimating and Costing II	25	75	100	40	3
21065	Hydraulics and Plumbing Lab	25	75	100	50	3
21067	Project Work	25	75	100	50	3
TOTAL		125	375	500		

ANNEXURE - V

(2010 – DIPLOMA IN CIVIL ENGINEERING SANDWICH)
CURRICULUM OUTLINE

THIRD SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21031	Engineering Mechanics	5			5
21032	Construction Materials and Construction Practice	4			4
21033	Surveying I	5			5
21042	Transportation Engineering	4			4
21034	Civil Engineering Drawing I		5		5
21035	Material Testing Lab I			3	3
21036	Surveying Practice I			6	6
20001	Computer Application Practical**			3	3
TOTAL		18	5	12	35

(2010 – DIPLOMA IN CIVIL ENGINEERING SANDWICH)
CURRICULUM OUTLINE

FOURTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21045	Material Testing Lab II			3	3
21047	CAD in Civil Engineering Drawing I			4	4
21091	Industrial Training I				
TOTAL					

FIFTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21041	Theory of Structures	5			5
21043	Surveying II	5			5
21044	Estimating and Costing I	4			4
21052	Environmental Engineering and Pollution Control	4			4
Elective Theory I		4			4
21071	Advanced Construction Technology				
21072	Remote Sensing and GIS				
21073	Soil Mechanics and Foundation Engineering				
21074	Water Resources Management				
21054	Civil Engineering Drawing II		4		4
21046	Surveying Practice II			5	5
21056	CAD In Civil Engineering Drawing II			4	4
TOTAL		22	4	9	35

(2010 – DIPLOMA IN CIVIL ENGINEERING SANDWICH)
CURRICULUM OUTLINE

SIXTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21051	Structural Engineering	6			6
21061	Construction Management with MIS	5			5
21062	Hydraulics	5			5
21064	Estimating and Costing II	5			5
Elective Theory II		4			4
21081	Steel Structures				
21082	Town Planning				
21083	Earthquake Engineering				
21084	Building Services				
21065	Hydraulics and Plumbing Lab			2	2
21066	Computer Applications In Civil Engineering			5	5
20002	Communication and Life Skills Practical**			3	3
TOTAL		25		10	35

SEVENTH SEMESTER

Subject Code	SUBJECT	HOURS PER WEEK			
		Theory Hours	Drawing Hours	Practical Hours	Total Hours
21055	Construction Practice Lab			3	3
21067	Project Work			4	4
21092	Industrial Training II				
TOTAL					

ANNEXURE – VI
(2010 – DIPLOMA IN CIVIL ENGINEERING SANDWICH)
SCHEME OF THE EXAMINATION

THIRD SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam. Marks	Total Mark		
21031	Engineering Mechanics	25	75	100	40	3
21032	Construction Materials and Construction Practice	25	75	100	40	3
21033	Surveying I	25	75	100	40	3
21042	Transportation Engineering	25	75	100	40	3
21034	Civil Engineering Drawing I	25	75	100	40	3
21035	Material Testing Lab I	25	75	100	50	3
21036	Surveying Practice I	25	75	100	50	3
20001	Computer Application Practical**	25	75	100	50	3
TOTAL		200	600	800		

FOURTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam Marks	Total Mark		
21045	Material Testing Lab II	25	75	100	50	3
21047	CAD in Civil Engineering Drawing I	25	75	100	50	3
21091	Industrial Training I	25	75	100	50	3
TOTAL		75	225	300		

(2010 – DIPLOMA IN CIVIL ENGINEERING SANDWICH)
SCHEME OF EXAMINATION

FIFTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam. Marks	Total Mark		
21041	Theory of Structures	25	75	100	40	3
21043	Surveying II	25	75	100	40	3
21044	Estimating and Costing I	25	75	100	40	3
21052	Environmental Engineering and Pollution Control	25	75	100	40	3
Elective Theory I		25	75	100	40	3
21071	Advanced Construction Technology					
21072	Remote Sensing and GIS					
21073	Soil Mechanics and Foundation Engineering					
21074	Water Resources Management					
21054	Civil Engineering Drawing II	25	75	100	40	3
21046	Surveying Practice II	25	75	100	50	3
21056	CAD In Civil Engineering Drawing II	25	75	100	50	3
		200	600	800		

(2010 – DIPLOMA IN CIVIL ENGINEERING SANDWICH)
SCHEME OF EXAMINATION

SIXTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam Marks	Total Mark		
21051	Structural Engineering	25	75	100	40	3
21061	Construction Management with MIS	25	75	100	40	3
21062	Hydraulics	25	75	100	40	3
21064	Estimating and Costing II	25	75	100	40	3
Elective Theory II		25	75	100	40	3
21081	Steel Structures					
21082	Town Planning					
21083	Earthquake Engineering					
21084	Building Services					
21065	Hydraulics and Plumbing Lab	25	75	100	50	3
21066	Computer Applications In Civil Engineering	25	75	100	50	3
20002	Communication and Life Skills Practical**	25	75	100	50	3
TOTAL		200	600	800		

SEVENTH SEMESTER

Subject Code	SUBJECT	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal assess-ment Marks	Board Exam Marks	Total Mark		
21055	Construction Practice Lab	25	75	100	50	3
21067	Project Work	25	75	100	50	3
21092	Industrial Training II	25	75	100	50	3
TOTAL		75	225	300		

Relevant papers in 'L' Scheme

SEM	K Scheme (Implementing academic year 2007-08)		Relevant papers in 'L' Scheme	
	Sub Code	Subject	Sub Code	Subject
III	11031	Engineering Mechanics	21031	Engineering Mechanics
	11032	Construction Materials and Practice	21032	Construction Materials and Construction Practice
	11033	Surveying	21043	Surveying II
	11034	Civil Engineering Drawing I	21034	Civil Engineering Drawing I
	11035	Material Testing Lab Practice I	21035	Material Testing Lab I
	11036	Surveying Practice I	21036	Surveying Practice I
IV	11041	Theory of Structures	21041	Theory of Structures
	11042	Environmental Engineering	21052	Environmental Engineering and Pollution Control
	11043	Transportation Engineering	21042	Transportation Engineering
	11044	Material Testing Lab Practice II	21045	Material Testing Lab II
	11045	CAD in Civil Engineering Drawing Practice I	21047	CAD in Civil Engineering Drawing I
	11046	Surveying Practice II	21046	Surveying Practice II

Relevant papers in 'L' Scheme

SEM	K Scheme (Implementing academic year 2007-08)		Relevant papers in 'L' Scheme	
	Sub Code	Subject	Sub Code	Subject
V	11051	Structural Engineering	21051	Structural Engineering
	11052	Quantity Surveying	21044	Estimating and Costing I
	11071	Concrete Technology and Advanced Construction	21071	Advanced Construction Technology
	11072	Elements of Interior Design	No Equivalent in L Scheme	
	11054	CAD in Civil Engineering Drawing Practice II	21056	CAD In Civil Engineering Drawing II
	11055	Construction Lab Practice	21055	Construction Practice Lab
	11011	English Communication Practical	20002	Communication and Life Skills Practical
VI	11061	Construction Management with MIS	21061	Construction Management with MIS
	11062	Hydraulics	21062	Hydraulics
	11081	Town Planning	21082	Town Planning
	11082	Water Resource Management	21074	Water Resources Management
	11064	Hydraulics and Plumbing Lab	21065	Hydraulics and Plumbing Lab
	11065	Computer Application In Civil Engineering	21066	Computer Applications In Civil Engineering
	11066	Project Work	21067	Project work

III SEMESTER

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

ENGINEERING MECHANICS

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21031**
Semester : III Semester
Subject Title : **ENGINEERING MECHANICS**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ENGINEERING MECHANICS	6 Hrs	96 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be familiar with:

- The mechanical properties of engineering materials, elastic constants, different types of stresses and strains, the deformation of elastic bodies under simple stresses, the use and principles of composite sections;
- The effects of transverse forces such as shear force and bending moment in beams; determination of SF and BM in simple beams under different loading systems;
- The geometrical properties such as centroid, moment of inertia etc of sections of different shapes;
- Determination of different types of stresses induced in beams and shafts due to bending and twisting moments respectively
- Analysis of perfect frames for vertical loads by analytical as well as graphical methods.

21031 ENGINEERING MECHANICS

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**SIMPLE STRESSES AND STRAINS** **1.1 INTRODUCTION TO STRESSES AND STRAINS** Definitions of: Force, Moment of force, Actions and reactions, Statics, Static equilibrium of bodies, Mechanics, Engineering Mechanics - Conditions of static equilibrium - Types of forces on structural members - Study of strength of material - Mechanical properties of materials – Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability - Definitions of stress and strain - Types of stresses -Tensile, Compressive and Shear stresses - Types of strains - Tensile, Compressive and Shear strains - Complimentary shear stress - Diagonal tensile / compressive stresses due to shear - Elongation and Contraction - Longitudinal and Lateral strains - Poisson's Ratio - Volumetric strain - Simple problems in computation of stress, strain, Poisson's ratio, change in dimensions and volume etc- Hooke's law - Elastic Constants - Definitions of: Young's Modulus of Elasticity – Shear modulus (or) Modulus of Rigidity - Bulk Modulus - Derivations for the relationship between elastic constants - Simple problems - Young's modulus values of few important engineering materials. **1.2 APPLICATION OF STRESS AND STRAIN IN ENGINEERING FIELD** Behaviour of ductile and brittle materials under direct loads - Load Extension curve (or) Stress Strain curve of a ductile material - Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress, Actual / Nominal stresses - Working stress - Factor of safety - Percentage elongation - Percentage reduction in area - Significance of percentage elongation and reduction in area of cross section - Deformation of prismatic and stepped bars due to uniaxial load - Deformation of prismatic bars due to its self weight - Numerical problems. Composite Sections – Examples of composite sections in Engineering field- Advantages - Assumptions made – Principles of analysis of Composite sections - Modular ratio - Equivalent area - Stresses in the materials - Problems on axially loaded composite sections like RC.C / Encased columns.	**20 Hrs**

Unit	Name of the Topic	Hours
II	**SHEAR FORCE AND BENDING MOMENT** **2.1 TYPES OF LOADS AND BEAMS** Definitions of: Axial load, Transverse load, Concentrated (or) Point load, Uniformly Distributed load (UDL), Varying load – Types of Supports and Reactions: Simple support, Roller support, Hinged support, Fixed support; Vertical reaction, Horizontal reaction, Moment reaction- Types of Beams based on support conditions- Diagrammatic representation of beams, loads and supports– Static equilibrium equations – Determinate and indeterminate beams. **2.2 SHEAR FORCE AND BENDING MOMENT IN BEAMS** Definitions of Shear Force and Bending Moment – Conventional signs used for S.F. and B.M – S.F and B.M of general cases of determinate beams – S.F and B.M diagrams for Cantilevers, Simply supported beams and Over hanging beams – Position of maximum BM - Point of contra flexure – Derivation of Relation between intensity of load , S.F and B.M. – Numerical problems on S.F and B.M.(Determinate beams with concentrated loads and udl only)	**18 Hrs**
III	**GEOMETRICAL PROPERTIES OF SECTIONS** **3.1 CENTROID** Geometrical properties – Definitions and examples of Symmetrical, Anti Symmetrical, Asymmetrical shapes - Definitions of centre of gravity and centroid - Centroid of Symmetrical shapes (solid / hollow square, rectangular, circular, I Sections) - Centroid of Asymmetrical shapes (triangular, semi circular, quadrant, trapezoidal, parabolic sections) - Centroid of Anti Symmetric shapes (S , Z sections) – Built up structural sections - Problems **3.2 MOMENT OF INERTIA** Definitions of: Inertia, Moment of Inertia, Polar moment of inertia, Radius of gyration, Section Modulus, Polar modulus - Parallel and perpendicular axes theorems - Derivation of expressions for M.I / Polar M I, Section modulus and Radius of gyration of regular geometrical plane sections (rectangle, circle, triangle) – M.I about centroidal axis / base, Section modulus, Radius of gyration of symmetric, asymmetric, anti symmetric and built up sections – Numerical problems.	**14 Hrs**

Unit	Name of the Topic	Hours
IV	**STRESSES IN BEAMS AND SHAFTS** **4.1 STRESSES IN BEAMS DUE TO BENDING** Types of Bending stresses – Neutral axis – Theory of simple bending – Assumptions – Moment of resistance – Derivation of flexure/bending equation $M / I = E / R = \sigma/y$ – Bending stress distribution – Curvature of beam – Position of N.A and centroidal axis – Stiffness equation – Flexural rigidity – Strength equation – Significance of Section modulus – Numerical problems. **4.2 STRESS IN SHAFTS DUE TO TORSION** Definitions of: Shaft, Couple, Torque (or) Twisting moment - Types of Shafts (one end fixed and the other rotating, both ends rotating at different speeds) - Theory of Pure Torsion – Assumptions -Derivation of Torsion equation, $T / I_p = \lambda_{max} / R = G\Theta / l$ - Shear stress distribution in circular section due to torsion - Strength and Stiffness of shafts – Torsional rigidity - Torsional modulus - Comparative analysis of hollow and solid shafts - Power transmitted by a shaft - Numerical problems.	**16 Hrs**
V	**PIN JOINTED FRAMES** **5.1 ANALYSIS BY ANALYTICAL METHOD (METHOD OF JOINTS)** Definitions of: Frame / Truss, Pin Joint, Nodes, Rafters, Ties, Struts, Slings - Determinate and indeterminate frames - Classification of frames - Perfect and imperfect frames – Deficient / Instable and redundant frames - Formulation of a perfect frame - Common types of trusses - Support conditions - Resolution of a force - Designation of a force - Nature of forces in the frame members - Analysis of Frames – Assumptions - Methods of analysis - Analytical methods - Method of Joints and Method of Sections - Problems on Analysis of cantilever and simply supported perfect frames (with not more than ten members) with vertical nodal loads by method of joints only. Identification of members with nil force in a determinate truss. **5.2 ANALYSIS BY GRAPHICAL METHOD** Graphic statics - Advantages - Space diagram - Bow's notation-Resultant force (or) Equivalent force -Equilibrant force - Vector diagram - Determination of magnitude and nature of forces in the members of a cantilever / simply supported determinate trusses (with not more than ten members) with vertical nodal loads only.	**16 Hrs**

Reference Book :

1) R.S.Khurmi "Strength of Materials", S.Chand & Company Ltd, New Delhi
2) S.Ramamirtham, "Strength of Materials", Dhanpat Rai (2003)
3) Vazirani & Ratwani, "Analysis of Structures-Vol 1", Khanna Publishers(2003)
4) S.B.Junnarkar, "Mechanics of Structures- Vol 1",
5) Sanchayan Mukherjee, "Elements of Engineering Mechanics", PHI Learning Pvt Ltd
6) R K Bansal, " Engineering Mechanics", Laxmi Publications Pvt.Ltd.,

21031 ENGINEERING MECHANICS

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Define the term “Ductility”

2. Name the three types of basic stresses.

3. State Hooke’s law.

4. Write the Young’s modulus values of any two materials.

5. Write examples of an uniformly distributed load and a point load with respect to beams.

6. When a support is called “fixed”?

7. How we call the point of zero bending moment in a beam?

8. Where the SF and BM are maximum in a cantilever beam?

9. What principle is applied in the determination of position of centroid of a section?

10. What is meant by centroidal axis?.

11. State perpendicular axes theorem.

12. Write the expression for the polar moment of inertia of a hollow circle.

13. What will be the magnitude of bending stress at the cetroidal axis of section due to flexure?

14. Write the relationship between E,R,I and M with respect to a beam.

15. Where the stress due to torque will be maximum in the cross section of a shaft?

16. Write the expression for the power transmitted by a rotating shaft.

17. Write the condition for perfect frame.

18. When the joint of a frame is called a “pin joint” ?

19. When you draw a “polar diagram”?.

20. How you select a joint for resolution in the analysis of a truss?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. A. i) Draw the stress-strain curve of a ductile material and name the salient points.

ii) A bar of 12 mm diameter extends 1.0mm in 500 mm length under an axial tension of 26kN. Find the Young's modulus of the material.

OR

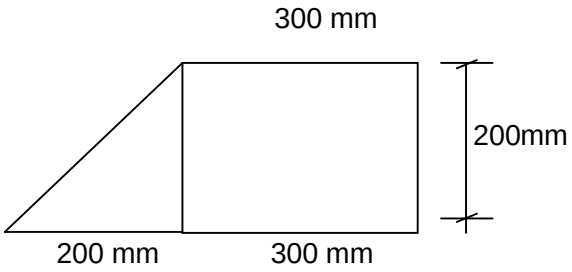
B. Drive an expression for the volumetric strain of a prismatic bar due to uni-axial stress, assuming load as P, length of bar as L, area of cross section as A, modulus of elasticity as E and Poisson's ratio of the material as "Y". Now determine the change in volume of the bar if P=15 kN; L=1.2 m; A=300 mm^2; E= $2.1x10^5$ MPa and v = 0.3.

22. A. A simply supported beam of 12m span carries two point loads of 25kN and 40kN at 5m and 8m respectively from the left support in addition to its self weight of 2kN/m. Draw the SF and BM diagrams for the beam.

OR

B. An overhanging beam of 8 metre length is supported at its left end and at 2m from its right end. The supported length of the beam carries an udl of 24 kN/m. A point load of 30kN is acting at the right end. Draw the SF and BM diagrams for the beam.

23. A. Find the position of centroid of the trapezium shown in the figure (direct formula shall not be used)



OR

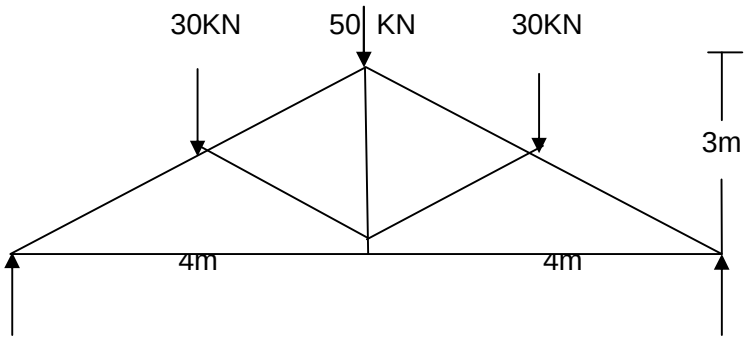
B. An I- section of top flange 200x12 mm, bottom flange 400x16mm has its clear web size 572x10mm, symmetrically placed, so that its overall depth is 600mm. Find the moment of inertia of the section about its major axis.

24. A. Drive the bending equation.

OR

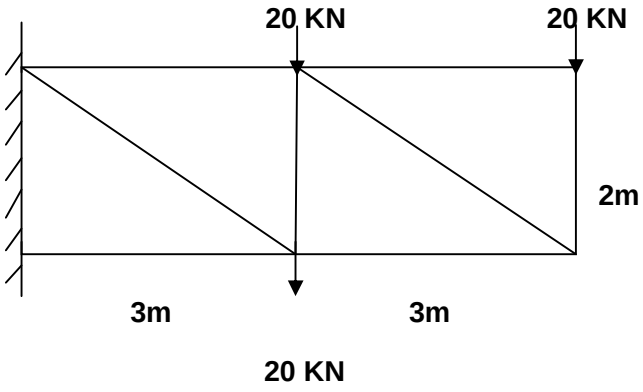
B. Determine the maximum power a hollow circular shaft of 120mm external diameter and 60mm internal diameter can transmit at a speed of 240 rpm if the shear stress in the shaft shall not exceed 80 N/mm^2. Assume maximum torque as 1.25 times the mean torque.

25. A. Determine the magnitude and nature of the forces in all the members of the truss shown in the sketch by method of joints. (Any frame having less than 10 members)



OR

B. Determine the forces in the members of the cantilever frame shown in the sketch by graphical method. (Any frame having less than 10 members)



21031 ENGINEERING MECHANICS

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Define the term “Stiffness”
2. What do you mean by “Diagonal tension”?.
3. Differentiate Ultimate stress and Breaking stress.
4. Define the term “modular ratio”.
5. What will be the difference in performance of a roller support from hinged support?
6. State the three static equilibrium equations.
7. What is the difference between sagging BM and hogging BM?
8. Where the sagging BM will be maximum in a simply supported beam with symmetrical loads?
9. State the position of centroid of a semi circle?
10. Give an example for Anti-symmetric shape.
11. What will be the MI of rectangular section about its base?.
12. Define the term “Polar modulus” of a cross-section.
13. Write an expression for the curvature of a beam from flexure equation
14. What is meant by flexural rigidity of a section?
15. What is meant by pure torsion?.
16. What will be the nature of stress in a shaft subjected to pure torsion?.
17. When a pin jointed frame is called a redundant frame?.
18. How a long span roof truss has to be supported at its ends to reduce overall buckling?
19. What a vector diagram represents?
20. Why loads are generally placed on the nodal points of the frame?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. A.) i) Differentiate the properties "rigidity" and "elasticity" of materials?.

ii) A brass bar of 10 mm diameter and 500 mm length is under an axial tension of 10kN. Its length increases by 0.6mm and diameter reduces by 0.003mm. Find the value of rigidity modulus of the material.

OR

B. A stepped bar of 1.2 metre length is 100mmx200mm size in the first 400mm length; 200mmx300 mm in the next 400mm, and 300mmx400mm in the remaining length. The bar is subjected to an axial compression of 1200kN. The Young's modulus of the material is $0.125x10^6$ N/mm^2. Determine the maximum and minimum stresses in the bar and decrease in its length.

22. A. (i) Discuss the different types of supports provided for horizontal beams.
(ii) How you identify beams as statically determinate? Explain with an example.

OR

B. An overhanging beam of 6 metre length is supported at 4 metre interval with equal overhangs on either end. The supported length of the beam carries an udl of 20 kN/m. The beam carries a point load of 30kN on the left end and another point load of 10 kN on the right end. Draw the SF and BM diagrams for the beam.

23. A. An angle section 200x110x10mm has a horizontal leg of 200mmx10mm size and a vertical leg of 100mmx10mm size. Find the position of cetroid of the section.

OR

B. Derive from first principle, an expression for the moment of inertia of a circle about its cetroidal axes and hence write expressions for section modulus and polar modulus of circles.

24. A. A mild steel strap of 120mmx 6 mm size is wound round a wooden wheel of 8 metre diameter and 120 mm width. The modulus of elasticity of steel is $2x10^{11}$ Pa. Determine the maximum bending stress developed in the strap.

OR

B. A hollow circular shaft of 120mm external dia and 80mm internal dia has a torque resisting capacity of 18 kN.m. Determine the torque resisting capacity of a solid shaft of 60 mm dia of same material.

25. A. Determine the magnitude and nature of the forces in all the members of the cantilever truss shown in the sketch by method of joints. (Any frame having less than 10 members)

OR

B. Determine the forces in the members of the simply supported frame shown in the sketch by graphical method. (Any frame having less than 10 members).

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME

2011 - 2012

CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21032**
Semester : III Semester
Subject Title : **CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE	5 Hrs	80 Hrs	25	75	100	3 Hrs

Objectives:

On completion of the course, the student will be familiar to:

- State different construction materials and their properties.
- Explain different types of cement, grades of cements and tests on cement.
- State and explain different types of modern building materials such as ceramic products, glass, metals and plastics.
- Explain method of preparation of mortar and cement concrete.
- State the different types of structures.
- Describe the different types of foundations.
- Describe the classification of stone masonry & brick masonry.
- State the different types of doors, windows, lintels & stairs.
- Describe the types of floors and roofs.
- Describe the different methods of pointing, plastering and termite proofing.
- Explain the methods of scaffolding, shoring & underpinning and form work.
- Describe procedure of colour washing , white washing , painting and varnishing.

21032 CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**1.1 INTRODUCTION** Physical properties of materials – Density, Bulk density, Specific gravity, porosity, water absorption, permeability, chemical resistance, fire resistance, weathering resistance, thermal conductivity, Durability. (Definitions only) **1.2 ROCKS AND STONES** Rocks – Classification of Rocks – Geological, Physical and Chemical classification – Uses of stones – Requirements of a good building stone – Natural stones for flooring – Cuddappa slabs, Kota stone, Sand stone, Shahabad stone , Granite, Marble –Artificial stones. **1.3 BRICKS** Definition – Brick earth – Composition of good brick earth – Manufacturing process –classification of bricks – properties of bricks – special types of bricks and their uses –compressive strength of bricks –Tests on bricks - grade of bricks as per BIS **1.4 LIME AND POZZOLANAS** Sources of lime – classification lime – Fat, Hydraulic and Poor lime - uses of lime, Pozzolanic materials – Surki, Flyash, Ground blast furnace slag, Rice husk ash – Advantages of addition of pozzolanas **1.5 CEMENT** Definition – Composition of ordinary Portland cement – Functions of cement ingredients – Different types of cements – Grades of cement (33,43 and 53) –Storage of cement - Tests of cement – objects of each test – Test requirements/ BIS specifications of OPC - Admixtures – Definition –types and uses . **1.6 WATER** General – Limits of deleterious materials allowed in the water for construction – Use of Brackish or Sea water for construction- Estimation of sulphates in ground water – Test results on water for construction. **1.7 GLASS** Definition – Constituents of glass – Classification of glass – Functions and Utility – Types of glass – sizes and thickness – uses in buildings.	**15 Hrs**

Unit	Name of the Topic	Hours
I	**1.8 CERAMIC PRODUCTS** Definition – Earthenware , Stoneware , Porcelain , Terracotta, Glazing, Tiles (Definitions only) – Types of Tiles – Clay Terracing tiles – Thermal care tiles – Glazed Ceramic tiles – Fully Vitrified tiles – Roof tiles – special requirements for floor, wall and roof tiles– Sanitary appliances.	
II	**2.1 MORTAR** Definition – Properties and uses of mortar – Types of mortar – Cement and Lime mortar – Mix ratio of cement mortars for different works. **2.2 CONCRETE** Definition – Constituents of concrete and their requirements – uses of concrete – Types of concrete: Lime concrete, cement concrete and light weight concrete. **2.3 PAINTS AND VARNISHES** Definition – Functions of paint – Types of paints and their uses - Oil, Enamel, Emulsion, Distemper, Cement,Aluminium, Bituminous and Plastic paints - Varnishes – Definition – Characteristics of a good varnish – Ingredients of varnish– Types of varnish and their uses –Oil, Turpentine , Spirit and water varnish **2.4 METALS AND PLASTICS** Types of metals used in construction – Cast Iron ,Steel, Aluminium, G I, Stainless steel – Market forms of steel – Steel for reinforced concrete - steel for pre stressed concrete –Hot rolled steel sections – cold formed light gauge section.- Plastics – Characteristics and Uses of plastics – Types – Thermoplastics and Thermosetting plastics – Various plastic products: pipes, taps, tubs, basins, doors, windows, water tanks, partitions – sizes , capacity and uses - Advantages of plastics – UPVC pipes and fittings - Asbestos - uses of asbestos. **2.5 TIMBER AND TIMBER PRODUCTS** Types of Timber – Teak, Sal, Rosewood, Mango, and Jack – Defects in timber – seasoning of timber - objectives – Timber Products – Veeners , Ply woods , Particle Board , Fibre board, Hard board, Block board, Laminated board – Uses. **2.6 ROOF COVERINGS** Definition – objectives and uses -Mangalore tiles – AC Sheets – FRB Sheets- G.I. sheets- Shell roof – R C C roof – Advantages – Types. **2.7 DAMP PROOFING MATERIALS** Materials used for damp proofing – Properties and functions of various types of water proofing materials commonly available – chemicals used for grouting / Coating porous concrete surfaces – Admixtures for cement mortar and cement concrete – Functions of Admixtures – Accelerators, Retarders, Air repelling chemicals.	**14 Hrs**

Unit	Name of the Topic	Hours
III	**3.1 INTRODUCTION** Permanent and temporary structures – Life of structures – Sub structure – super structure – load bearing structure – framed structure – concept of framed structure – advantages of framed structure. **3.2 FOUNDATION** Definition – objectives of foundation – Bearing capacity of soil – Definition – maximum/ultimate and safe bearing capacity - Bearing capacity of different types of soils – Factors affecting bearing capacity – Requirements of a good foundation – Types of foundations – Shallow foundation : Spread foundation, Isolated column footing, combined footing, continuous footing, Raft foundation – Deep foundation : Pile, Stone columns – Types of piles : Bearing pile, Friction pile, under reamed pile – Causes of failure of foundation – Remedial measures. **3.3 STONE MASONRY** Definition – Common terms used : Natural bed, sill, corbel, course, cornice, coping,weathering, throat, spalls, quoins, string course, lacing course, through stone, plinth, jambs – Classification of stone masonry – Rubble masonry : Coursed, un coursed & Random rubble masonry – Ashlar masonry– points to be considered in the construction of stone masonry – Tools used – Trowel, square, sprit level, plumb bob,chisel line & pins, spall hammer, punch, pitching tool. **3.4 BRICK MASONRY** Definition – Common terms used – Header, stretcher, bed joint, lap, perpend, closer, king, queen& bevelled, bat – permissible loads in brick masonry - Bond - Types – Header, stretcher, English bond & Flemish bond – one brick thick and one and a half brick thick– 'T' junction in English bond –Points to be considered in the construction of brick masonry – Cavity bond masonry- Defects in brick masonry – Maintenance of brick masonry.- Reinforced brick masonry – purpose – Reinforced masonry walls – Masonry reinforced columns - Advantage with respect to strength and Earthquake resistance. **3.5 PARTITION** Definitions – Requirements of good partition walls – Types – Brick, Concrete, glass, Aluminum frame with Glass sheet, timber, straw board, wood wool, Asbestos Cement board and plastic board partitions. **3.6 WATER PROOFING AND DAMP PROOFING** Dampness – Causes of dampness – Effects of dampness - Damp proofing – Damp proof courses (DPC) –– Method of mixing – Bad effects of excessive Admixtures in RCC – Water proofing coats for sump / over head tank walls – Methods of grouting..	**16 Hrs**

Unit	Name of the Topic	Hours
IV	**4.1 DOORS, WINDOWS AND VENTILATORS** Standard sizes of doors and windows – Location of doors and windows – Different materials used – Doors – Component parts – Types – Framed and panelled – gazed, flush, louvered, collapsible, rolling shutter and sliding doors – Windows – Types – Casement, Glazed, Bay, Corner – Pivoted Circular and Dormer windows – Ventilators – Definition – purpose – Types – Mosquito proof – Ventilator combined with windows / doors. **4.2 HOLLOW BLOCK CONSTRUCTIONS** Hollow blocks – Advantages of hollow blocks – load bearing and non load bearing hollow blocks - – Open cavity blocks – face shells, web, gross area, nominal dimensions of blocks, minimum thickness of face shells and web, grades of hollow concrete blocks -Materials used, admixtures added – mixing, moulding, placing and compacting, curing, drying –Physical requirements – Use of light weight aggregates -Hollow concrete (Hollow Block) masonry –Construction of walls– Advantages of hollow concretes masonry . **4.3 STAIRS** Definition – Terms used – Location of stair – types – Straight, Dog legged, Open well, bifurcated and spiral stairs – Moving stairs (Escalators) – Lift – components – uses and advantage of lifts over stairs. **4.4 FLOORS AND FLOORING** Floors - Definition – Types – Timber, Composite, RCC floors – Flooring - Definition- Materials used – Selection of flooring – types – Construction Methods(As per C.P.W.D. Specifications)- Mosaic, Granolithic, Tiled, Granite, Marble, Pre cast concrete flooring, Plastic & PVC tile flooring- – Carpet tile & Rubber flooring. **4.5 ROOF** Definition –Types of roof – Flat roof – RCC roof – Pitched roof – Tile roof – Shell roof – Technical terms - Steel roof truss – Types: King post, Raised chord , Howe truss, Fan, fink , north light and Modified north light trusses. **4.6 WEATHERING COURSE** Weathering course –Purpose-Materials Required- Brick Jelly Concrete preparation – Laying procedure- Preparation of mortar with Damp Proof materials for laying pressed clay tiles- Pointing and finishing of laid clay tiles.	**15 Hrs**

Unit	Name of the Topic	Hours
V	**5.1 POINTING** Objectives – Mortar for pointing – Methods of pointing(As per C.P.W.D. Specifications) – Types of pointing – Flush, recessed, weathered, keyed or grooved pointing. **5.2 PLASTERING** Definitions – Objectives – Cement mortars for Plastering - Requirements of a good plaster – Methods of Plastering- Defects in plastering- Stucco plastering –Acoustic plastering – Granites silicon- plastering – Barium plastering – Asbestos marble plastering – Facde finishing(Structural Glazing)Sand faced – Pebble dash – Wall paper finishing–Wall tiling. **5.4 WHITE WASHING, COLOUR WASHING , DISTEMPERING, PAINTING & VARNISHING** White washing – preparation of surface – Application of white wash – Colour washing - Distempering – Preparation of surfaces – Application of distemper- Painting & Varnishing **-**Preparation of surface – Application of Painting & Varnishing. **5.5 ANTI TERMITE TREATMENT** Definition – objectives and uses – Methods of termite treatment. **5.6 SCAFFOLDING, SHORING AND UNDER PINNING** Scaffolding – Definition – Component parts – Types – Single, double & Steel scaffolding, Shoring – Definition – Types – Raking, flying and dead shores – Underpinning – definition – Purpose – Types – Pit Methods – Pile Method. **5.7 FORM WORK** Definition – Materials used – Requirements of a good form work – Form work for column, RC beams and RC slab. **TEST & REVISION**	**15 Hrs** **5 Hrs**

Reference Book :

1. P.C.Varghese, “Building Materials”, Prentice-Hall of India (P) Ltd., I Edition, 2011.
2. S.K.Duggal, “Building Materials”, New Age International (P) Ltd., II Edition, 2003.
3. S.C.Rangwala, “ Building Materials”,Charotar Publishing House, VII Edition, 1982.
4. P.C.Varghese, “BuildingConstructions”, Prentice-Hall of India (P) Ltd., I Edition, 2011.
5. Dr. B.C. Punmia, “Building Construction”, Laxmi publications (p)Ltd New Delhi.
6. S.C.Rangwala, “ Building Construction”,Charotar Publishing House, VII Edition.
7. Ashokkumar Jain, “Building Construction”, Laxmi publications (p)Ltd Chennai.
8. I S 2185 Part I & II
9. PWD & CPWD Specifications.

21032 CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Why weathering course is laid on the top of roof slab?
2. List out the artificial stones used for flooring.
3. What are the uses of quick lime?
4. Define shakes?
5. What do you mean by framed structure?
6. Define asbestos?
7. What is meant by bond?
8. Define ceramics?
9. Define curtain wall.
10. Define partition.
11. What is meant by D.P.C?
12. Write short note on the dado?
13. Define core block?
14. Define Ferro cement?
15. What is meant by composite floor?
16. Define truss.
17. Define bifurcated stair?
18. Name any two types of pointing?
19. What do you mean by flaking?
20. What are the super imposed wads which come on a form work?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. A.) What are the various stages in the manufacture of brick and explain them. 12

OR

B. (i) What are the different types of shallow foundation and explain any two. 8
(ii) What ate the requirements of a good building stone? 4

22. A. (i) Explain the construction details an English bond and with neat sketches. 6
(ii) What are the deleterious materials in water allowed for construction and their limits? 6

OR

B. List out the different types of doors and explain any 3 types with sketches 12

23. A. Explain with a neat sketch a king-post truss indicating the parts. 12

OR

B. with sketches the various types of composite floors 12

24. A. (i) Sketch and explain : a) Open well stairs, b) Dog-legged stairs. 6
(ii) Describe the various types of pointing with sketches. 6

OR

B. Explain any two different types of scaffoldings with neat sketches 12

25. A. Explain in detail about the types of flooring. 12

OR

B. Write in detail about the physical requirements of concrete blocks. 12

21032 CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. State any two stratified rocks.
2. Where is a pug mill used?
3. How is surki made?
4. What do you mean by OPC?
5. Name the different type of glass?
6. What is meant by curing of concrete?
7. Name the different type of glass?
8. Define Bearing capacity of a soil?
9. What are the two types of plastics?
10. What is meant by stone masonry?
11. Define Partition?
12. Expand D.P.C?
13. How are Bitumen sheets available?
14. Define Horn?
15. What is meant by Ferro cement?
16. What do you mean by composite floor
17. Define a flight?
18. State the purpose of Plaster?
19. Define Distempering?
20. What do you understand by the term anti-termites?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question
ii) All divisions carry equal marks.

21. A.) What are the various stages in the manufacture of brick and Explain them? 12

OR

B. (i) What are the different types of shallow Foundation and Explain any two? 8

(ii) What are the requirements of a good building stone? 4

22. A. (i) Explain the method of seasoning of timber? 6
(ii) Describe the properties of a mortar? 6

OR

B. (i) State the types of varnish and explain them. 6
(ii) Explain in detail the types of metals used in building construction? 6

23. A. Describe the points to be considered in the construction of Brick masonry? 12.

OR

B. Explain in detail about Admixtures and their Functions? 12

24. A. (i) Illustrate and explain the component parts of a stair? . 6
(ii) Describe the various types of roof coverings. 6

OR

B. Explain with sketches the various types of timber floors? 12

25. A. List out the technical terms used in pitched roof with a neat sketch and define each. 12

OR

B. (i) Write in detail about the defects in plastering. 6
(ii) Explain with a neat sketch any one type of scaffolding. 6

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME

2011 - 2012

SURVEYING I

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21033**
Semester : III Semester
Subject Title : **SURVEYING I**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
SURVEYING I	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be familiar with:

OBJECTIVES:

On completion of the course, the student will posses knowledge about :

- Chain surveying
- Compass surveying
- Levelling
- Contour surveying
- Global Positioning System

21033 SURVEYING I

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**INTRODUCTION TO SURVEYING AND CHAIN SURVEYING** **1.1 INTRODUCTION TO SURVEYING** Definition – Objectives and uses of surveying – Main Divisions of surveying – Plane and Geodetic surveying – Classification of Surveying - Principles of surveying. **1.2 CHAIN SURVEYING** Introduction – Instruments used for chaining – Chains and Tapes - Types – Definitions of terms commonly used in chain surveying : Survey stations, base line, check line and tie line - Ranging : Direct and Indirect ranging – Offsets : Definition, types, Instruments used and Procedure of taking an offset – Conventional signs – Chain surveying : Equipments required, field work and recording field notes – Errors in chaining - Obstacles in chaining : Types and Problems – Tape correction : Simple problems.	**14 Hrs**
II	**COMPASS SURVEYING** Angular measurements – Necessity – Instruments used – Prismatic compass **:** Construction details, functions and Temporary adjustment – Types of meridians - Types of bearings **:** Whole circle and Reduced bearings, Fore and Back bearings – Computation of included angles from bearings – Computation of bearings from included angles – Problems - Local attraction **:** Detection, Correction and Problems - Dip and declination – Compass traversing – Errors in compass surveying.	**14 Hrs**
III	**LEVELLING** Levelling – Definition – Level – Parts – Functions – Accessories – Types of levels **:** Dumpy level, Modern Tilting level, Quick setting level, Automatic and Laser level – Levelling staff **-** Types – Component parts of Levelling instrument – Definitions of terms used **:** Level surface, Horizontal and Vertical surfaces, Datum, Bench marks, Reduced level, Rise, Fall, Line of collimation, Axis of telescope, Axis of bubble tube, Station, Back sight, Fore sight, Intermediate sight, Change point, Height of instrument, Focusing and Parallax - Temporary adjustment of a level –Balancing Back sight and Foresight – Principle of levelling - Simple levelling– Theory of Differential levelling (Fly levelling) –Levelling field book - Reduction of levels – Height of collimation and Rise and Fall method – Comparison of methods – Problems on reduction of levels - Missing entry calculations **:** Problems.	**12 Hrs**

Unit	Name of the Topic	Hours
IV	**LEVELLING (CONTD.)** Types of levelling - Check levelling **:** Definition, Field Procedure and use - Profile levelling or Longitudinal section(L.S) **:** Definition, use, field procedure and plotting the profile - Cross-sectional levelling(C.S) **:** Definition, use, field procedure and plotting the cross-section – Specimen field book for L.S and C.S - Reciprocal levelling **:** Definition, use and problems on difference in elevation - Curvature and Refraction **:** Effects, correction and problems – Errors in levelling - Fundamental lines and desired relationship between them – Permanent adjustments of a dumpy level **:** Process.	**14 Hrs**
V	**CONTOUR SURVEYING AND GLOBAL POSITIONING SYSTEM** **5.1 CONTOUR SURVEYING** Definition – Contour – Contouring – Characteristics of contours – Methods of contouring – Direct and Indirect methods – Tacheometric contouring - Interpolation of contours – Different methods – Contour gradient – Uses of contour plan and map – Calculation of capacity of reservoir **:** Simple problems. **5.2 GLOBAL POSITIONING SYSTEM (GPS)** Introduction - Maps – Types of Maps – Various Satellites used by GPS – Differential GPS - Fundamentals of GPS – Application of GPS – GPS Receivers – Hand held GPS Receiver – Function – Field procedure – Observation and processing applications in Civil Engineering. **TEST & REVISION**	**14 Hrs** **12 Hrs**

Reference Book :

1. Kanetkar.T.P. & S.V.Kulkarni, “Surveying and Levelling Part 1 & 2 ”, Puna vidyarthi griha, Prakashan, 23rd edition, 2008.
2. Punmia.B.C. Ashok K.Jain & Arun K. Jain, ”Surveying Volume I ”, Laxmi Publications Private Limited, 16th edition, 2011.
3. Mimi Das Saikia, Bhargab Mohan Das & Madan Mohan Das, “Surveying”, PHI Learning Private Limited, Edition 2010.
4. S. K. Roy, “Fundamentals of Surveying”, PHI Learning Private Limited, Edition 2010.
5. Learning Material Development Project – NITTTR, Taramani, Chennai, CD programme on GPS and GIS

21033 SURVEYING I

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. What is the primary objective of surveying?
2. State any one principle of surveying.
3. What is meant by perpendicular offset?
4. State the formula for Pull in tape correction.
5. Define the term True meridian.
6. State the relation between fore bearing and back bearing.
7. The whole circle bearing of a line is **275º**. Convert the value to reduced bearing.
8. What is Local attraction?
9. State the abbreviation for M.S.L.
10. Define the term Bench mark.
11. What do you mean by Parallax?
12. State the error eliminated by balancing B.S and F.S distances.
13. What is the purpose of running Check levelling?
14. Give one example where Profile levelling is adopted.
15. State the formula for correction due to Curvature.
16. State any one instrumental error in levelling.
17. State any one method of Interpolation of contours.
18. Define the term Contour gradient.
19. What are the three measurements required using GPS receiver, to locate the position of a point?
20. State any one application of GPS.

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. A.) i) Briefly explain the procedure of ranging by direct method. 6
ii) Briefly explain how a cross-staff is used to set perpendicular offsets. 6

OR

B. (i) Define the following terms : Base line, Check line and Tie line. 3

(ii) A survey line intersects a tall building. To continue the line PQ, a line QR of length 120m was set out at right angles to PQ. From R, two lines RS and RT making angles of 45º and 60º with RQ were ranged. Find the length of RS and RT in order that stations S and T may be in PQ produced. Also find the length of QS. 9

22. A. Draw a neat sketch of a prismatic compass and name the parts. Explain the functions of the components. 12

OR

B. The following bearings were observed in running a compass traverse. Calculate the interior angles of the traverse. Apply the required check. 12

LINE	**F.B**	**B.B**
AB	45º 15´	225º 15´
BC	123º 15´	303º 15´
CD	181º 00´	1º 00´
DA	289º 30´	109º 30´

23. A. Explain the temporary adjustments of a dumpy level. 12

OR

B. The following staff readings were observed with a level : 12

0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030 and 2.765.

The first reading was taken with the staff held upon a B.M. of elevation 132.135. The instrument have been moved after the second, fifth and eighth readings. Enter the readings in a field book form and reduce the level by rise and fall. Apply usual check.

24. A. What is Longitudinal sectioning? Explain the field procedure for carrying out L.S 12

OR

B. (i) A and B are two points on the opposite banks of a valley. The staff readings on A and B from one bank were 6.940 and 5.270. The level was shifted to other bank and the readings were 8.160 and 5.490. Find the true difference in level and R.L of B if the R.L of A is + 100.380 6

(ii) What are the fundamental lines of a level ? State the desired relationship between them. 6

25. A. Describe various characteristics of contours with neat sketches. 12

OR

B. (i) Briefly state the various satellite used by GPS. 6

(ii) Briefly explain three segments (Fundamental) on which GPS works 6

21033 SURVEYING I

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. What are the two primary divisions of surveying?
2. State the purpose of conducting Astronomical surveying.
3. Define the term Ranging.
4. Sketch the conventional sign for Survey station.
5. State the function of focusing stud in a prismatic compass.
6. Define the term magnetic meridian.
7. Convert the reduced bearing **S 42º 30´ W** into whole circle bearing.
8. Name any two attractive bodies which cause local attraction.
9. State the function of slow motion screw in a dumpy level.
10. Mention different types of leveling staff.
11. Define the term Line of collimation.
12. State the necessity of choosing change point in levelling operation.
13. Write the formula to find the true difference in level between two points in reciprocal levelling.
14. Define cross-sectional levelling.
15. What is the combined effect due to curvature and refraction?
16. The following is the desired relationship between the fundamental lines in a Dumpy level.
    "The axis of bubble tube need not be perpendicular to vertical axis" Is it True or False?
17. Define the term contour interval.
18. Sketch the contour line for a hill.
19. Mention different types of maps.
20. State three segments on which GPS works.

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. A.) i) Briefly state the classification of surveying based on field of surveying. 4
ii) Explain with a neat sketch the constructional details of 30m chain 8

OR

B. (i) Briefly explain the field works in chain surveying. 6
(ii) A 30m tape was standardized at a pull of 90 N. A line was measured with this tape under a pull of 210N and was found to be 167m. Find the true length of the line if the cross-sectional area of the tape is 1.8mm^2 and the young's modulus of elasticity of steel is 2.10 x 10^5 N/mm^2. 6

22. A (i) Draw Define the following : Whole circle bearing, Reduced bearing, Dip and Declination. 4
(ii) Explain the field procedure of running a closed compass traverse. 8

OR

B. The following bearings were observed in running a compass traverse in a place where local attraction is suspected. Calculate the interior angles of the traverse. Apply the required check. 12

LINE	**F.B**	**B.B**
AB	92º 30´	272º 30´
BC	10º 15´	190º 00´
CD	211º 00´	34º 00´
DE	112º 30´	288º00´
EA	15º 30´	197º 15´

At what stations do you suspect local attraction? Find the correct bearing.

23. A. Fly levels were run from a B.M. of R.L. 88.380 and the following readings were observed 12

B.S	3.260	5.280	4.720	7.080	6.350
F.S	4.160	3.920	5.780	6.440	3.200

Calculate the R.L of all the points by Height of collimation method. Apply usual check

OR

B. The following readings were taken from the page of an old level field book. Fill up the missing readings. Apply usual checks 12

Point	B.S	I.S	F.S	Rise	Fall	R.L
B.M	1.450					420.690
1		X			1.670	x
2		4.320				417.820
3		X				417.440
4		X		1.320		
5	4.230		x	2.520		
6		2.380				
7		X			1.040	422.090
8			x		x	420.820

24. A. (i) Define the following : Check levelling and Reciprocal levelling 4
(ii) Explain the field procedure to run reciprocal levelling 8

OR

B. (i) Briefly describe the procedure for Plotting Cross-sectioning. 6
(ii) A level was set up at a point C at a distance of 350 m from A and 750 m from B. The staff reading on the staff held at A was 1.650 and that on the staff held at B was 2.865. Find the true difference in elevations between A and B. Also find the R.L of B if the R.L of A was +105.000. 6

25. A. (i) State any five uses of contour maps. . 4
(ii) The area within the contour lines at the site of a reservoir and along the face of the proposed dam is as follows: 8

Contour (m)	490	495	500	505	510	515	520
Area (sq.m)	24000	32500	34750	36800	39500	41000	42250

Take 490m as the bottom level of the reservoir and calculate the capacity of reservoir by Trapezoidal rule and Prismoidal formula.

OR

B. (i) Briefly explain the various features of any one Handheld GPS receiver 8
(ii) State the applications of GPS. 4

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME

2011 - 2012

CIVIL ENGINEERING DRAWING I

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21034**
Semester : III Semester
Subject Title : **CIVIL ENGINEERING DRAWING I**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
CIVIL ENGINEERING DRAWING I	6 Hrs	96 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be :

- Able to study Conventions and Abbreviations;
- Able to prepare layout of buildings;
- Gain thorough knowledge of the rules, regulations and standards of buildings;
- Able to read the line sketch and prepare plan, sections and elevations of buildings; and gain thorough knowledge of planning various types of buildings**.**

Unit	Name of the Topic	Hours
I	**INTRODUCTION** **1 CONVENTIONS, SYMBOLS :** General – Conventions- Title block- Scales- Line work- Lettering- Symbols- Abbreviations	**3 Hrs**

Unit	Name of the Topic	Hours
	2. DRAWINGS 1. Standard symbols used in Civil Engineering Drawing. 2. Elevation of : (a) Fully panelled double leaf door. (b) Fully Panelled single leaf door (c) Flush door (d) Fully Panelled window with grill (e) Partly glazed and partly panelled window (f) Lean- to - roof (g) King post roof truss (h) Steel roof truss (i) Rain water Harvesting – Recharging into the ground (a) Shallow well sytem (b) Percolation pit system.	**12 Hrs**
	3 BUILDING BYE-LAWS AND SUBMISSION DRAWINGS Objects of bye-laws- Importance of bye-laws- Function of local authority- Set backs- Plot Coverage- Number of floors- Height of building- Built up Area- Floor space index- Views and details necessary for a civil engineering drawing- Site Plan – Necessity for Approval of plans from local body- Layout plan and key plan-Composition of submission drawing.	**6 Hrs**
II	**PLANNING** **1 PLANNING OF RESIDENTIAL BUILDINGS** Types of residential buildings- Usual requirements-Types of Rooms – Minimum Size requirement for each type of rooms -Furniture arrangement in each room- Position of stairs / lifts- Position of Doors/ Windows House drainage and Sanitary fittings – Sump/Water tanks- Plumbing Pipes -Preparation of line drawing for given requirements with dimensions, not to scale.	**6 Hrs**
	2 PLANNING OF INDUSTRIAL STRUCTURES Planning aspects - Requirements of industrial units - Sheets for pitched roof coverings – Rolling Shutters - Ramps- Stores- Public Toilets/ Bath rooms- Dining/ Resting rooms- Ventilation and Lighting - Preparation of line drawing for given requirement with measurements not to scale:	**3Hrs**

Unit	Name of the Topic	Hours
	3 PLANNING OF PUBLIC BUILDINGS Types of public buildings - Miscellaneous public buildings - General requirements of Public Buildings -Landscape architecture- Preparation of line plan with dimensions for the given requirements , not to scale.	**3 Hrs**
III	**BUILDING DRAWINGS** Preparation of plan, section and elevation of buildings with specifications for the given line drawing to suitable Scale: 1. A Reading room with R.C.C flat roof 2. A House with single bed room and attached bathroom with R.C.C. flat roof. 3. A residential building with two bed rooms with R.C.C. flat roof 4. A house with single bed and hall with partly tiled and partly R.C.C. flat roof. 5. A Two roomed house with RCC slope roof with gable ends 6. A House with fully tiled roof with hips and valleys 7 . A Small workshop with north light steel roof truss (6 to 10m Span) over R.C.C. Columns. 8 A Primary health center for rural area with R.C.C roof. 9. A Village Library building with R.C.C flat roof 10. A small Restaurant building with R.C.C flat roof 11. A Single storeyed School building with R.C.C flat roof 12. A Bank building with R.C.C flat roof **REVISION & TEST**	**54 Hrs** **9 Hrs**

SCHEME OF EXAMINATION

Part A - (Unit I & II -2 X 3 , Unit III -1 X 9) - 15 Marks

Part B - (Unit III) - 60 Marks

Reference Book :

1. National Building Code (NBC-2012)
2. TamilNadu District Municipal building rules and by-laws
3. B.P. Verma ,"Civil Engineering Drawing and house planning"
4. Dr N. Kumaraswamy and A. Kameswara Rao," Building Planning and Drawing",
5. G. Vaidhyanathan, I. Kulasekaran, G. sathish Kumar "Building Planning and Construction Companion",
6. S.C.Rangwala ,"Civil Engineering Drawing ",
7. V.R.Thothathri, "A Guide to Civil Engg Drawing.

21034 CIVIL ENGINEERING DRAWING I

MODEL QUESTION PAPER I

Time : Three Hours

(Maximum Marks : 75)

N.B. 1. Answer all questions under Part A in the drawing sheet supplied.
2. Answer question under Part B in the drawing sheet supplied.
3. The sketches under Part A should be drawn using pencil and drawing instruments, not necessarily to scale.
4. Any data, not given may be assumed suitably and should be indicated in the drawing.

PART A (15 marks)

I. Answer the following **(2 x 3 = 6)**

1. What is the main factor to be considered while planning?
2. Specify the minimum dimension for a living room in residential building as per the NBC standards.

II Sketch the elevation of a steel truss using the following details **(1 x 9 = 9)**

Wall thickness : 300 mm
Bottom tie member : 2 Nos flat 80 X 6 mm
Pitch of roof : 30^{o}
Strut : Single ISA 70 X45 X 8 mm
Principal rafter : Two ISA 80 X 50 X 8 mm
Cleat angle : 75 X 75 X 8 mm
Purlins : 125 X75 X 8 mm
All other ties : 60 mm X 10 mm flat
Roof covering : G.I. Sheet
Gusset Plate : 10 mm thick

PART B (60 marks)

III The sketch shows the line plan of "A two bed room house with R.C.C. roof". The dimensions noted therein indicate the clear dimensions between the inside walls. The specifications are given below:-

Foundation:-
Foundation shall be of C.C. !:4:8 mix, 1000 wide and 300 thick laid at 1100 below G.L. for all main walls and verandah retaining wall. It consists of two footings of size 700 X 400 and 500 X 400 in C.M. 1:6

Basement:-
The basement will be in brick work in C.M. 1:5, 300 mm wide and 600 thick above G.L. A Damp Proof course in C. M. 1:3, 20 thick will be provided for all walls.

Super Structure:-
All main walls will be in brick work in C.M. !:5, 200 mm thick. The inner partition walls in toilet will be 100 mm thick. The height of all the walls will be 3000 mm above floor level.

Roofing:-
The roofing will be R.C.C. 1:2:4 mix, 120 mm thick flat slab. Verandah slab will be of R.C.C. 1:2:4 mix, 100 thick at a height of 2600 mm from verandah floor level. A weathering course in brick jelly lime concrete plastered with mortar 1:5:9 mix, 75 mm thick will be provided.

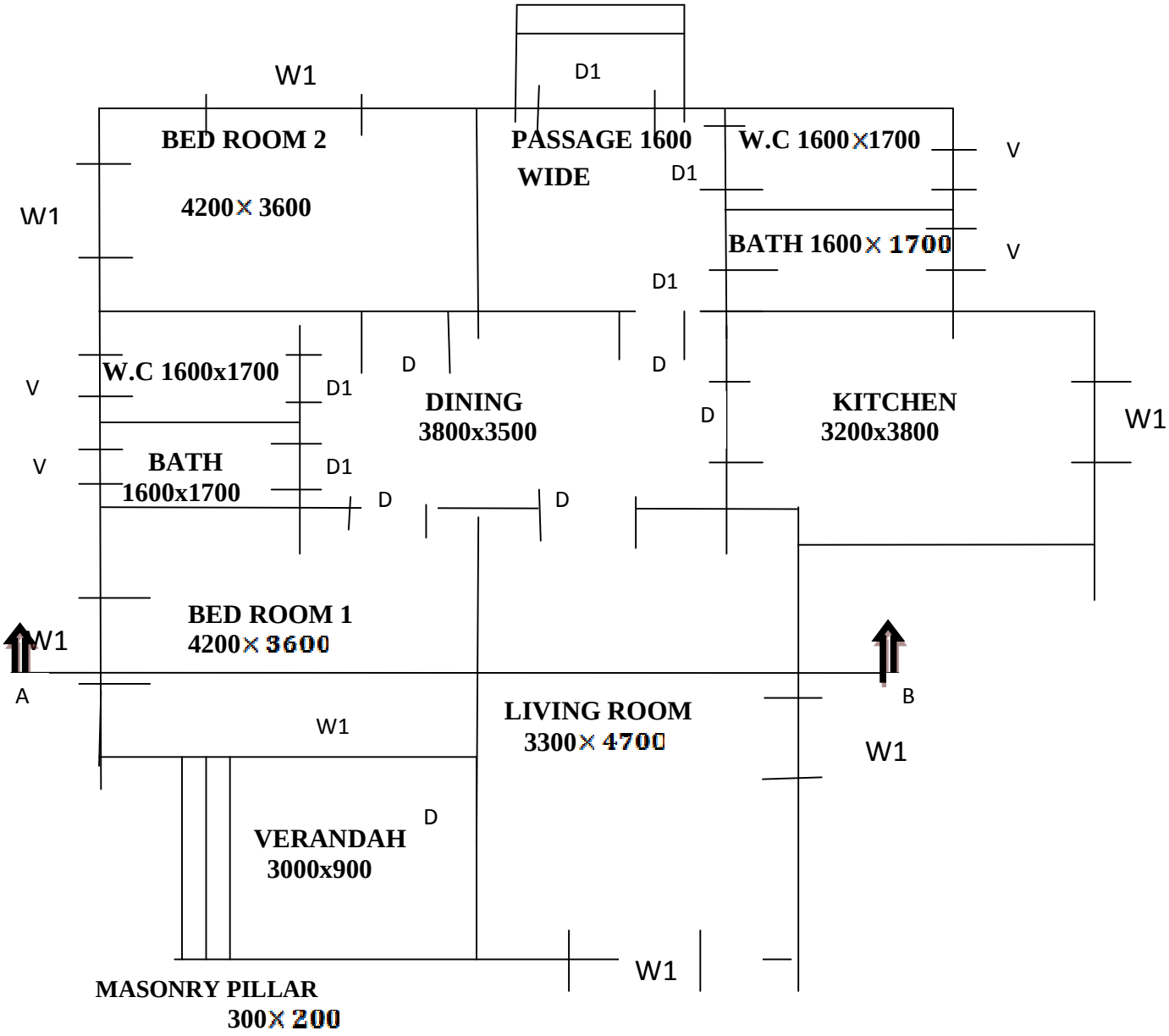
Lintels:-
R.C.C. lintel 120 thick over all the openings shall be provided. Suitable sunshades for all external openings shall be provided.

Flooring:-
The flooring will be in C.C. 1:4:8, 120 mm thick plastered smooth with C.M. 1:3, 20 mm thick for all the portions.

Steps:-
Provide steps of rise 150mm and tread 250 mm

Draw the following views to a suitable scale:-

a) Plan of the building - 20 Marks
b) Section on “AB” - 25 Marks
c) Front Elevation - 15 Marks



D FLUSH DOOR 1000× 2100
D1 PANELLED DOOR 900× 2100
W1 WINDOW GLAZED 1200× 1200
V VENTILATOR GLAZED 1200× 300
C CUP BOARD

LINE PLAN

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME

2011 - 2012

MATERIAL TESTING LAB I

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name	**:**	**DIPLOMA IN CIVIL ENGINEERING**
Course Code	:	1010
Subject Code	**:**	**21035**
Semester	**:**	III Semester
Subject Title	**:**	**MATERIAL TESTING LAB I**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
MATERIAL TESTING LAB PRACTICE I	3 Hrs	48 Hrs	25	75	100	3 Hrs

Objectives:

On completion of the course, the student will be familiar with:

- Study of UTM, Torsion testing machine, Hardness tester, Compression testing machine,
- To determine the Material Properties- test conducted on steel, wood, cement, Aluminium, Brass and Brick.

Unit	Name of the Topic	Hours
Part A	1. Tension test on mild steel and deformed steel bars. 2. Deflection test on Simply Supported Beams of (a) wood and (b) steel to find Young's modulus 3. Torsion test on mild steel bar to determine the Modulus of Rigid 4. Determination of the fineness of cement (Blains Permeability apparatus). 5. Initial and final setting time of cement with Vicat's Apparatus. 6. Determination of normal consistency of cement by Vicat's Apparatus. 7. Soundness test on cement by Autoclave method.	**18 Hrs**

Unit	Name of the Topic	Hours
Part B	. 8. Finding Brinnel's and Rockwell's hardness numbers of the following materials.. (a) Mild steel (b) Brass (c) Aluminum. 9. Compression Test on Wooden cube . 10. Double Shear test on M.S.bar. 11. Impact Test on mild steel by performing Izod and Charpy tests 12. Compression test on Bricks and Solid Blocks. 13. Water absorption test on Bricks and pressed tiles. 14. Flexure test on Tiles.	**18 Hrs**
Part C	**(Not for Examination)** **15.** Study of UTM, Torsion testing machine, Hardness testing Machine, Compression testing Machine etc. Drawing sketches and marking the components. **16.** Demonstration of Strain gauges and Strain indicators. **17.** Study of Strain Recording Instruments.	**6 Hrs**
	. **REVISION & TEST**	**6 Hrs**

SCHEME OF EXAMINATION:

1. In the examination the students have to be given two experiments one from Part A and another from Part-B by lot.

2. **Allocation of marks:**

Part - A	-	40	Marks.
Part - B	-	30	Marks.
Viva-Voce	-	05	Marks.
Record	-	25	Marks.
Total	**-**	**100**	Marks.

21035 MATERIAL TESTING LAB I

Model Question paper

Duration: **3 hours** Maximum Marks : 75

(The candidate has to be given any one of the following question by lot - No choice shall be given)

1(a) Conduct a tension test on the given M.S. Specimen and determine yield stress, breaking stress, ultimate stress, percentage elongation, and percentage reduction in area. (40 marks)

(b) Determine the Rockwell Hardness Number of the given Aluminium (30 marks)

2(a) Conduct a deflection test on the given M.S. beam and determine the value of Young's modulus of the material. Draw a graph "load Vs deflection". (40 marks)

(b) Conduct water absorption test on brick and determine the percentage water absorption of brick in 20 minutes. (30 marks)

3(a) Conduct a deflection test on wooden beam and determine the value of Young's Modulus of wood. Draw a graph "load Vs deflection" (40 marks)

(b) Conduct Rockwell's hardness test and determine the RHN of given Brass. (30 marks)

4(a) Determine the percentage of water required for preparing a paste of normal consistency of the given sample of cement. (40 marks)

(b) Conduct Brinell's hardness test and determine the BHN of mild steel (30 marks)

5(a) Determine the initial setting time of given cement. Write the procedure of finding the final setting time of cement (40 marks)

(b) Conduct a double shear test on the given steel rod and determine the ultimate shear strength of steel. Assuming a suitable f.o.s find the allowable shear stress. (30 marks)

6(a) Conduct a torsion test on the given specimen and determine the rigidity modulus of the material (40 marks)

(b) Determine the flexural strength of the given tile by conducting a bending test (30 marks)

7(a)Conduct Autoclave Expansion test on the given cement sample and find and find the percentage expansion in…..minutes. (40 marks)

(b) Conduct impact test on mild steel specimen and determine the impact value of the material (Izod or Charpy) (30 marks)

8(a) Conduct a Fineness test on the given cement sample in Blains Permeability apparatus and find its specific surface area . (40 marks)

(b) Conduct a compression test on the given wooden cube and find its ultimate strength parallel to its fibres. (30 marks)

9(a) Conduct a tension test on the given deformed steel bar and determine yield stress, breaking stress, ultimate stress, percentage elongation, and percentage reduction in area. (40 marks)

(b) Conduct a compression test on the given brick / solid block and determine its ultimate compressive strength. Assuming a F.O.S find the permissible stress for the brick. (30 marks)

ALLOCATION OF MARKS

S.No	Description	Part - A Max. Marks(40)	Part - B Max.Marks(30)
1	Procedure	5	5
2	Tabulation and Observation	15	10
3	Calculations	10	5
4	Sketch / Graph	5	5
5	Accuracy of result	5	5

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME

2011 - 2012

SURVEYING PRACTICE I

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21036**
Semester : III Semester
Subject Title : **SURVEYING PRACTICE I**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
SURVEYING PRACTICE I	6 Hrs	96 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student:

- will have experience in handling surveying equipments and do practical exercises in Chain surveying, Compass surveying, , Levelling and GPS.

Unit	Name of the Topic	Hours
Part A	**1 CHAIN SURVEYING** 1.1. Study of chain, tape and accessories used for chain survey. 1.2. Unfolding, Spreading, Aligning, Reading and Folding a chain. 1.3. Use of Cross staff – Taking offsets of objects and recording. 1.4. Chaining and ranging a line. 1.5. Determination of area of a plot using chains (Minimum two exercises – One base line and at least two offsets on either side of a chain line) 1.6. Chain survey traverse around a building and plot the existing building.	**15 Hrs**

Unit	Name of the Topic	Hours
	2 COMPASS SURVEYING 2.1 Study of Prismatic compass, setting up over a station and observe bearings of lines. 2.2. Running closed traverse and finding the included angles – Minimum 5 points. 2.3. Determination of distance between two points when their base is accessible. 2.4. Determination of distance between two points when their base is inaccessible.	**15 Hrs**
PART B	**3 LEVELLING** 3.1. Study of a Level - Temporary adjustment, taking readings and booking in a field book. 3.2. Fly levelling – Reduction by Height of Collimation method - Minimum 6 bench marks with two change points (Minimum Four exercises) 3.3. Fly levelling – Reduction by Rise and Fall method - Minimum 6 bench marks with two change points (Minimum Four exercises) 3.4. Fly levelling – with inverted readings. 3.5. Check levelling and reduction of levels (Minimum four exercises)	**42 Hrs**
PART C	**4 GLOBAL POSITIONING SYSTEM (GPS)** 4.1. Reading of various Maps like Taluk map and District map. 4.2. Study of Hand held GPS. 4.3. Measurement of Latitude, Longitude and Altitude using hand held GPS. 4.4. Selection and marking of routings (Way points) using hand held GPS. **REVISION & TEST**	**12 Hrs** **12 Hrs**

In Board Examination, questions will be chosen as follows:

PART – A	By Lot ONE question (Either in chain survey or compass survey)	- 25 Marks
PART – B	Levelling (Compulsory)	- 35 Marks
PART – C	ONE question from GPS	- 10 Marks
Viva-Voce		- 5 Marks
Record Marks		- 25 Marks
	TOTAL	**100 Marks**

ALLOCATION OF MARKS

S.No	Description	Part - A Max. Marks(25)	Part - B Max. Marks(35)	Part - C Max. Marks(10)
1	Procedure, Handling Instruments / Tools	5	5	3
2	Field works, Observation and Tabulation	10	15	5
3	Calculations and Check / drawings.	7	12	0
4	Accuracy of result	3	3	2

21036 - SURVEYING PRACTICE I

MODEL QUESTION PAPER

Time : Three hours **Maximum Marks** : 75

PART – A : By Lot (25 Marks)

1. Determine the area of a Plot marked on the ground (between 5/6 station points), by conducting chain survey. Use Cross-staff for taking offsets.
2. Run closed compass survey (between 5/6 station points) and find the included angles. Apply usual check.
3. Determine the distance between the two accessible points QR from the station point P. Use Prismatic Compass.
4. Determine the distance between the two points PQ from the base line AB of length 5m/10m. Use Prismatic Compass.

PART – B : Compulsory (35 Marks)

5. Run Fly level connecting the following bench marks and reduce their levels by Height of Collimation method / Rise and Fall method. Assume R.L of BM1 as 100.000m.

    1. BM1
    2. BM2
    3. BM3
    4. BM4 – Inverted reading
    5. BM5
    6. BM6
    7. BM7 - Inverted reading
    8. BM8
    9. BM9
    10. Close on the starting point.

PART – C : By Lot (10 Marks)

6. Measure Latitude, Longitude and Altitude and locate the position of any three points in the College campus. Use Handheld GPS.
7. Mark waypoints of a route (Say. College main building to Hostel building / College entrance to the Laboratory blocks etc.) and display the route map. Use Handheld GPS.

COMMON TO ALL BRANCHES

L - SCHEME

2011 - 2012

COMPUTER APPLICATIONS PRACTICAL

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **COMMON TO ALL BRANCHES**
Subject Code : **20001**
Semester : III Semester
Subject Title : **COMPUTER APPLICATIONS PRACTICAL**

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
COMPUTER APPLICATIONS PRACTICAL	4 Hrs	64 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student

- will understand the Windows operating systems
- Familiarize and customize the desktop
- Use the different facilities available in the word processor
- Analyze the data sheet
- Create and manipulate the database
- Prepare PowerPoint presentation
- Understand Internet concepts and usage of e-mail

GUIDELINES:

- All the eighteen experiments given in the list of experiments should be completed and all the experiments should included for the end semester practical examination.
- The end semester practical examination question paper contains two questions-the first question from section-I and the second question from section-II. Each question carries 35 marks and viva voce carries 5 marks.
- The computer systems should be 1:2 ratio for practical classes

ALLOCATION OF MARKS

1. Internal Assessment – 25 Marks

DESCRIPTION	MARKS ALLOTTED
Record with Printout	10
Assignment	5
Attendance	5
Model Examination	5
Total	**25 MARKS**

2. Board Examinations – 75 Marks

Content	Max. Marks	
	Section I	**Section II**
Writing steps	15	15
Execution of exercise	15	15
Result with Printout	5	5
Viva voce	5	
Total	**75 Marks**	

LAB EXERCISES

SECTION – I

WINDOWS

Introduction- History of Windows- screen saver and monitor resolution – Wallpaper setting- Folder manipulation – properties of a folder – Recycle bin – Short cuts – Sorting Folder – Switching between Application – Copying in CD/DVD settings – Recording Audio files.

Exercises

1. a. Installing screen saver and change the monitor resolution by 1280X960
   b. Setting wall papers
   c. Creating, moving, deleting and renaming a folder
   d. Copy, paste and cut a folder/file
   e. Displaying the properties for a file or folder
2. a. Restoring files and folders from Recycle bin
   b. Creating short cuts for folder/file
   c. Finding a file or folder by name
   d. Selecting and moving two or more files/folders using mouse
   e. Sorting folders/files.
3. a. Copying files into CD/DVD
   b. Switching between applications
   c. Making the taskbar wider and hiding the taskbar
   d. Recording and saving an audio file
   e. Set/Change the date and time.

WORD PROCESSING

Introduction – Menus – Tool bar – Create – Edit – Save – Alignment – Font Size – Formatting – Tables – Fill Colours – Mail Merge – Page Setup - Preview – Water marking – Header – Footer – Clip art.

Exercises

4. Create the following table and perform the operations given below

ABC PVT. LTD.

Chennai

Production Summary of various Units in every Quarter

Unit	Product – ID	Jan-Mar	Apr-June	July-Sept.	Oct-Dec.
Unit - I	56	234.	50	74	125
Unit - II	142	236	126	175	251
Unit - III	213	541	216	60	43
Unit - IV	125	243	127	250	136
Unit - V	143	152	138	80	45

- Arrange Unit name as left align and other columns as right align.
- Use doubled Border to the Summary Title and fill with 15% gray colour.
- Implement merging and splitting two or more cells
- Give alternative fore colour for columns.
- Print the above table.

5. Create a standard covering letter and use mail merge to generate the customized letters for applying to a job in various organizations. Also, create a database and generate labels for the applying organizations.

6. Create a news letter of three pages with two columns text. The first page contains some formatting bullets and numbers. Set the document background colour and add ‘confidential’ as the watermark. Give the document a title which should be displayed in the header. The header/ footer of the first page should be different from other two pages. Also, add author name and date/ time in the header. The footer should have the page number.

SPREADSHEET

Introduction – Menus – Tool bar – Create – Edit – Save – Formatting cells – Chart wizard – Fill Colours – Creating and using formulas – Sorting – Filtering.

Exercises

7. Create a result sheet containing Candidate's Register No., Name, Marks for six subjects. Calculate the total and result. The result must be calculated as below and failed candidates should be turned to red.

   Result is Distinction if Total >= 70 %

   First Class if Total > = 60 % and < 70 %

   Second Class if Total >= 50 % and < 60 %

   Pass if Total >= 35 % and < 50 %

   Fail otherwise

   Create a separate table based on class by using auto filter feature.

8. Create a table of records with columns as Name and Donation Amount. Donation amount should be formatted with two decimal places. There should be at least twenty records in the table. Create a conditional format to highlight the highest donation with blue colour and lowest donation with red colour. The table should have a heading.

9. Prepare line, bar and pie chart to illustrate the subject wise performance of the class for any one semester.

SECTION – II

DATABASE

Introduction – Menus – Tool bar – Create – Edit – Save – Data types – Insert – Delete – Update – View – Sorting and filtering – Queries – Report – Page setup – Print.

Exercises

10. Create Database to maintain at least 10 addresses of your class mates with the following constraints

    - Roll no. should be the primary key.
    - Name should be not null

11. Prepare a payroll for employee database of an organization with the following details:

    Employee Id, Employee name, Date of Birth, Department and

    Designation, Date of appointment, Basic pay, Dearness Allowance,

    House Rent Allowance and other deductions if any.

    Perform simple queries for different categories.

12. Design a pay slip for a particular employee from the above database

PRESENTATION

Introduction – Menus – Tool bar – Create – Edit – Save – Slide transition – Insert image – Hyper link – Slide numbers – View slide show with sound – Photo album – Clip art.

Exercises

13. Make a marketing presentation of any consumer product with at least 10 slides. Use different customized animation effects on pictures and clip art on any four of the ten slides.
14. Create a Presentation on "Communication Skills" with three different slide transitions with sound effect.
15. Create a photo album in PowerPoint.

INTERNET

Introduction – Browsers – Open a website – Email: Send, receive and delete – Email with Attachments Google docs – Search Engines – Searching topics

Exercises

16. Create an e-mail id and perform the following

- Write an e-mail inviting your friends to your Birthday Party.
- Make your own signature and add it to the e-mail message.
- Add a word attachment of the venue route
- Send the e-mail to at least 5 of your friends.

17. Create a presentation on Google docs. Ask your friend to review it and comment on it. Use "Discussion" option for your discussions on the presentation.
18. Find out the direction and distance about road travel from Delhi to Agra using the Internet search. Also make a report of the Map and other details like place to stay and visit at Agra.

MODEL QUESTION PAPER

Year / Sem: **II / III**	Subject: **COMPUTER APPLICATIONS PRACTICAL**	Code: **20001**
Answer all the questions		**Max.Marks:75**
1	**Section - I** Prepare line, bar and pie chart to illustrate the subject wise performance of the class for any one semester.	
2	**Section - II** Create an e-mail id and perform the following • Write an e-mail inviting your friends to your Birthday Party. • Make your own signature and add it to the e-mail message. • Add a word attachment of the venue route • Send the e-mail to at least 5 of your friends.	

LIST OF EQUIPMENTS AND THE QUANTITY REQUIRED FOR A BATCH OF 30 STUDENTS

SOFTWARE REQUIREMENTS

Operating System	Windows XP or Windows Vista or Windows 7 / Linux
Office Package	Microsoft office 2000 or Office 2003 or Office 2007/Open Office

HARDWARE REQUIREMENTS

Desktop Computer System with latest configuration	30 Nos
Power Backup (UPS)	10 KVA
Laser Printer	3 Nos

SAFETY PRECAUTIONS TO BE FOLLOWED BY STUDENTS

- Do not touch, connect or disconnect any plug or cable without teacher's permission
- Don't attempt to touch any live wires
- Systems should be shutdown properly after completion of work

REFERENCES

TITLE	AUTHOR	PUBLISHER	Year of Publication
Computer Applications Practical Manual	Dr.V.Karthikeyan Mr.D.Arulselvan	Learning Resource Centre, Thiagarajar Polytechnic College, Salem- 636 005	2012
Windows 7 in easy steps	Harshad kotecha	Tata McGrawHill	2011
A First Course in Computer 2003	Sanjay Sasena	Vikas Publications	2009
MS Office – 2003	Ramesh Bangia	Kanna Book Publication	2005
Introduction to Computers with MS-Office 2000	Alexis Leon & Mathews Leon	Tata McGraw-Hill	2002
Mastering Microsoft Office 2000	Gini Courter & Annette Marquis	BPB Publications	1999

IV SEMESTER

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

THEORY OF STRUCTURES

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21041**
Semester : IV Semester
Subject Title : **THEORY OF STRUCTURES**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
THEORY OF STRUCTURES	6 Hrs	96 Hrs	25	75	100	3 Hrs

Objectives:

On completion of the course, the student will be familiar with:

- Determine the Slope and Deflection of Determinate beams by area moment method.
- Analyse Propped cantilevers and Fixed beams by Area-Moment method and draw SFD, BMD.
- Analyse Continuous beams by Theorem of Three moments and draw SFD, BMD.
- Analyse Continuous beams, Portal frames and Substitute frames by Moment Distribution Method and draw SFD, BMD.
- Define different types of Columns and find critical loads of Columns.
- Analyse Columns and Chimneys subject to eccentric loading / moment / horizontal loads and find maximum and minimum combined stresses in their sections.
- Calculate maximum and minimum bearing pressures and check the stability of Masonry Dams and Retaining walls.

IV SEMESTER

21041 THEORY OF STRUCTURES

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**1.1 SLOPE AND DEFLECTION OF BEAMS** Deflected shapes / Elastic curves of beams with different support conditions –Definition of Slope and Deflection- Flexural rigidity and Stiffness of beams- Mohr's Theorems – Area Moment method for slope and deflection of beams – Derivation of expressions for maximum slope and maximum deflection of standard cases by area moment method for cantilever and simply supported beams subjected to symmetrical UDL & point loads – Numerical problems on slopes and deflections at salient points of Cantilevers and Simply supported beams from first principles **1.2 PROPPED CANTILEVERS** Statically determinate and indeterminate Structures- Stable and Unstable Structures- Degree of Indeterminacy-Concept of Analysis of Indeterminate beams - Definition of Prop –Types of Props- Prop reaction from deflection consideration – SF and BM diagrams by area moment method for UDL throughout the span, central and non-central concentrated loads – Propped cantilever with overhang – Point of Contra flexure.	18 Hrs
II	**2.1 FIXED BEAMS – AREA MOMENT METHOD** Introduction to fixed beam –Degree of indeterminacy of fixed beam- Sagging and Hogging bending moments – Determination of fixing end(support) moments(FEM) by Area Moment method – Derivation of Expressions for Standard cases – Fixed beams subjected to symmetrical and unsymmetrical concentrated loads and UDL – SF and BM diagrams for Fixed beams with supports at the same level (sinking of supports or supports at different levels are not included) – Points of Contra flexure – Problems- Slope and Deflection of fixed beams subjected to only symmetrical loads by area moment method – Problems.	18 Hrs

Unit	Name of the Topic	Hours
II	**2.2 CONTINUOUS BEAMS – THEOREM OF THREE MOMENTS METHOD** Introduction to continuous beams – Degree of indeterminacy of continuous beams with respect to number of spans and types of supports – Simple/Partially fixed/ Fixed supports of beams- General methods of analysis of Indeterminate structures – Clapeyron's theorem of three moments – Application of Clapeyron's theorem of three moments for the following cases – Two span beams with simply supported or fixed ends – Two span beams with one end fixed and the other end simply supported – Two span beams with one end simply supported or fixed and other end overhanging –Determination of Reactions at Supports- Application of Three moment equations to Three span Continuous Beams and Propped cantilevers –Problems- Sketching of SFD and BMD for all the above cases.	
III	**3.1 CONTINUOUS BEAMS – MOMENT DISTRIBUTION METHOD** Introduction to Carry over factor, Stiffness factor and Distribution factor – Stiffness Ratio or Relative Stiffness- Concept of distribution of un balanced moments at joints - Sign conventions – Application of M-D method to Continuous beams of two / three spans and to Propped cantilever (Maximum three cycles of distribution) –Finding Support Reactions- Problems - Sketching SFD and BMD for two / three span beams. **3.2 PORTAL FRAMES AND SUBSTITUTE FRAMES – MOMENT DISTRIBUTION METHOD** Definition of Frames – Types – Bays and Storey - Sketches of Single/Multi Storey Frames, Single/Multi Bay Frames- Portal Frame(Single storey, Single bay frame) – Sway and Non sway Frames- Analysis of Non sway (Symmetrical) Portal Frames for Joint moments by Moment Distribution Method and drawing BMD only– Definition of Framed Structure and Substitute frames – Analysis of a Two bay Substitute Frame(with either unequal spans or unequal loads, but with equal floor heights) for vertical load only by Moment Distribution method (maximum three cycles only) and drawing BMD for the beams (SFD not required).	18 Hrs

Unit	Name of the Topic	Hours
IV	**4.1 COLUMNS AND STRUTS** Columns and Struts – Definition – Short and Long columns – End conditions – Equivalent length / Effective length– Slenderness ratio – Axially loaded short column - Axially loaded long column – Euler's theory of long columns – Derivation of expression for Critical load of Columns with hinged ends – Expressions for other standard cases of end conditions (separate derivations not required) – Problems – Derivation of Rankine's formula for Crippling load of Columns– Factor of Safety- Safe load on Columns- Simple problems. **4.2 COMBINED BENDING AND DIRECT STRESSES** Direct and Indirect stresses – Combination of stresses – Eccentric loads on Columns – Effects of Eccentric loads / Moments on Short columns – Combined direct and bending stresses – Maximum and Minimum stresses in Sections– Problems – Conditions for no tension – Limit of eccentricity – Middle third rule – Core or Kern for square, rectangular and circular sections – Chimneys subjected to uniform wind pressure –Combined stresses in Chimneys due to Self weight and Wind load- Chimneys of Hollow square and Hollow circular cross sections only – Problem	16 Hrs
V	**5.1 MASONRY DAMS** Gravity Dams – Derivation of Expression for maximum and minimum stresses at Base – Stress distribution diagrams – Problems – Factors affecting Stability of masonry dams – Factor of safety- Problems on Stability of Dams– Minimum base width and maximum height of dam for no tension at base – Elementary profile of a dam – Minimum base width of elementary profile for no tension. **5.2 EARTH PRESSURE AND RETAINING WALLS** Definition – Angle of repose /Angle of Internal friction of soil– State of equilibrium of soil – Active and Passive earth pressures – Rankine's theory of earth pressure – Assumptions – Lateral earth pressure with level back fill / level surcharge – Earth pressure due to Submerged soils – (Soil retained on vertical back of wall only) – Maximum and minimum stresses at base– Stress distribution diagrams – Problems – Stability of earth retaining walls – Problems to check the stability of walls- Minimum base width for no tension. **REVISION & TEST**	16 Hrs 10 Hrs

REFERENCE :

1. S. Ramamrutham, "Theory of structures"
2. B.C. Punmia, Ashok Jain & Arun Jain," Theory of structures ",Laxmi Publications, 9th Edition, April1992.
3. S.B. Junnarkar, Mechanics of structures (Vol.II) Charator Publiching,22nd Edition,1997
4. V.N. Vazirani & M.M. Ratwani, "Analysis of structures"
5. R.L. Jindal , "Elementary Theory of Structures"
6. FV. Warnock, "Strength of materials"
7. Madhan Mohan Dass, " Structural Analysis" PHI Learning Pvt. Ltd., New Delhi.

21041 THEORY OF STRUCTURES

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Define the term “Slope”
2. What will be the deflection at mid span of a simply supported beam carrying udl ?
3. What do you mean by indeterminate structures ?
4. What will be the BM at a prop provided at the end of a cantilever ?
5. What will be the degree of indeterminacy of a fixed beam with only vertical loads ?
6. How many points of contra flexure will be there in a fixed beam ?
7. What is meant by partially fixed end? Where you can expect partial fixity ?
8. State Clapeyron’s theorem ?
9. Define “carry over factor”
10. Two members of same material, equal length, equal width and with same end condition meet at a joint. The depth of one member is bigger than that of other. Which member will have the larger value of distribution factor ?
11. What is meant by substitute frame ?
12. How many bays a Portal frame has ?
13. What do you mean by “Critical load” of a column ?
14. Define “Effective length” of a column
15. Differentiate direct stress and indirect stress
16. What will be the diameter of core of a circular section ?
17. Which are the main factors affecting the stability of a masonry dam ?
18. When tension is developed at the base of a dam ?
19. Which side of a retaining wall has passive earth pressure ?
20. At which point of the base the bearing pressure will be maximum in a retaining wall ?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. A.) A cantilever beam of length 4.0 m carries an u.d.l of 12 kN/m for a distance of 2.0 m from support and a point load of 15 kN at its free end. EI=7.2x10^4 kN.m^2. Find the slope and deflection at the free end of the beam by area-moment method. .

OR

B. A cantilever beam of length 4.0 m carries an u.d.l of 12 kN/m for a distance of 2.0 m from support and a point load of 15 kN at its free end. EI=7.2x10^4 kN.m^2. Find the slope and deflection at the free end of the beam by area-moment method. .

22. A. A fixed beam of 8 m span carries an u.d.l of 20kN/m on its full length and a point load of 40 kN at 2m from its left support. Draw the SF and BM diagrams..

OR

B. A two span continuous beam of 4m and 6m spans are fixed at both of its extreme ends. The size of the beam is uniform in both spans. The 4m span carries an u.d.l of 24kN/m throughout its length. The 6m span carries two point loads of 30 kN each at its one third points. Find out the support moments using theorem of three moments

23. A. A two span continuous beam ABC is fixed at support A and simply supported at support C. AB=8m; BC=4m. Span AB carries an u.d.l of 16kN/m; BC carries a central point load of 80kN. $I_{AB=}$ 1.5 $I_{BC.}$ Analyze the beam by moment distribution method and draw the BMD.

OR

B. Explain with neat sketches how substitute frames are assumed and analyzed in the case of multi storey buildings.

24. A. Two channel sections ISLC 300@331N/m of 5m length are placed back to back at a clear distance of 120mm and used as a column. The bottom end of the column is rigidly fixed and the top hinged. The geometrical properties of each channel are: A=4211 mm^2; D=300mm; b_f=100mm; t_f=11.6mm; t_w=6.7mm; C_y=25.5mm; I_{zz}=60.48x$10^6$$mm^4$; I_{yy}=2.46x$10^6$$mm^4$. Find the Euler's crippling load for the column. Assuming a factor of safety 2, find the safe permissible compressive stress in the cross section.

OR

B. A hollow rectangular cross section of a masonry pillar has the overall dimension 1600mmx1000mm. The wall thickness is 200mm. A vertical load of 600kN is resting on the pillar with eccentricities of 120mm from major axis and 80mm from minor axis. Determine the maximum and minimum stress in the cross section ignoring its self weight.

25. A. A gravity dam of trapezoidal cross section of 20m height stores water on its vertical face for 18 m height, with 2 m free board. The top and bottom widths of dam are 4m and 10m respectively. Draw the pressure distribution diagram at base. Specific weights of masonry and water are 20 kN/m^3 and 10 kN/m^3 respectively.

OR

B. A masonry retaining wall of 7.2 m height retains earth of unit weight 16 kN/m^3 and angle of repose 35^o up to its top. The width of wall is 1.2m at top, 1.2m at 1.0m depth and 4.2m at base. Check the wall for its stability and no tension at base. The co efficient of friction between wall and earth is 0.6. Unit weight of wall may be taken as 19 kN/m^3.

21041 THEORY OF STRUCTURES

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Draw the deflected shapes of any two beams.
2. Write the difference between roller and hinged supports
3. Where the bending moment is maximum in a propped cantilever subjected to u.d.l throughout.
4. Define " A prop "
5. Define : Free BMD
6. State any two advantages of a fixed beams
7. State any four methods of analysis of Indeterminate structures
8. State Clapeyron's theorem
9. Define carry over moment
10. Define distribution factor
11. What is a symmetrical portal frame ?
12. What do mean by sway and non-sway frames ?
13. Write any two assumptions made in Euler's theory of long columns
14. Define : Strut
15. State the effects of eccentric loading
16. Define : Core or Kern of a section
17. Draw the elementary profile of a masonry dam
18. On what basis the base width of a masonry dam is determined ?
19. Define : Angle of repose of soil
20. What will be the coefficient of passive earth pressure of soil having angle of repose 30° ?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. A.) A cantilever beam 120mm wide and 200mm deep is 3m long. What udl should the beam can carry to produce a deflection of 8mm at the free end. Take E = 210 GN/mm^2 .

OR

B. A cantilever of span 6m is supported by a rigid prop at the free end. It carries an udl of 20 KN/m throughout the span. Determine the prop reaction and the and the fixing moment. Draw SFD and BMD.

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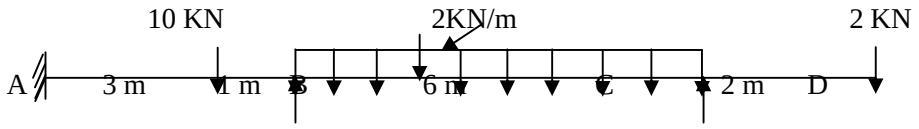
22. A. A fixed beam of span 6m carries point loads of 20KN and 15KN at 2m and 4m from the left end respectively. Find the support moments. Draw SFD and BMD.

OR

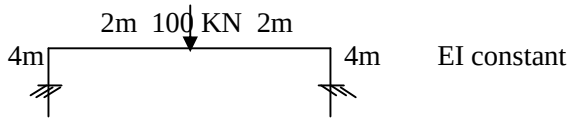
B. A two span continuous beam ABC of uniform flexural rigidity is subjected to udl of w/unit length. The two spans AB = BC = l . Determine the support moment at B using Clapeyron's theorem of three moments. The supports A and B are simply Supported.

23. A. Analyse the continuous beam shown in fig. by moment distribution method. Find the support moments and draw the BMD. Assume EI as constant.



OR

B. For the portal frame shown in fig. compute the bending moments by moment distribution and draw BMD



24. A. A hollow C I column whose outside diameter is 200 mm has a thickness of 25 mm. It is 4.5m long and is fixed at both the ends. Calculate the safe load by Rankine's formula using a factor of safety 3 , if a = 1/7500 , E = 2.1 x 10^5 N/mm^2 and yield stress is 330 N/mm^2 .

OR

B. A rectangular column 300 mm wide and 250 mm thick is carrying a vertical load of 100 KN , acting at an eccentricity of 50 mm in a plane bisecting the thickness. Determine the maximum and minimum stress developed.

25. A. A trapezoidal masonry dam 3m wide at top , 12m wide at the base is 18 m high. It retains water upto a depth of 17 m on its vertical face. Check the stability of the dam for sliding if, $\mu = 0.6$ and F.O.S = 1.5. Take the weight of masonry as $20KN/m^3$ and that of water as $10KN/m^3$

OR

B. A retaining wall trapezoidal in section is 8 m high, 1 m wide at top and 3 m wide at the bottom with a vertical earth face retaining earth level with the top of the wall. If the weight of the masonry is 24 KN/m^3 and that of the earth is18 KN/m^3 with an angle of repose of 30° , calculate the maximum and minimum stress at the base.

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

TRANSPORTATION EENGINEERING

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name	**:**	**DIPLOMA IN CIVIL ENGINEERING**
Course Code	:	1010
Subject Code	**:**	**21042**
Semester	**:**	IV Semester
Subject Title	**:**	**TRANSPORTATION ENGINEERING**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
TRANSPORTATION ENGINEERING	5 Hrs	80 Hrs	25	75	100	3 Hrs

Objectives:

On completion of the course, the student will be familiar with:

- To study about the importance of the roads , Development of roads, Classification of roads
- To know about highway pavements , Geometrical design , Traffic controls , Road Arboriculture and Highway Lighting
- To study about highway alignment , Road machineries and Construction of different types of Roads
- To study about Railway fixtures , Types of stations , Signalling and Control of movement of trains
- To study about Maintenance of Track and Rapid Transport System of Railways
- To Know about Bridges , Classifications and its Components

21042 TRANSPORTATION ENGINEERING

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**HIGHWAY ENGINEERING** **1.1 INTRODUCTION** General – Development of Roads in India - Modes of transportation - Nagpur Plan - Ribbon development - Advantages of Roads - Importance of roads in India - Requirements of an ideal road - Indian Road Congress - Objects of Highway planning - Classifications of Highways. **1.2 HIGHWAY PAVEMENTS** Objectives - Types of Pavement - Flexible and Rigid Pavements - Comparative study of Flexible and Rigid pavements - Factors affecting the design of pavements - Other types of pavements (Description not reqd.) **1.3 GEOMETRICAL DESIGN OF HIGHWAYS** General - Road structure - Right of way - Land width - Width of formation - Road Camber - Super elevation - Sight distances - Road gradient - Road Curves - Horizontal curves - Vertical curves - Types - Widening of pavement on horizontal curves. **1.4 TRAFFIC ENGINEERING** Objectives - Traffic surveys - Road accidents - Causes of road accidents - Preventive measures - Parking - Methods of parking - Road junctions (Grade intersections and Grade separators) - Traffic signals - Advantages - Types of road signs - Expressways. **1.5 SUB GRADE SOIL** Significance - Soil mass as a three phase system - Grain size classification - Atterberg limits - Definition and description - I S Classification of soils - Compaction - Standard Proctor Compaction test - Shear strength - Direct shear test. **1.6 ROAD ARBORICULTURE AND LIGHTING** Objects of Arboriculture - Selection of trees - Location of trees - Highway lighting - Benefits.	14 Hrs

Unit	Name of the Topic	Hours
II	**HIGHWAY ENGINEERING** **2.1 HIGHWAY ALIGNMENT AND SURVEYS** Definition - Principles for ideal highway alignment - Factors affecting highway alignment - Surveys - Engineering surveys - Reconnaissance, Preliminary and Location surveys - Project Report and Drawings - Highway Re-alignment projects. **2.2 ROAD MACHINERIES** Excavating equipments - Tractor, Bull dozer, Grader, Scraper, J C B - Compaction equipments - Road roller - Types and description - Equipments for Bituminous road (Description not reqd.) **2.3 LOW COST ROADS** General - Classifications - Earthen road, Gravel road, Water Bound Macadam roads - Construction with sketches - Advantages and disadvantages - Maintenance - Soil stabilization - Methods. **2.4 BITUMINOUS ROADS** General - Advantages and disadvantages - Bituminous materials used - Types of Bituminous roads - Surface dressing - Types - Bituminous Concrete - Maintenance of Bituminous roads. **2.5 CEMENT CONCRETE ROADS** General - Advantages and disadvantages - Methods of construction of cement concrete roads with sketches - Construction procedure for concrete roads. **2.6 HILL ROADS** Factors considered in alignment - Formation of hill roads - Hair pin bends - Retaining and Breast walls.	14 Hrs
III	**RAILWAY ENGINEERING** **3.1 INTRODUCTION** Introduction - History of Railways - Classifications of Indian Railways - Rail Gauges - Types - Uniformity in gauges - Loading gauge - Construction gauge. **3.2 RAILS** General - Functions of rails - Requirements of an ideal rail - Types of rail sections - Length of rails - Welding of rails - Wear of rails - Coning of wheels - Hogged rails - Bending of rails - Creep of rails - Causes and prevention of creep.	14 Hrs

Unit	Name of the Topic	Hours
III	**3.3 SLEEPERS AND BALLAST** Functions of Sleepers - Types of sleepers - Requirements of sleepers - Materials for sleepers - Sleeper density - Functions of Ballast - Requirements of ballast - Materials used as ballast. **3.4 RAIL FASTENINGS AND PLATE LAYING** Rail joints - Types - Rail fastenings - Fish plates - Fish bolts - Spikes - Chairs and Keys - Bearing plates - Blocks - Elastic fastenings - Anchors and anti-creepers - Plate laying - Methods of plate laying - PQRS method of relaying. **3.5 MAINTENANCE OF TRACK** Necessity - Maintenance of Track , Bridges and Rolling stock.	
IV	**4.1 STATIONS AND YARDS** Definition of station - Purpose of railway station - Types of stations - Wayside, Junction and Terminal stations - Platforms - Passenger and Goods platforms - Definition of Yard - Types of yard - Passenger yard, Goods yard, Marshalling yard and Locomotive yards - Level crossings. **4.2 STATION EQUIPMENTS** General - Engine shed - Ash pits - Examination pits - Drop pits - Water columns - Triangles - Turn table - Traversers - Scotch Block - Buffer stops - Fouling marks - Derailing switch - Sand hump - Weigh bridges. **4.3 POINTS AND CROSSINGS** Purpose - Some definitions - Turnouts - Right hand and left hand turnouts -Sleepers laid for points and crossings - Types of switches - Crossings - Types of crossings. **4.4 SIGNALLING** General - Objects of signalling - Types of signalling - Based on function and location - Special signals - Control of movement of trains - Different methods - Following train system - Absolute block system - Automatic signalling - Pilot guard system - Centralized traffic control system. **4.5 INTERLOCKING** Definition - Principles of interlocking - Methods of interlocking - Tappets and locks system - Key system - Route relay system - Improvements in interlocking and signalling. **4.6 RAPID TRANSPORT SYSTEM** General - Under ground railways - Advantages - Tube railways - Its features.	14 Hrs

Unit	Name of the Topic	Hours
V	**BRIDGE ENGINEERING** **5.1 INTRODUCTION** Bridge definition - Components of bridge - IRC loadings - Selection of type of bridge - Scour - Afflux - Economic span - Waterway - Factors governing the ideal site for bridge - Alignment of bridge - Factors to be considered in alignment. **5.2 FOUNDATIONS** Functions of foundation - Types of foundations - Selection of foundations - Control of ground water for foundation - Caisson foundation - Coffer dam – Types. **5.3 CLASSIFICATION OF BRIDGES** Classification according to IRC loadings , Materials , Bridge floor , Type of superstructure - Culverts and Cause ways - Classifications with sketches - Conditions to construct causeways. **5.4 SUBSTRUCTURE** Abutments - Types - Piers - Types - Wing walls - Types. **5.5 SUPERSTRUCTURE** Types - Description - Simple bridge - Types according to bridge floor - Continuous bridge - Cantilever bridge - Balanced cantilever bridge - Arch bridge - Bow-string girder type bridge - Rigid frame bridge - Suspension bridge - Continuous steel bridges - Steel arched bridges. **5.6 BRIDGE BEARINGS** Definition - Purpose - Importance of bearings - Types of bearings – Elastomer bearings. **TEST & REVISION**	14 Hrs 10 Hrs

REFERENCE :

1. RANGWALA, “Highway Engineering” , Charotor Publishing House Pvt. Ltd., Edition 2010
2. RANGWALA, “Railway Engineering” , Charotor Publishing House Pvt. Ltd., Edition 2010
3. RANGWALA, “Bridge Engineering” , Charotor Publishing House Pvt. Ltd., Edition 2009
4. S P CHANDOLA, “A Text Book of Transportation Engineering” S Chand & Company Ltd.,
5. G V RAO, “Principles of Transportation & Highway Engineering” Tata McGraw-Hill Publishing Company Ltd.,
6. Madhan Mohan Dass, “ Structural Analysis” PHI Learning Pvt. Ltd., New Delhi.

21042 TRANSPORTATION ENGINEERING

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1 What is Nagpur plan ?
2 Define "Super elevation"
3 Define "Plastic limit"
4 State any two advantages of highway lighting
5 What do you mean by Reconnaissance survey ?
6 What is soil stabilization ?
7 What do you mean by surface dressing bituminous road ?
8 What is hair pin bend ?
9 Define "Gauges"
10 What do you meant by creep of rails ?
11 State any two functions of sleepers
12 State the use of fish plates
13 Define "Marshalling yard"
14 What is the use of turn table ?
15 State any two objects of signaling
16 State the principles of interlocking
17 Define "Economic span"
18 What is coffer dam ?
19 What are the different types of wing walls ?
20 What is elastomer bearings ?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. **A.)** (i) What are the requirements of an ideal road ?. 4

(ii) What is sight distance ? Explain any two types of sight distances with neat sketches 8

OR

B. (i) What are the objects of road arboriculture ? 4

(ii) What is optimum moisture content ? Explain with neat sketches the Proctor's compaction test to determine the optimum moisture content 8

22. A. (i) What are the factors affecting road alignment ? 4

(ii) Explain with neat sketch the construction of water bound macadam road 8

OR

B. (i) Write short notes on retaining wall and breast wall 4

(ii) Explain with neat sketches the different methods of construction of concrete roads 8

23. A. (i) What are the advantages of uniformity in gauges ? 4

(ii) What are the functions and requirements of good ballast materials ? 8

OR

B. (i) Explain the different types of rail joints 4

(ii) Explain how the maintenance of railway track is carried out 8

24. A. (i) State the purposes of railway stations . 4

(ii) Define switches . Explain the different types of switches with neat sketches 8

.

OR

B. (i) Write short notes on absolute block system of controlling the movement of trains? 4

(ii) Explain with neat sketches the tappets and locks system of interlocking 8

25. A. (i) What are the factors to be considered in the alignment of bridges ? 4

(ii) What are causeways ? Explain with neat sketches any two types of causeways 8

OR

B. (i) State the functions of bearings used in bridges ? 4

(ii) Write short notes on balanced cantilever bridges and suspension bridges 8

21042 TRANSPORTATION ENGINEERING

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1 State IRC classifications of road.
2 What is transition curve ?
3 Define : Liquid limit
4 What do you meant by road arboriculture ?
5 What is the purpose of grader ?
6 State the materials used for WBM road ?
7 Define : Coal tar
8 Define : Breast wall
9 What are the different classifications of gauges ?
10 What do you meant by coning of wheels ?
11 Define : Sleeper density
12 What are the different types of rail joints ?
13 Define : Level crossings
14 What is the use Fouling marks ?
15 What do you meant by turnouts ?
16 State the principles of interlocking
17 Define : Scour
18 State any two functions of foundations ?
19 What are causeways ?
20 State the importance of bearings in bridges

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21A.) (i) What is Ribbon development ? State the effects of Ribbon development 4
(ii) What is gradient ? Explain the different types of gradient 8

OR

B (i) Explain how the plastic limit of soil is determined in the laboratory ? 4
(ii) What is road accident ? What are the causes of road accident ? Explain the preventive measures for the road accident 8

22. A (i) Write short notes on preliminary survey in a road project ? 4
(ii) Explain with a neat sketch the different methods of construction of gravel road 8

OR

B (i) What are the factors to be considered in the alignment of hill roads ? 4
(ii) Explain with neat sketches the different types of surface dressing bituminous road 8

23. A (i) Write short notes on loading gauge ? 4
(ii) What are the functions and requirements of good sleepers ? 8

OR

B. (i) State the necessities for the maintenance of railway track 4
(ii) Explain how the telescopic method of plate laying is carried out ? 8

24. A. (i) Write short notes on examination pits and drop pits ? 4
(ii) Draw a neat sketch of left-hand turnout and name the various parts on it 8

.OR

B. (i) What are the objects of signalling ? 4

(ii) Explain the features of under ground railways and tube railways 8

25. A. (i) Explain how the ground water is controlled during construction of foundation ? 4
(ii) What is cofferdam ? Explain with neat sketches the different types of cofferdams

OR

B. (i) State Define : Abutment . State the different types of abutment 4
(ii) Explain with neat sketches the different types of bridges according to its superstructure 8

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

SURVEYING II

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21043**
Semester : IV Semester
Subject Title : **SURVEYING II**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
SURVEYING II	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will posses knowledge about :

- Theodolite surveying
- Tacheometric surveying
- Trignometric Surveying
- Curve setting
- Basics of Remote sensing
- Photogrammetric surveying
- Hydrographic surveying
- Total Station
- Geographical Information system

21043 SURVEYING II

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**THEODOLITE SURVEYING** Introduction - Types of Theodolites : Transit and non-transit Theodolite, Vernier and Micrometer Theodolites – Electronic Theodlite (Principles and description only) – Component parts of a transit Theodolite – Functions – Technical terms used in Theodolite surveying – Temporary adjustments – Fundamental lines and relationship between them – Measurement of horizontal angle by method of repetition and reiteration – Measurement of vertical angle and deflection angle – Reading bearing of a line – Theodolite traversing – Methods – Field checks in closed traverse - Latitude and departure – Consecutive coordinates - Independent coordinates – Problems on computation of area of closed traverse – Balancing the traverse - Omitted measurements – Problems	**18 Hrs**
II	**TACHEOMETRIC SURVEYING** Introduction – Instruments used in tacheometry – Systems of tacheometry : Stadia and Tangential tacheometry – Principles – Fixed hair method of tacheometry – Distance and Elevation formulae – Anallactic lens (No proof) : Advantages and uses – Simple problems – Distomats (Description only) – Direct reading tacheometers - Determination of constants of a tacheometer – Tacheometric traverse – Errors in tacheometric surveying – Problems.	**14 Hrs**
III	**3.1 TRIGONOMETRICAL LEVELLING** Introduction – Finding elevation of objects – Base accessible - Base inaccessible: Single Plane and Double Plane methods – Problems on determination of elevation of objects. **3.2 REMOTE SENSING, PHOTOGRAMMETRIC SURVEYING AND HYDROGRAPHIC SURVEYING** Remote sensing – Definition – Basic Process – Methods of remote sensing – Applications -Photogrammetric Surveying – Definition – Terrestrial and Aerial photographs – Applications - Hydrographic surveying – Definition- Uses – Sounding: Definition, Purpose, Instruments needed – Steps in hydrographic surveying.	**14 Hrs**

Unit	Name of the Topic	Hours
IV	**CURVES** Introduction – Types of curves – Designation of curves – Elements of simple circular curve – Setting out simple circular curve by: Offsets from long chords, Offsets from tangents, Offsets from chords produced and Rankine's method of deflection angles – Simple problems – Transition curves : Objectives – Vertical curves : Definition and types.	**12 Hrs**
V	**TOTAL STATION AND GEOGRAPHICAL INFORMATION SYSTEM** **5.1 TOTAL STATION** Introduction – Application of total station – Component parts of a Total Station – Accessories used – Summary of total station characteristics - Features of total station – Electronic display and data reading – Instrument preparation, Setting and Measurement (Distance, Angle, Bearing etc.) – Field procedure for co-ordinate measurement – Field procedure to run a traverse survey - Linking data files. **5.2 GEOGRAPHICAL INFORMATION SYSTEM (GIS)** Introduction – Geographical information – Development of GIS – Components of GIS – Steps in GIS mapping - Ordinary mapping to GIS – Comparison of GIS with CAD and other system – Fields of Applications : Natural resources, Agriculture, Soil, Water resources, Wasteland management and Social resources – Cadastral survey and Cadastral records – Land Information System(LIS). **REVISION AND TEST**	**12 Hrs** **10 Hrs**

Reference Book :

1. Kanetkar.T.P. & S.V.Kulkarni, "Surveying and levelling part 1 & 2 ", Puna vidyarthi griha, Prakashan,23rd edition, Reprint 2008.
2. Punmia.B.C, Ashok K.Jain & Arun K. Jain,"Surveying Volume I", Laxmi, Publications Private Limited., 16the edition, 2011.
3. Punmia.B.C, Ashok Jain & Arun K. Jain,"Surveying Volume II & III", Laxmi, Publications Private Limited., 15th edition, 2011.
4. Mimi Das Saikia, Bhargab Mohan Das & Madan Mohan Das, "Surveying", PHI Learning Private Limited, Edition 2010.
5. S. K. Roy, "Fundamentals of Surveying", PHI Learning Private Limited, Edition 2010.
6. Sathesh Gopi, R.Sathikumar & N.Madhu, Advanced Surveying, (Total Station, GIS, Remote Sensing), Pearson Education, Chennai, 2007.
7. M.Anji Reddy, Remote sensing and Geographical information system, B.S Publications, Edition 2006.
8. Burrough P A, Principles of GIS for Land Resources Assessment, Oxford Publication, 2000.
9. Learning Material Development Project – NITTTR, Taramani,Chennai, CD programme on GPS and GIS.

21043 SURVEYING II

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. What is a transit theodolite?
2. Define the term changing face.
3. What is the function of an optical plummet in a theodolite?
4. Define Latitude.
5. What are the instruments used in tacheometry?
6. Write the distance formula in a stadia tacheometry, if the line of sight is horizontal.
7. What is an anallactic lens?
8. Mention any one instrumental error in tacheometric surveying.
9. What is the objective of trignometrical levelling?
10. When do you adopt single plane method to determine elevation of an object?
11. State any one application of photogrammetric surveying.
12. Define soundings in hydrographic surveying.
13. State any three elements of simple circular curve.
14. Mention any two linear methods of setting out simple circular curve.
15. What do you mean by right handed curve?
16. Define vertical curves.
17. What is the function of prism reflectors in total station?
18. Mention any two total station characteristics.
19. What do you mean by GIS?
20. State any two field applications of GIS.

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. (A) Draw a neat sketch of a vernier theodolite and explain the functions of any five component parts.

OR

(B) The following lengths and bearings were observed in running a closed traverse ABCD. The length and bearing of line DA have been omitted. Calculate the length and bearing of DA.

Line	**Length (m)**	**Bearing**
AB	485	314º 48´
BC	1725	16º 24´
CD	1050	142º 06´

22. (A) What are the various constants of a tacheometer? Describe the field procedure of determining the constants of a tacheometer.

OR

(B) A tacheometer fitted with an anallactic lens was set up at a station and the following readings were obtained on a vertically held staff:

Station	**Staff station**	**Vertical angle**	**Stadia hair readings (m)**	**Remarks**
A	B.M	- 2º 18´	3.225, 3.550, 3.875	R.L of B.M = 743.565
	B	+ 8º 36´	1.650, 2.515, 3.380	

Calculate the horizontal distance from A to B and R.L of B.

23. (A) Determine the R.L of top of a transmission tower from the following observations:

Inst. Station	Vertical angle to top of tower	Staff reading on B.M (m)	R.L of B.M.
A	+ 18º 30´	2.815	105.000
B	+ 12º 40´	1.865	

The distance between the station A and B is 60m. Stations A, B and the tower are in the same vertical plane.

OR

(B) i) Write short notes on methods of remote sensing. (6)
ii) Briefly describe the steps in hydrographic surveying. (6)

24. (A) i) Derive the relationship between degree of curve and radius, for a unit chord of 30. (6)
ii) Describe the procedure for setting out the curve in the field based on offsets from long chords. (6)

OR

(B) Two tangents intersect at chain age of 1190m. The intersection angle being 144º. Calculate all the necessary data for setting out a curve of radius 300m by offsets from chords produced. Assume peg interval as 20m.

25. (A) i) State the various applications of Total station. (3)
ii) Briefly write the field procedure to run a traverse survey using Total station. (9)

OR

(B) i) Briefly explain the components of GIS. (6)
ii) Briefly explain the application of GIS in Agriculture and Water resources. (6)

21043 SURVEYING II

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. State the function of shifting head in a theodolite.
2. Define the term transiting.
3. State any one field checks in a closed theodolite traverse.
4. State any one rule to balance the theodolite traverse.
5. What are the two systems of tacheometry?
6. Write the distance formula in a stadia tacheometry, if the line of sight is inclined.
7. State one advantage of anallactic lens.
8. What is a Distomat?
9. When do you adopt trigonometrical leveling?
10. State any one method to find elevation of objects when the base is inaccessible.
11. Define remote sensing.
12. Name various instruments used for sounding in hydrographic surveying.
13. Mention different types of circular curves.
14. State the relationship between radius and degree of curve if the chord length is 20 m.
15. Mention any two methods of setting out simple circular curve.
16. Write any one objective of a transition curve.
17. Name any two accessories used in Total station.
18. Mention any one Linking software used, to transfer data files in Total station.
19. Mention any two geographical informations required in GIS.
20. List out the components of GIS.

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. (A) i) What are the fundamental lines of a theodolite. State the relationship between them. 4
ii) Briefly describe the field procedure of running theodolite traverse by included angles. 8

OR

(B) The following table gives the latitude and departure of the sides of a closed traverse ABCD. Calculate the Independent co-ordinates and find the area of the traverse. 12

Line	Latitude (m)	Departure (m)
AB	- 88.00	+ 133.90
BC	+ 416.10	+ 356.90
CD	+ 7.00	- 14.84
DA	- 335.10	- 475.96

22. (A) i) Briefly explain different systems of tacheometry. 8
ii) Write short notes on direct reading tacheometer. 4

OR

(B) A tacheometer fitted with an anallatic lens was set up over a B.M 250.000 above datum and the following readings were obtained on a vertically held staff: 12

Staff station	Vertical angle	Stadia hair readings(m)
P	+5º 14´	0.450, 1.035, 1.620
Q	- 7º 33´	0.860, 1.270, 1.680

Calculate the distances of P and Q from the instrument station and their elevation. The height of the instrument is 1.500m.

23. (A) Determine the R.L of top of the temple from the following observations: 12

Inst. Station	Vertical angle to top of temple	Staff reading on B.M (m)	Remarks
A	+ 16º 42´	3.625	R.L of B.M = 1728.785 Distance AB = 30m
B	+ 11º 12´	2.005	

Stations A, B are in line with the top of the temple.

OR

(B) i) Briefly write about the basic process of remote sensing. 6
ii) Briefly write about the applications of Photogrammetric surveying. 6

24. (A) i) Briefly explain different types of circular curves with neat sketches. 6
ii) Define Transition curve and Vertical curve. State their uses. 6

OR

(B) Two tangents intersect at a chainage of 5637m. The intersection angle being 161º. Calculate and tabulate all the necessary data for setting out a left handed curve of radius 345m, by Rankine's method of deflection angles. Assume peg interval as 30m and the least count of the theodlite as 20".

25. (A) i) Write short notes on Electronic display in Total station. 5
ii) Briefly write the field procedure for co-ordinate measurement, using Total station. 7

OR

(B) i) Briefly explain the various steps in GIS mapping. 8
ii) Briefly explain the application of GIS in Wasteland management. 4

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

ESTIMATING AND COSTING I

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name **:** **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code **:** **21044**
Semester **:** IV Semester
Subject Title **:** **ESTIMATING AND COSTING I**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ESTIMATING AND COSTING I	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be familiar with:

- Different types of estimates, different systems of estimating in use;
- To determine the quantity of earth work in embankment and cuttings;
- To determine the rates for different items of works;
- To determine the quantities of different items of works in the construction of buildings using Trade and Group systems

21044 ESTIMATING AND COSTING I

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**1.1 INTRODUCTION** Estimation- Definition of Estimate- Necessity of Estimates- Importance of fair estimation- Duties and requirements of a good Quantity Surveyor- Types of Estimates- Approximate and Detailed Estimates- Main and Sub Estimates- Revised Estimates-Supplementary Estimates – Maintenance/Repair Estimates-Taking off Quantities- Trade and Group Systems- Merits of Trade/ Group systems- Stages in Detailed Estimation- Units of measurements for materials and works-Degree of accuracy in measurements- Measurement Books- Deduction for openings in masonry/plastering/colour washing works- Painting Coefficients- Categories of Labourers- Material requirements for different items of works- Labour requirement for different items of works- Standard Data Book- Task or Out turn of labourers -Cost of materials and wages of labour- Schedule of Rates- Revision of rates- Market Rates- Lead- Cost of conveyance- Handling charges –Lump sum and Contingency provisions in Estimates- Abstract Estimates. **1.2 APPROXIMATE ESTIMATES** **1.3** Necessity of Approximate Estimates- Types – Service Unit method- Plinth Area method- Carpet Area method- Cubical Content method- Typical Bay method- Rough Quantity method- Examples for each method- Problems on preparation of Preliminary/Approximate Estimates for building projects.	**12 Hrs**
II	**2.1 AREAS AND VOLUMES** Areas of regular and irregular sections- Computation of Areas of Irregular figures- End Ordinate rule, Mid Ordinate rule, Average Ordinate rule, Trapezoidal rule, Simpson's rule- Problems- Volumes of regular and irregular solids- Computation of Volumes of Irregular solids- End Area rule, Mid Area rule, Average Area or Mean Area rule, Trapezoidal rule, Simpson's or Prismoidal rule. **2.2 EMBANKMENTS AND CUTTINGS** Areas of cross sections of embankments of roads, tank bunds etc – Level Section and Two level Section- Areas of cross sections of cuttings of canals, drains etc- Level Section and Two level Section- Determination of Volume of Earth work in Embankment / Cutting with level sections of varying heights/ depths or with two level sections of uniform height/ depth.	**12 Hrs**

Unit	Name of the Topic	Hours
III	**ANALYSIS OF RATES** Analysis of Rates or Preparation of Data for the following Building works using Standard Data Book: 1) Cement/ Lime mortars; 2) Plain Cement Concrete in Foundation/ Leveling Course; 3) Flooring with cement concrete, plastered with cement mortar; 4) Flooring with PCC finished with ellis pattern cement concrete surface; 5) Flooring with Cuddapa slabs; 6) Mosaic/ Ceramic tiled flooring; 7) Brickwork in cement mortar in foundation; 8) Brickwork in CM in super structure; 9) Brickwork in CM in partition with plastering; 10) Random rubble masonry in CM; 11) Coursed rubble masonry in CM; 12) Lime-Surki concrete in Weathering course finished with pressed tiles in CM; 13) Reinforced cement concrete in Slabs (per unit volume/unit area); 14) R.C.C in Beams; 15) R.C.C in Columns; 16) R.C.C in Sunshades; 17) Plastering Brick masonry with CM; 18) Pointing Stone masonry with cement mortar; 19) Painting the wood work; 20) Painting Steel work; 21) White/ Colour washing the plastered surfaces; 22) Form works (strutting, centering, shuttering etc) for Slabs/Beams/ Columns; 23) Fabrication of Steel Reinforcement; 24) A.C Sheet roofing; 25) Supplying and fixing Rain water pipes – Exercises.	**16 Hrs**
IV	**TAKING OFF QUANTITIES BY TRADE SYSTEM** General- Methods of taking off quantities- Individual wall method- Centre line method- Examples- Entering the dimensions- Standard forms for entering Detailed measurements and Abstract estimates- Rounding of quantities. Preparing Detailed Estimate using Trade System and Take off quantities for all items of works in the following types of Buildings: A small Residential building with Two/Three rooms with RCC flat roof A small Residential building with Two/Three rooms with RCC sloped roof A Two Storied Commercial building (framed structure) with RCC flat roof A Community hall with RCC columns and T-beams A small Industrial building with AC/ GI sheet roof on Steel Trusses	**16 Hrs**

Unit	Name of the Topic	Hours
V	**TAKING OFF QUANTITIES BY GROUP SYSTEM** General- Standard method of measurement- Taking off and Recording the dimensions- Order of Taking off- Dimension Paper- Entering dimension paper- Spacing dimensions- Descriptions - Cancellation of Dimensions - Squaring Dimensions- Method of Squaring- Checking the Squaring- Casting up the dimensions- Abstracting and Billing-Function of abstract- Use of Abstract sheets- Order of Abstracting- Preparing the Abstract – Checking the Abstract – Casting and Reducing the Abstract- Writing the bill- Method of writing the bill- Checking the Bill. Preparing Detailed Estimate using Group System and Take off quantities for all items of works in the following types of Buildings: A small Residential building with Two/Three rooms with RCC flat roof A small Residential building with Two/Three rooms with RCC sloped roof A Community hall with RCC columns and T-beams (Note: The same drawings of Unit 4 may be practiced and quantities compared) REVISION AND TEST	**16 Hrs** **8 Hrs**

Reference Book :

1. Rangawala, “Estimating & Costing” , Charotor Publishing;
2. N.A.Shaw, “Quantity Surveying & Valuation”, Khanna Publishers;
3. L.N.Dutta, “Estimating & Costing”, Dhanpat Rai & Sons
4. Bridie, “Estimating & Costing”
5. Indian Standard Code of Practice, IS:1200.

21044 ESTIMATING AND COSTING I

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Differentiate Group system and Trade system in quantity surveying.
2. What do you mean by “Contingency provision”?.
3. What is the purpose of preparing Preliminary estimate for a project?
4. Define the term “Carpet area” of a building.
5. What do you mean by “mean area” of a bund?
6. Write the trapezoidal rule used to calculate the area of an irregular field.
7. Differentiate level section and two level section.
8. In which practical case you come across a section with partial cutting and partial embankment?
9. State the use of standard data book in the analysis of rates.
10. What is meant by lead cost?
11. Why sundries provision is provided in the analysis of rates?
12. How could the rates arrived for items of works not mentioned in the standard data book?
13. Define “abstract estimate”
14. How the quantities are to be rounded off?
15. What do you mean by individual wall method of taking off quantities?
16. State the unit of work “Pointing of stone masonry with cement mortar”.
17. Write any two advantages of Group system of estimating quantities.
18. What do you mean by “casting and reducing the abstract”?
19. How the dimensions are squared?
20. State how the entered dimensions are cancelled ?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. (A) The particulars of a proposed residential building are given below:

Carpet area = 216 m^2
Circulation area = 12% of Plinth area
Non-livable area = 6% of Plinth area
Wall area = 10% of Plinth area

The total expenditure of a recently constructed similar residential building of plinth area 350m^2 is Rs.49,00,000. Calculate the approximate cost of the proposed building.

OR

(B)(i) List out the duties and requirements of a good quantity surveyor.

(ii) A brick masonry wall of 200m^2 area has to be plastered with 12mm thick 1:4 cement mortar. Allowing 15% excess mortar for wastage and undulations in the surface, calculate the quantities of cement(in kg) and sand (in m^3) required for the work.

22. (A) (i) Explain mid ordinate rule and end ordinate rule used for calculating the area of irregular shape.

(ii)The offsets measured to the curved boundary of a land from a straight chain line are given below. Compute the area enclosed by the boundary and the chain line by trapezoidal and Simpson's rules.

Chainage (m)	0	15	30	45	60	75	90	105	120
Offsets (m)	0	2.4	3.7	5.4	8.2	6.9	5.7	3.1	0

OR

(B) It is proposed to cut a drain of 1 km length with a uniform base width of 5m. The depth of cutting will be 3.0m at the starting point, 4.2m at the mid length and 5.0m at the end point. The sides have slopes of 2:1 on left side and 1½:1 on the right side. Compute the volume of earth work in cutting using Prismoidal formula.

23. (A) Analyze and determine the rates for the following items of work with the given data.

Flooring with 100mm thick base concrete using 40 mm size broken stone in cement mortar 1:4 and finished with 20mm thick ellis pattern cement concrete surface - 1 m^2

OR

(B) (i) Flush pointing R R masonry with cement mortar 1:4 – 1m^2.
(ii) Supplying and fixing 100mm dia rain water pipes – 1m.

Material and Labour requirement:

Cement concrete base with 40mm broken stone in CM1:4 – 10m^3

40 mm broken stone	9.5	m^3
Cement mortar 1:4	3.8	m^3
Mason Category II	1.8	No.
Mazdoor Category I	17.7	No.
Mazdoor Category II	14.1	No.

Flooring with 100mm thick base concrete using 40mm size broken stone in CM1:4 and finishing with 20mm thick ellis pattern cement concrete surface- 10m^2

Cement concrete base	1	m^3
Stone chips	0.24	m^3
Cement	117	kg
Mason Category I	0.50	No.
Mazdoor Category I	1.10	No.
Mazdoor Category II	4.30	No.
Labour for tamping base concrete course	Rs.400 per 10m^2	
Labour for fishing the floor work	Rs.450 per 10m^2	

Flush pointing R R masonry with cement mortar 1:4 – 10m^2.

Cement mortar 1:4	0.09	m^3
Mason Category II	1.6	No.
Mazdoor Category I	0.5	No
Mazdoor Category II	1.1	No.

Supplying and fixing 100mm dia rain water pipes – 3m

A.C pipe 100 dia	3	m
M.S clamp	2	No.
T.W plugs	4	No.
Plumber	1	No
Cement Packing	LS	

Cost of materials and lead particulars:

Material	Unit	Cost (Rs)	Lead (kM)	Rate for Lead/kM(Rs)	Handling charges(Rs)
Cement	50 kg	280.00	4	2.00	5.00
Sand	1m^3	250.00	30	20.00	60.00
Broken stone(40mm)	1m^3	380.00	20	18.00	40.00
Stone chips	1m^3	520.00	20	18.00	40.00
A.C pipe 100mm dia	1m	65.00	4	3.00	5.00
M.S clamp	1No	16.00	--	--	--
T.W plugs	1No	3.00	--	--	--

Cost of Labour:

Mason Category I	Rs.550.00 per day
Mason Category II	Rs.500.00 per day
Plumber	Rs.550.00 per day
Mazdoor Category I	Rs.400.00 per day
Mazdoor Category II	Rs.275.00 per day
Mixing charge for mortar	Rs.200 / m^3

24. (A) Take the quantity of earth work in foundation for the residential building shown in (Sketch 1) by Centre line method using Trade system

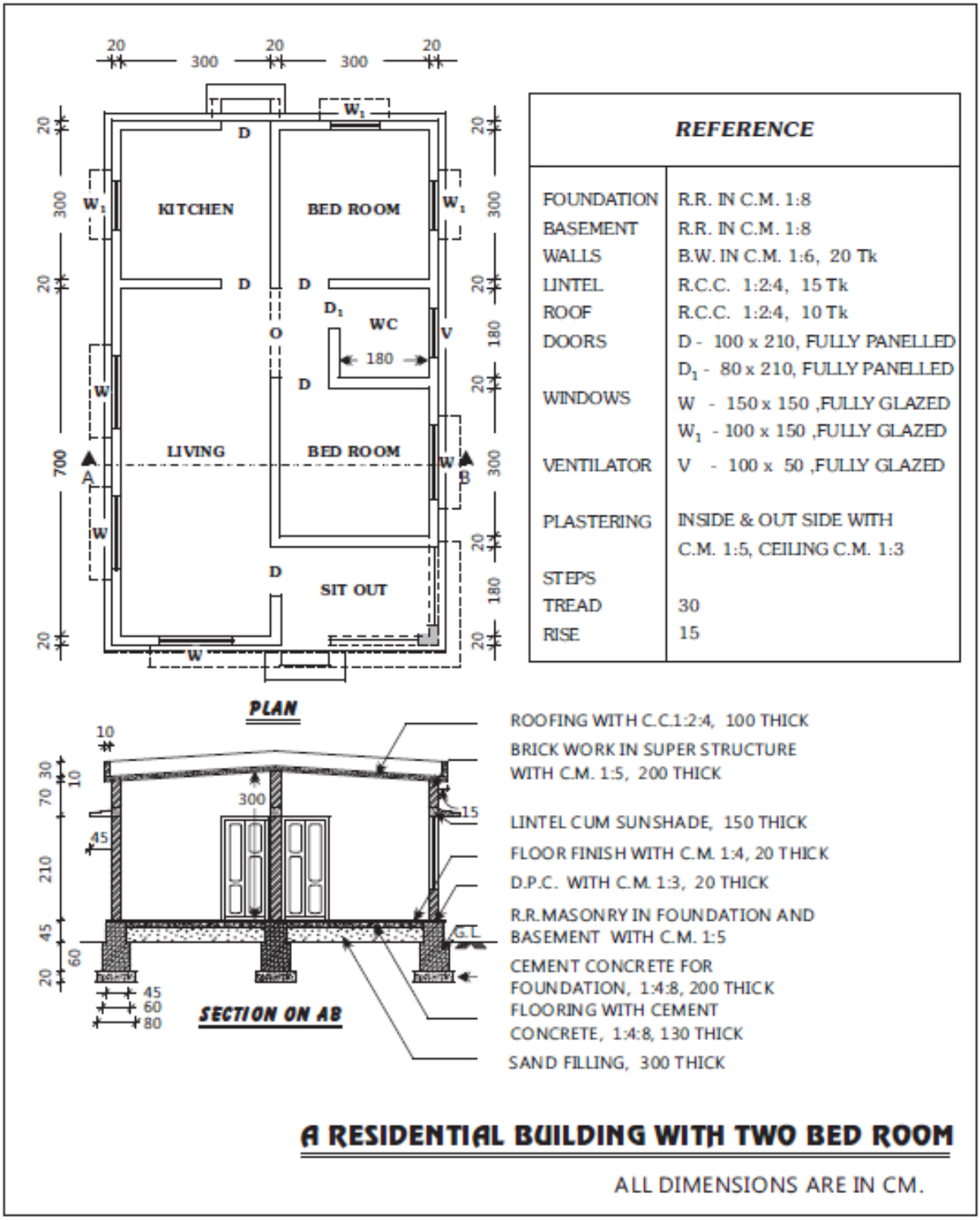
OR

(B) Take the quantity of R.C.C in the sloped roof for the residential building shown in Sketch 1 using Trade system (Sketch 1) – A plan and section of a small residential building with sloped RCC roof.)

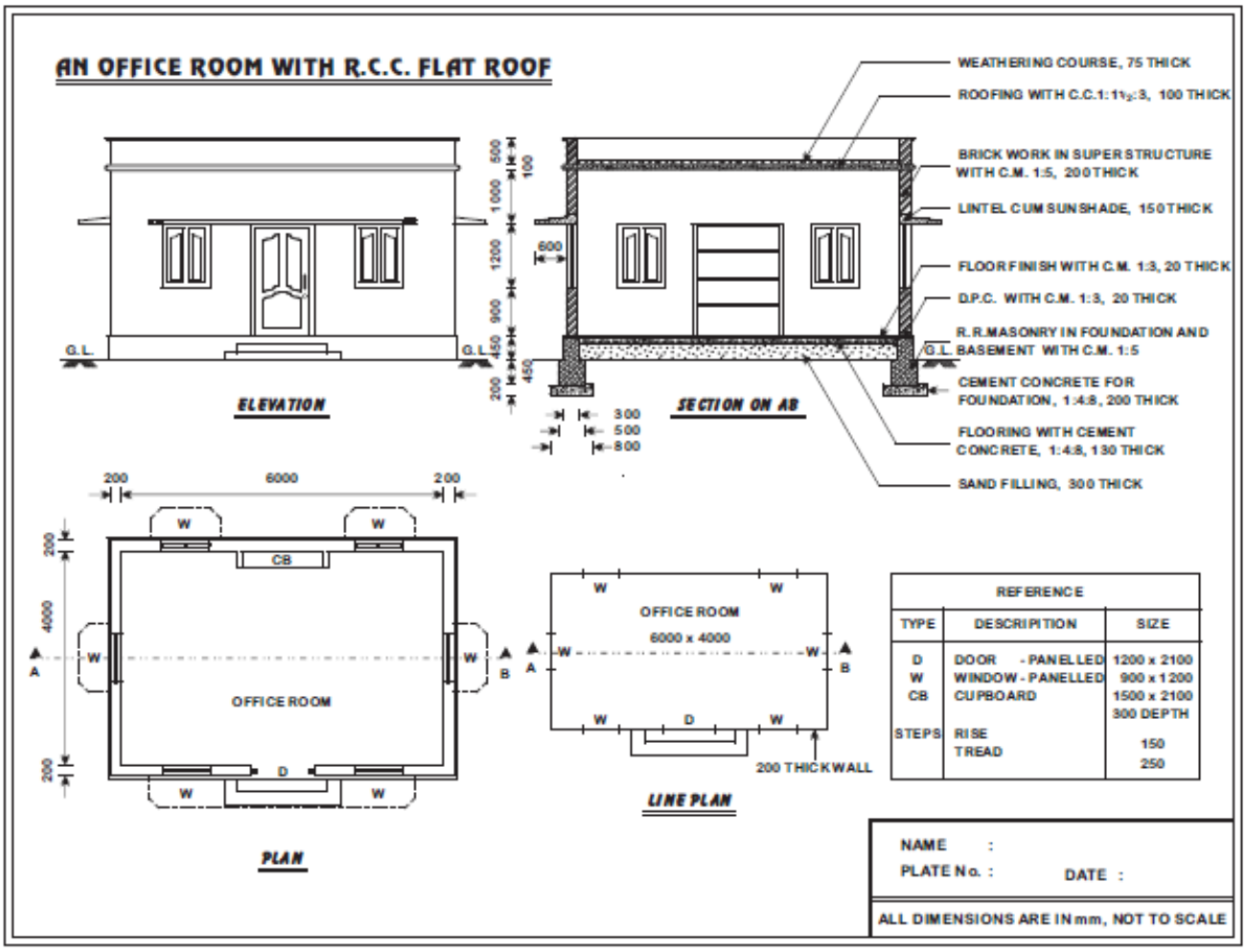
25. (A) Take the quantity of brick work in foundation and basement for the residential building shown in (Sketch 2) using Group system

OR

(B) Take the quantities of works in the parapet of the residential building shown in Sketch 2 using Group system. (Sketch 2) – A plan and section of a small office building with flat RCC roof).


20
300
20
300
20
W1
D
KITCHEN
BED ROOM
W1
D
D
D1
WC
O
V
180
D
W
LIVING
BED ROOM
W
A
B
700
W
D
SIT OUT
W
REFERENCE
FOUNDATION R.R. IN C.M. 1:8
BASEMENT R.R. IN C.M. 1:8
WALLS B.W. IN C.M. 1:6, 20 Tk
LINTEL R.C.C. 1:2:4, 15 Tk
ROOF R.C.C. 1:2:4, 10 Tk
DOORS D - 100 x 210, FULLY PANELLED
D1 - 80 x 210, FULLY PANELLED
WINDOWS W - 150 x 150 ,FULLY GLAZED
W1 - 100 x 150 ,FULLY GLAZED
VENTILATOR V - 100 x 50 ,FULLY GLAZED
PLASTERING INSIDE & OUT SIDE WITH C.M. 1:5, CEILING C.M. 1:3
STEPS
TREAD 30
RISE 15
PLAN
10
30
70
210
45
60
300
15
G.L
45
60
80
SECTION ON AB
ROOFING WITH C.C.1:2:4, 100 THICK
BRICK WORK IN SUPER STRUCTURE WITH C.M. 1:5, 200 THICK
LINTEL CUM SUNSHADE, 150 THICK
FLOOR FINISH WITH C.M. 1:4, 20 THICK
D.P.C. WITH C.M. 1:3, 20 THICK
R.R.MASONRY IN FOUNDATION AND BASEMENT WITH C.M. 1:5
CEMENT CONCRETE FOR FOUNDATION, 1:4:8, 200 THICK
FLOORING WITH CEMENT CONCRETE, 1:4:8, 130 THICK
SAND FILLING, 300 THICK
A RESIDENTIAL BUILDING WITH TWO BED ROOM
ALL DIMENSIONS ARE IN CM.

SKETCH – 1


AN OFFICE ROOM WITH R.C.C. FLAT ROOF
WEATHERING COURSE, 75 THICK
ROOFING WITH C.C.1:1½:3, 100 THICK
BRICK WORK IN SUPER STRUCTURE WITH C.M. 1:5, 200 THICK
LINTEL CUM SUNSHADE, 150 THICK
FLOOR FINISH WITH C.M. 1:3, 20 THICK
D.P.C. WITH C.M. 1:3, 20 THICK
R.R.MASONRY IN FOUNDATION AND BASEMENT WITH C.M. 1:5
CEMENT CONCRETE FOR FOUNDATION, 1:4:8, 200 THICK
FLOORING WITH CEMENT CONCRETE, 1:4:8, 130 THICK
SAND FILLING, 300 THICK
G.L.
ELEVATION
SECTION ON AB
OFFICE ROOM
6000 x 4000
200 THICK WALL
LINE PLAN
PLAN
REFERENCE
TYPE
DESCRIPTION
SIZE
D
DOOR - PANELLED
1200 x 2100
W
WINDOW - PANELLED
900 x 1200
CB
CUPBOARD
1500 x 2100
300 DEPTH
STEPS
RISE
150
TREAD
250
NAME :
PLATE No. :
DATE :
ALL DIMENSIONS ARE IN mm, NOT TO SCALE

SKETCH – 2

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

MATERIAL TESTING LAB PRACTICE II

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name **:** **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code **:** **21045**
Semester **:** IV Semester
Subject Title **:** **MATERIAL TESTING LAB II**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
MATERIAL TESTING LAB PRACTICE II	3 Hrs	48 Hrs	25	75	100	3 Hrs

LIST OF EXPERIMENTS

PART A 18 Hours

1. Voids ratio and porosity of sand.
2. Determination of liquid limit and plastic limit of the given soil.
3. Determination of bulk density and specific gravity of Fine and Coarse aggregates.
4. Proctor's compaction test on clay.
5. Direct shear test on sand.
6. Field Density of Soil

PART B 12 Hours

7. Attrition test on Aggregate.
8. Abrasion test on Aggregate.
9. Aggregate crushing value test.
10. Aggregate impact value test.

PART C 15 Hours

11. Determination of Total solids present in the given sample of water.
12. Determination of Turbidity of water by "Jackson candle turbidity meter."
13. Determination of settleable solids present in the given sample of water/ waste water by "Imhoff cone."
14. Moisture content in coarse aggregate (or) Water absorption test on coarse aggregate.

REVISION & TEST 3 Hours

SCHEME OF EXAMINATION :

In the examination, each student has to be given either a Single question from Part A (or) TWO questions, ONE from Part B and ONE from Part C.

ALLOCATION OF MARKS

PART A		70 marks
	OR	
PART B		40 marks
PART C		30 marks
VIVA VOCE		05 marks
RECORD		25 marks
Total		100 Marks

21045 MATERIAL TESTING LAB PRACTICE II

MODEL QUESTION PAPER

Duration : 3 Hours **Max. Marks :** 75

1. Determine the void ratio, porosity and bulk density of the given sand sample. (70 marks)
2. Determine the liquid limit and plastic limit of the given soil sample. (70 marks)
3. Determine the bulk density and specific gravity of the fine aggregate sample. (70 marks)
4. Determine the bulk density and specific gravity of the coarse aggregate sample (70 marks)
5. Find out the optimum moisture content of the given soil sample by conducting the Proctor's Compaction test. Use moisture meter or assume water added to the soil sample as its moisture content. (70 marks)
6. Conduct a direct shear test on the given sand and find the friction angle of sand. (70 marks)
7. Determine the field density of soil at the given site using sand pouring cylinder below a depth of 150mm from ground level. (70 marks)
8. a) Conduct the crushing strength test on the given aggregate and determine the aggregate crushing value. (40 marks)
   b) Determine the Total solids present in the given sample of water. (30 marks)
9. a) Conduct an abrasion test on the given stone specimen and determine the co-efficient of Hardness/ Aggregate abrasion value. (40marks)
   b) Determine the Turbidity of water using "Jackson candle turbidity meter". (30 marks)
10. a) Determine the impact value of the given aggregate. From your result find the suitability of the aggregate for road construction. (40marks)
    b) Determine the settle able solids present in the given waste water using Imhoff cone apparatus. (30marks)
11. a) Conduct Attrition test on the given coarse aggregate for a duration of 30 minutes and find the percentage loss of material. (40 marks)
    b) Determine the moisture content in the given sample of coarse aggregate / Conduct a water absorption test on the given coarse aggregate and find the percentage water absorption. (Any one) (30 marks)

[Allocation of Marks : Exam Marks:70; Viva Voce: 5; Record : 25. Total : 100]

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

SURVEYING PRACTICE II

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU
L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name **:** **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code **:** **21046**
Semester **:** IV Semester
Subject Title **:** **SURVEYING PRACTICE II**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
SURVEYING PRACTICE II	6 Hrs	96 Hrs	25	75	100	3 Hrs

Objective :

At the end of the course, Students

- will have experience in handling surveying equipments
- Do practical exercises in Theodolite surveying,
- Do Tacheometric surveying
- Do surveying using Total station.

21046 SURVEYING PRACTICE II

LIST OF EXPERIMENTS

PART A: THEODOLITE SURVEYING **42 Hrs**

1. Study of a Theodolite - Temporary adjustments – Reading horizontal angles.
2. Measurement of horizontal angle by:
   a. Reiteration method (not for Exam)
   b. Repetition method (not for Exam)
3. Determination of distance between two points when their bases are accessible, using Theodolite - Measuring Horizontal angles by repetition method and distances from a Thedolite Station.
4. Determination of distance between two points when their bases are inaccessible, using Theodolite - Measuring Horizontal angles by reiteration method from a baseline.
5. Run closed theodolite traverse - Measuring length, included angles, and bearing at initial station. Plot the traverse.
6. Measurements of vertical angles to different points.
7. Determination of Elevation of an object when the base is accessible.
8. Determination of Elevation of an object when the base is inaccessible by :
   a) Single plane method
   b) Double plane method.

PART B: TACHOMETRIC SURVEYING 24 Hours

9. Determination of constants of a tacheometer.
10. Determination of distance and elevation of points by Stadia tacheometry.
11. Determination of gradient between two points (with different elevations) by Stadia tacheometry.
12. Determination of distance and elevation of points by Tangential tacheometry.

PART C: TOTAL STATION **18 Hrs**

13. Study of Total Station – General commands used - Instrument preparation and setting – Reading distances and angles.
14. Measurement of distances and co-ordinates of given points, using Total station.
15. Measurement of altitude of given elevated points, using Total Station.
16. Run closed traverse using Total Station and plotting the traverse.
17. Determination of area of a field / land (enclosed between three or more known points),using Total station.

REVISION & TEST 12 Hours

SURVEY CAMP : (Outside the Campus) Duration: 7 days

The objective of the survey camp is to enable the students to get practical training in the field work. Groups of not more than six members in a group will carry out each exercise in Survey camp. The camp must involve work on a large area of not less than 30 acres outside the campus. At the end of the camp, each student shall have mapped and contoured the area. The camp record shall include all original field observations, calculations and plotting.

15 marks to be allotted for Survey file in the Board Examination.

Works to be conducted in survey camp :

i) L.S and C.S for a road / canal alignment

ii) Radial Tachometric contouring

iii) Contouring by block levels

iv) Curve setting by deflection angle

v) Theodolite / Tacheometric traverse (Balancing the traverse by Bowditch rule)

ALLOCATION OF MARKS

PART- A & B	By Lot One question (Either Theodolite surveying or in Tacheometry surveying)	**- 45 Marks**
PART- C	One question	**- 10 Marks**
Survey Camp		**- 15 Marks**
Viva-Voce		**- 5 Marks**
Record Marks		**- 25 Marks**
	TOTAL	**100 Marks**

MARK ALLOCATION FOR PART – A & B

S.No	Description	Part – A & B Max. Marks (45)
1	Procedure, Handling Instruments / Tools	10
2	Field works, Observation and Tabulation	15
3	Calculations and Check	15
4	Accuracy of result	5

21046 SURVEYING PRACTICE II

MODEL QUESTION PAPER

Duration : 3 Hours **Max. Marks :** 75

PART – A & B: By Lot (45 Marks)

1. Determine the distance between two accessible points QR from the station point P. Measure the included angles by repetition method. Use Theodolite.
2. Determine the distance between two inaccessible points QR taking observations from the base line AB of length 5m / 10m. Measure the included angles by reiteration method. Use Theodolite.
3. Determine the height of a Flag post and R.L. of its top and bottom, from a known bench mark. Take the distance between Theodolite and Flag post as 5m / 10m / 20m.
4. Determine the R.L. of elevated points by Single Plane method, from a known bench mark. Take the distance between the two Theodolite position as 5m / 10m / 20m.
5. Determine the R.L. of inaccessible elevated points, from a known bench mark by Double Plane method. Take the distance between the two theodolite positions as 5m / 10m / 20m.
6. Determine the Constants (C and K) of the given Tacheometer. Keep the horizontal distances as 10m, 20m, 30m, 40m and 50m.
7. Determine the distances and R.L. of two points (one Elevated and the other depressed), from a known bench mark, by Stadia tacheometry. Take Multiplying constant as (100) and Additive constant as (0).
8. Determine the Gradient between two points (say A and B) of different elevations, from a known bench mark, by Stadia tacheometetry.
9. Determine the distances and R.L. of points, from a known bench mark, by Tangential tacheometry. Keep the Stadia intercept between the targets as 2m / 2.5m / 3m.

PART – C: By Lot (10 Marks)

10. Display the distances and Co-ordinates of points (Minimum three points) lying at different elevations, using Total station.
11. Determine the R.L. of elevated points, using Total station.
12. Determine the area enclosed between three / four points, using Total station.

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

CAD IN CIVIL ENGINEERING DRAWING PRACTICE I

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21047**
Semester : IV Semester
Subject Title : **CAD IN CIVIL ENGINEERING DRAWING PRACTICE I**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
CAD IN CIVIL ENGINEERING DRAWING PRACTICE I	5 Hrs	80 Hrs	25	75	100	3 Hrs

Objectives :

On completion of the course, the student will be able:

- To know about CAD commands
- To understand building components
- To draw building drawing using CAD software
- To prepare approval drawing for submission to authority

21047 CAD IN CIVIL ENGINEERING DRAWING PRACTICE I

LIST OF EXPERIMENTS

Preparation of drawing using CAD Software

I. Introduction of CAD software for Preparation of Drawings **6 Hours**

1. Definition of various commands used in CAD software.
2. Simple Exercises for familiarizing the drawing commands in CAD software.

II. Draw the given drawings in Computer and take print out of all drawings in A4 sheet using Inkjet / laser printer or plotter and produced in file forms as record. 15 Hrs

3. Section of semicircular Arch
4. Elevation of door, partly paneled and partly glazed
5. Preparation of Plan showing arrangement of furnitures / fixtures and other features with standard sizes for the followings (Each room to be drawn separately - features and furnitures may be pasted from the Blocks available in the packages)
   (i) Living (ii) Bed Room (iii) Kitchen (iv) Toilet
6. Steel Structures: Cross section of I, Channel, T, Angle and Tubular section, Compound Beams.

7. Section of Load bearing wall from parapet to foundation showing all the details across the section. (Single storey)

III Draw the building drawing using available CAD software 50 Hours

8. Plan, Section and Elevation of single bed roomed building (R.C.C. Roof)
9. Plan, Section and Elevation of Double bed roomed building (R.C.C. Roof)
10. Plan, Section and Elevation of a Primary School Building
11. Plan, Section and Elevation of a Hospital Building
12. Plan, Section and Elevation of a Workshop with steel columns, Steel roof truss and Metal sheet Roofing of about 300 m^2 area.
13. Preparation of approval drawing to be submitted to Corporation or Municipality showing required details in one sheet such as
    a) Site Plan (Land boundary, Building boundary, Car Parking, Passage, sanitary layout, septic tank location etc.
    b) G.F. Plan, F.F. Plan, Section and Elevation(line diagram is enough)
    c) Key Plan
    d) Septic tank Plan and section (line diagram)
    e) Rain water harvesting pit (with all detail)
    f) Typical foundation details (Column foundation or spread footing)
    g) Title block showing – joinery details, Specification, Area statement, colour Index, Title of the property, space for owners Signature and Licensed Surveyor's Signature with address.

REVISION & TEST 9 Hours

21047 CAD IN CIVIL ENGINEERING DRAWING PRACTICE I

MODEL QUESTION PAPER

Duration : 3 Hours **Max. Marks :** 75

PART – A

1. Draw a longitudinal sectional elevation of semicircular arch
2. Draw the elevation of door partly paneled and partly glazed
3. Prepare a plan showing arrangement of furniture / fixtures and other features with size for a living room.
4. Prepare a plan showing arrangement of fixtures and other features with standard size for a bedroom.
5. Prepare a plan showing arrangement of fixtures and other features with standard size for a kitchen.
6. Prepare a plan showing arrangement of fixtures and other futures with standard size for a toilet.
7. Draw a section of load bearing wall from parapet to foundation and showing all the details across the section (Single storey).
8. Draw cross section of I, channel and compound beam of steel structures.
9. Draw cross section of T, Angle and Tubular section of steel structures.

PART - B (Line plan and detailed specifications to be given)

1. Draw the plan and section with schedule of opening of single bed room building.
2. Draw the plan and section with schedule of opening of double bed room building.
3. Draw the plan and section with schedule of openings of a primary school building.
4. Draw the plan and section with schedule of opening of a hospital building.
5. Draw the plan and section with schedule of opening of a small workshop with steel columns, steel roof trusses and metal sheet roofing.

IN BOARD EXAMINATION, QUESTIONS WILL BE CHOSEN AS FOLLOWS

PART –A	By lot one question	30 marks
PART – B	By lot one question	40 marks
Viva - voce		5 marks
Record works		25 marks
Total		100 marks

V SEMESTER

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

STRUCTURAL ENGINEERING

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21051**
Semester : V Semester
Subject Title : **STRUCTURAL ENGINEERING**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
STRUCTURAL ENGINEERING	6 Hrs	96 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course the students should be able to:

- Analyse and design simple RCC elements like singly / doubly reinforced rectangular beams, and singly reinforced T-beams (Cantilevers, Simply supported/ Continuous beams, Lintels etc.) for shear and flexure by limit state method;
- Design One way/ Two way slabs and Staircases by limit state method;
- Design Axially loaded Columns and Footings by limit state method;
- Design simple Steel members like Laterally supported Beams, Tension members, Compression members and Welded connections by limit state method.

21051 STRUCTURAL ENGINEERING

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**REINFORCED CEMENT CONCRETE STRUCTURES** **1.1 INTRODUCTION TO WORKING STRESS AND LIMIT STATE METHOD** Reinforced Cement Concrete- Materials used in R.C.C and their basic requirements – Purpose of providing reinforcement – Different types and grades of cement and steel – Characteristic strength and grades of concrete – Behaviour of R.C members in bending-Modular ratio and Equivalent area of R.C.Sections – Different types of loads on structures as per IS: 875-1987 - Different methods of design. Working Stress Method-Assumptions made in the W.S.M- Singly reinforced rectangular sections – Strain and stress distribution due to bending – Actual and Critical neutral axes – Under / Over reinforced sections- Balanced sections – Lever arm – Moment of resistance of singly reinforced rectangular sections (No problems). Limit State Method - Concept –Advantages- Different limit states- Characteristic strength and design strength of materials – Characteristic loads and design loads - Partial safety factors for loads and material strength - Limit state of collapse in flexure – Assumptions – Stress Strain curves for concrete and steel – Stress block – Maximum strain in concrete – Limiting values of neutral axis of singly reinforced section for different grades of steel -Design stress in tension and compression steel– Moment of resistance of singly and doubly reinforced rectangular sections – Problems. **1.2 DESIGN OF RECTANGULAR BEAMS FOR FLEXURE BY L.S.M** Design requirements-Effective spans of cantilever and simply supported beams – Breadth and depth requirements of beams – Control of deflection – Minimum depth requirement for stiffness –Minimum concrete cover for durability and fire resistance – Minimum and maximum areas/ spacing for main reinforcement and side face reinforcement as per IS 456-2000- Anchorage and Curtailment of reinforcements- Design bending moments – Design of singly and doubly reinforced rectangular beams (Cantilevers and Simply supported beams carrying point loads and u.d.l only)- Problems- Practice on using Design Aids, SP16 (not for examination).	**18 Hrs**
II	**2.1 DESIGN OF T-BEAMS AND LINTELS FOR FLEXURE BY L.S.M** Cross sections of Tee and L-beams- Effective width of flange-Neutral Axis and M.R of Singly Reinforced T-Sections- Design of singly reinforced T-beams/L-beams for flexure–Problems on Cantilevers (Inverted-T) and Simply supported T- beams – Loads on Isolated Lintels over openings of masonry walls - Design B.M for isolated lintels carrying rectangular/triangular loads- Design of Lintel- Simple problems	**18 Hrs**

Unit	Name of the Topic	Hours
II	**2.2 DESIGN OF CONTINUOUS BEAMS FOR FLEXURE AND SHEAR BY L.S.M** Methods of analysis of continuous beams- Effective Span- Arrangement of Loading for Critical Bending Moments- B.M coefficients specified by IS:456-200-Design of rectangular continuous beams (Singly and Doubly Reinforced) using B.M. coefficients (equal spans & u.d.l only) for sagging and hogging moments. Limit state of collapse in shear – Design shear strength of concrete – Design shear strengths of vertical / inclined stirrups and bent up bars –Principle of shear **design –** Critical sections for shear- S.F Coefficients specified by IS:456- 2000– Nominal shear stress –Minimum shear reinforcement- Design of vertical stirrups, inclined stirrups and bent up bars for rectangular beams using limit state method –Simple problems- Practice on use of Design Aids (not for examination).	
III	**3.1 DESIGN OF ONE WAY SLABS AND STAIRCASES BY L.S.M** Classification of Slabs – Effective spans – Loads (DL and IL) on floor/roof slabs and stairs (IS: 875-1987) – Strength and Stiffness requirements – Minimum and maximum permitted size, spacing and area of main and secondary reinforcements as per IS 456 -2000- Cover to reinforcements in slabs- Design of cantilever/simply supported one way slabs and sunshades by limit state method – Design of continuous slabs using B.M coefficients- Check for shear and stiffness – Curtailment of tension reinforcement – Anchoring of reinforcement– Practice in designing slabs using design aids (not for examination). Types of stairs according to structural behaviour- Requirements of Stairs- Planning a staircase – Effective span of stairs – Effective breadth of flight slab- Distribution of loads on flights – Design of cantilever steps – Design of doglegged and Open well stairs spanning parallel to the flight. **3.2 DESIGN OF TWO WAY SLABS BY L.S.M** Introduction –Effective spans –Thickness of slab for strength and stiffness requirements - Middle and Edge strips – B.M coefficients as per IS:456 – Design B.Ms for Simply supported, Restrained and Continuous slabs – Tension and Torsion reinforcement requirement– Design of two way slabs using B.M. coefficients – Curtailment of reinforcement – Check for shear and stiffness.	**18Hrs**
IV	**4.1 DESIGN OF COLUMNS BY L.S.M** Limit state of collapse in compression – Assumptions - Limiting strength of short axially loaded compression members - Effective length of compression members – Slenderness limits for columns – Classification of columns - Minimum eccentricity for column loads – Longitudinal and Transverse reinforcement requirements as per I S 456-2000 – Cover requirement - Design of axially loaded short columns with lateral ties / helical reinforcement – Use of Design Aids (not for examination).	**18 Hrs**

Unit	Name of the Topic	Hours
IV	**4.2 DESIGN OF COLUMN FOOTINGS** Basic requirements of Footings-Types of footings –Minimum depth below GL- Footings with uniform thickness and varying thickness (sloped footing) – Critical sections for BM, Transverse/Punching Shears – Minimum reinforcement, Distribution of reinforcement, Development length, Anchorage, Cover, Minimum edge thickness requirements as per IS 456-2000 – Design of Isolated footing (square and rectangular) with uniform/ varying thickness by limit state method- For Examination : Problem either on (i) Designing Size of Footing and Area of tension steel for flexure only for the given Column load and SBC of soil, or on (ii) Checking the footing for Punching shear and Transverse shear only, for the given sizes and other required details of the footing.	
V	**STEEL STRUCTURES** **5.1 DESIGN OF TENSION AND COMPRESSION MEMBERS BY L.S.M** General- Characteristic Actions, Partial Safety Factors for Loads, Design Actions- Ultimate Strength, Partial Safety Factors for Materials, Design Strengths of Materials - Rolled Steel Sections - Different forms of Tension members – Gross area, Net area and Net Effective sectionalarea of Tension members– Maximum permitted values of Effective Slenderness Ratio – DesignStrength of Tension members against Yielding of Gross section, Rupture of Critical section andBlock Shear- Design Strength of given Plates/ Angles connected to gussets by bolts/welds- Designof ties using single/ double angles, T-sections and channels. Different forms of Compression members- Classification of Cross sections- Limiting Width to Thickness Ratio- Effective sectional area- End Conditions and Effective length of Compression members – Maximum permitted values of Slenderness ratio –Imperfection factor and Stress reduction factor– Design Strength of Compression members- Problems –– Design of single angle and double angle Struts – Design of steel columns using rolled steel sections (Symmetrical sections only) with or without cover plates. (Lacing and battens not included). **5.2 DESIGN OF SIMPLE BEAMS AND WELDED CONNECTIONS BY L.S.M** Classification of Steel beams –Effective span- Design principles- Minimum thickness of Web-Design Strength in Bending/ Shear- Limiting deflection of beams - Lateral buckling of beams – Maximum permitted Slenderness Ratio- Plastic Moment of Resistance and Plastic Section Modulus of Sections- Shape Factor –– Design of laterally supported Simple beams using single / double rolled steel sections (symmetrical cross sections only). Types of welds – Size, Effective area and Effective length of Fillet welds – Requirements of welds-Stresses in Welds –Design strength of fillet/ butt welds – Lap and butt joints for plates and angles – Beam to Beam and Beam to Column connections - Seat angle and Web angle connections(Details only)–Problems on design of welded connections (Moment resistant connections not included). **REVISION AND TEST**	**18 Hrs** **6 Hrs**

Reference Book :

1. S.R.Karve and V.L.Shah," Limit state Theory and Design of Reinforced Concrete",Pune Vidya Griha Prakashan.
2. P C Varghese," Limit state Design of Reinforced Concrete",PHI Learning Pvt. Ltd",2011.
3. Dr.S.Ramachandra,Limit State Design of Concrete Structures",Scientific publishers, 2004.
4. Mallick and Rangasamy,"Reinforced Cement Concrete" Oxford-IBH.
5. N Krishnaraju, " Reinforced Concrete Design" New Age International Publications, 2012
6. B C Punmia, " Limit State Design of Reinforced Concrete", Laxmi Publications,2007
7. B C Punmia, " R C C Designs", Laxmi Publications, 2006
8. S S Bhavikatti, " Design of R C C and Structural Elements" (RCC Vol I), New Age International Publications, 2011
9. I S 456-2000 ; I S 875-1987; I S 800 -2007.
10. Explanatory hand book SP24, Design Aid SP 16, Detailing of Reinforcement,SP 34
11. M.R.Shiyekar "Limit State Design in Structural Steel", PHI Learning Pvt Ltd, 2011

21051 STRUCTURAL ENGINEERING

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. What is meant by limit state ?
2. How design load is determined from characteristic load ?
3. What is meant by doubly reinforced section ?
4. Why cover is necessary for the reinforcement steel ?
5. How the width of lintel is being chosen ?
6. Write any one advantage of T-beam over rectangular beam
7. Where inverted T-beams are provided ?
8. How the effective width of flange of a T-beam is determined ?
9. When a slab is to be designed as a one way slab ?
10. Write the Clause number of IS:456-2000 with respect to maximum spacing of tension reinforcement in slabs
11. What is meant by restrained slab ?
12. When torsion reinforcement has to be provided in two way slabs ?
13. State the minimum value of eccentricity to be considered in the design of columns
14. Why lateral ties are provided in columns ?
15. What is the purpose of footing ?
16. Specify the critical section for punching shear in an isolated R.C footing
17. Write the formula for the net effective area of tension plate connected by staggered bolts
18. When the cross section of a steel member is classified as compact section ?
19. Write the formula for calculating the strength of fillet weld
20. Write any two advantages of Butt weld

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 (A) i) Explain critical neutral axis and actual neutral axis in working stress method with a neat sketch.

ii) A RCC beam 300 mm $\times$ 420 mm effective size is reinforced with 3 Nos of 16mm diameter bars in its tension zone. Fe415 grade steel and M20 grade concrete are used. Determine the limiting moment of resistance of the section by limit state method

(OR)

(B) A cantilever beam of rectangular section 250 mm wide and 500 mm overall depth has to carry an udl of 24 KN/m (inclusive of self weight) over an effective span of 3.4 metre. M20 grade concrete and Fe415 grade steel are to be used. Design the reinforcement for flexure by limit state method

22 (A) Find the moment of resistance of a T beam having the following data: Effective width of flange = 740mm; Breadth of rib = 250mm; Reinforcement = 5 Nos 25 mm dia bars in tension zone; Thickness of slab = 80 mm; Effective depth of beam= 400 mm ; Steel grade Fe 415; Concrete grade M20

(OR)

(B) The support section of a continuous rectangular beam is subjected to a shear force of 150 KN. The effective size of the section is 305 mm x 510 mm. The beam had 5 numbers of 20 mm dia Fe 415 grade bars as tension reinforcement at mid span out of which two bars are cranked at 45^0 near the support. The support section already had 2 numbers of 20 mm dia bars in its tension zone. Design the shear reinforcement for the support section using Fe 415 grade steel by LSM. Concrete used is of grade M25.

23 (A) Design a dog legged staircase for a flat using M25 grade concrete and Fe.415 grade steel. The height between the floors is 3.0m. The effective span of a flight is 5.25 m including the two landings. The tread and rise of brick steps are 300mm and 150mm respectively. The unit weight of brick steps is 19KN/m^3.The imposed load is 3KN/m^2. The flight slab is simply supported at their ends and their sides are not embedded in to the wall. Uniform loading may be assumed for the full span.

(OR)

(B) Design a simply supported roof slab for a library of clear size 4 m $\times$ 5 m by LSM. The thickness of walls all-round is 230 mm. Access is not provided to the roof. The corners of the slab are not held down. Weight of weathering course will be 1 KN/m^2 . Use M 20 grade concrete and Fe 415 grade steel (Check for stiffness not necessary).

24 (A) Design a circular RC column with lateral ties to carry an axial load of 1250 KN. Take f_{ck} as 20 MPa and f_y as 500 MPa. The unsupported length of the column is 4 m. The ends of the column are effectively held in position but not restrained against rotation.

(OR)

(B) Design a square footing of uniform thickness for a RC Column carrying an axial load of 1800 KN. Size of column is 400 mm $\times$ 400 mm safe being capacity of soil is 150 KN/m^2 Use M20 grade concrete and Fe 415 grade steel. Check for shear not required

25 (A) Select a suitable single angle section to carry an axial tension of 240KN, due to DL and IL. The member has to be connected to gusset plates at its ends by fillet welds through one leg. The yield and ultimate strengths of steel are 250 N/m^2 and 400 N/m^2 . Connection need not be designed.

(OR)

(B) A laterally supported cantilever beam of 3 m effective span carries a load of 12.5 KN/m inclusive of its self weight through out its span. Design the beam by limit state method using double channels of yield stress 350 MPa. Check for stiffness not necessary.

21051 STRUCTURAL ENGINEERING

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Specify the size of fine aggregate to be used in RCC.
2. Define lever arm with respect to RC cross section.
3. What do you mean by under reinforced section?
4. What is meant by curtailment of reinforcement?
5. What is the function of lintels in buildings?
6. Where inverted T-Beams are provided?
7. At which section of a continuous beam there will be maximum BM?
8. List out the different types of shear reinforcement in beams .
9. What is the functional difference between one way slab and two way slab?
10. Why distribution bars are provided in slabs?
11. Which portion of a flight slab is subjected to maximum intensity of load?
12. When torsion reinforcement has to be provided in two way slabs?
13. What is meant by effectively held in position?
14. Write the advantage of helical reinforcement in columns.
15. Specify the critical section for punching shear in RC footings.
16. Specify minimum nominal cover for the reinforcement bars of footings.
17. What are the three different strengths of a tension member?
18. Why imperfection factors are used in the design of compression members?
19. What is the maximum permitted slenderness ratio for the compression flange of beams?
20. Specify the reduction factor for long welds.

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 (A) (i) Explain how the design stress for compression steel of a beam can be determined from the stress-strain curve.

(ii) A rectangular section of overall size 300 mm x 600 mm is reinforced with 4# 20 mm Φ bars in the tension zone and 2# 20 mm Φ bars in the compression zone with a clear cover of 25 mm. M20 grade concrete and Fe415 grade steel are used. Find the limiting moment of resistance of the section. (f_{sc} = 355 N/mm^2 for d'/d = 0.05 and f_{sc} = 352 N/mm^2 for d'/d = 0.10)

(OR)

(B) A simply supported rectangular beam has to be provided over a clear span of 12 m to carry an UDL of 20 KN/m, excluding its self weight. Design the midspan section of the beam using M20 grade concrete and Fe 415 grade steel in tension for the limit state of collapse in flexure. Assume the width of support as 300 mm.

22 (A) A Tee beam with rib width 230 mm, breadth of flange 1600 mm, and thickness of flange 100 mm has to carry an udl of 36 KN/m over its full span. The clear span of the beam is 6metre. Width of supports is 300 mm. Design the mid span section of the beam for limit state of collapse in flexure using M20 grade concrete and Fe.500 grade steel.

(OR)

(B) A continuous rectangular beam with 7 metres equal spans (effective) carries an imposed load (not fixed) of 12 KN/m and a dead load of 24 KN/m throughout its length. Design the beam for the maximum bending moment using M25 grade concrete and Fe.415 grade steel.

23 (A) (i) List the different types of stairs used in ordinary buildings. Draw a neat sketch of any one type.

(ii) The vertical height between two successive floors of a multi storeyed residential building is 3.2m. The clear size of the staircase room is 2.10 m × 4.25 m. Plan a dog legged stair case for the building.

(OR)

(B) Design the corner panel of a continuous reinforced concrete slab , which is supported by 230 mm wide RC beams at 3.8 m centres in X-direction and at 4.75 m centres in Y-direction, using M20 concrete and Fe 415 steel by limit state method. Imposed load (not fixed) is 2 KN/m^2 and weight of floor finish is 0.6 KN/m^2.

24 (A) Design a short square column using M15 concrete and mild steel to carry an axial load of 1800KN, by limit state method. Check the slenderness of the column if its effective length is 3.2 m.

(OR)

(B) The size of the rectangular footing provided for an RC column of 300 mm x 500 mm size is 3.0 m x 3.6 m. The column carries an axial load of 1500 KN. The thickness of footing is 1.0 m along the faces of column and 200 mm along its free edges. 18 numbers of 12 mm dia Fe 415 steel bars are provided in each direction at an average effective cover of 70 mm. Check the footing fo r transverse shear. The concrete used is of M20 grade.

25 (A) Design a tie member using a single channel section to carry an axial load of 850 KN. f_y = 450 MPa; f_u = 570 MPa. The member will be connected at its ends through its web by side fillet welds of 300 mm length each.

(OR)

(B) Two mild steel flats of 240 mm x 10 mm and 240 mm x 8 mm size are to be connected by a lap joint at the site. Using the maximum permissible size of welds, determine the design tensile strength of the joint . The angle between the fusion faces will be 105^0. Ultimate strength of weld is 415 N/mm^2. Determine the maximum permissible design tensile stresses in the two plates.

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name	**:**	**DIPLOMA IN CIVIL ENGINEERING**
Course Code	:	1010
Subject Code	:	**21052**
Semester	:	V Semester
Subject Title	:	**ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be able:

- To know the procedure of estimating water requirements for a water supply scheme.
- To select suitable sources of water supply and pipe materials.
- To determine the quality of water , testing procedures and standards for drinking water.
- To understand the methods of purification of water.
- To understand the systems of distribution for a water supply scheme.
- To understand the basic facts of sanitary engineering, the methods of collection and conveyance of sewage.
- To understand the primary and secondary treatment of sewage and disposal.
- To know the methods of disposal of sludge and solid wastes.
- To identify the various pollution and their prevention.
- To create awareness about environmental impact assessment.

21052 ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**PART I - WATER SUPPLY ENGINEERING** **1.1 QUANTITY OF WATER** Water supply - need for protected water supply - objectives of public water supply system – demand -types of demand - per capita demand - prediction of population - problems in arithmetical increase method, geometrical increase method, incremental increase method - sources of water - surface and subsurface sources. **1.2 INTAKES AND CONVEYANCE** Intakes - types of intakes-description of intakes - necessity of pumps - types of pumps - pipes for conveyance of water - cast iron, steel, G.I., cement concrete, R.C.C., hume and PVC pipes-pipe joints -laying and testing of pipe lines - pipe corrosion - corrosion control. **1.3 QUALITY OF WATER** Impurities in water - testing of water - collection of water sample - physical, chemical, bacteriological tests - standards of drinking water - water borne diseases and their causes.	**14 Hrs**
II	**2.1 TREATMENT OF WATER** Object of water treatment - flow diagram of treatment plants – sedimentation – purpose - types of sedimentation - coagulation - coagulants and their choice - types of sedimentation tanks – filtration - theory of filtration - types and description of filters - disinfection of water – methods - water softening –miscellaneous water treatment(names only) - mineral water – requirements - R.O process. **2.2 DISTRIBUTION SYSTEM** Distribution system - methods of distribution – gravity system, pumping system, combined system -systems of water supply - continuous and intermittent supply of water - layouts of distribution - dead end , grid iron, radial and circular systems - service reservoirs - types.	**14Hrs**
III	**PART II - SANITARY ENGINEERING** **3.1 COLLECTION AND CONVEYANCE OF SEWAGE** Sanitation – purpose – terms - systems of sanitation - quantity of sewage - variation in rate of flow of sewage - estimation of storm water – problems - minimum size of sewer - shapes of sewer (names only) -materials used for sewer- joints in sewer line - laying and testing of sewer lines - ventilation of sewers -cleaning of sewers.	**14Hrs**

Unit	Name of the Topic	Hours
	3.2 SEWER APPERTENANCES Sewer appurtenances – manhole - lamp hole - catch basin - street inlet - grease and oil trap -flushing tanks – drainage arrangements in buildings - sanitary fittings - sewage pumps –necessity - types of sewage pumps (names only).	
IV	**4.1 TREATMENT AND DISPOSAL OF SEWAGE** Objects of sewage treatment - flow diagram of sewage treatment plants - treatment of sewage - primary and secondary treatments - screens - skimming tanks - grit chambers - sedimentation tanks – filters - types and description of filters - activated sludge process - septic tanks for isolated buildings - construction and working of septic tanks - disposal of septic tank effluent – soak pits, dispersion trenches - oxidation ponds – sludge – types - methods of sludge disposal. **4.2 SOLID WASTE MANAGEMENT** Solid waste – classification - collection and conveyance of solid waste - disposal of solid waste – necessity - reduction and reuse of solid wastes - methods of solid waste disposal - incineration, dumping, sanitary landfill , composting - energy from waste	**14Hrs**
V	**PART III - POLLUTION CONTROL** **5.1 ENVIRONMENTAL POLLUTION** Environment – definition - water pollution - sources of water pollution - effects of water pollution - control of water pollution - soil pollution - sources of soil pollution - effects of soil pollution - control of soil pollution - noise pollution - sources of noise pollution - effects of noise pollution - control of noise pollution - air pollution - sources of air pollution - effects of air pollution on human beings, plants, animals, materials - air pollution control equipment - control devices for particulate contaminants - environmental degradation - ozone layer depletion - green house effect - acid rain. **5.2 ENVIRONMENTAL IMPACT ASSESSMENT** Environmental impact assessment (EIA) - methodology of EIA - organising the job - performing the assessment - preparation of environmental impact statement (EIS) - review of EIS - environmental risk assessment - limitation of EIA. **REVISION AND TEST**	**14Hrs** **10Hrs**

Reference Book :

1. N.N. BASAK- Environmental Engineering,Tata McGraw hill publishing company Ltd.,New Delhi, 2010
2. A.KAMALA,D.L.KANTHRAO- Environmental engineering, Tata McGraw hill publishing company Ltd.,New Delhi
3. GURCHARAN SINGH- Water supply and sanitary engineering vol.I &II,Standard publishers & distributors,Delhi
4. Dr.SURESH K.DHAMEJA- Environmental engineering and management,S.K.Kataria &Sons, New Delhi.
5. S.K.GARG- Water supply and sanitary engineering,Khanna publishers, Delhi.
6. M.ANJI REDDI- Text book of Environmental science and technology,BS Publications, Hyderabad.
7. P.VENUGOPALA RAO – Principles of Environmental science and engineering, PHI learning pvt. Ltd., New Delhi.
8. B C Punmia, “Environmental Engineering”, Laxmi Publications, 2010
9. B C Punmia, “Waste Water Engineering”, Laxmi Publications, 2010

21052 ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1 State the need for protected water supply to community
2 State any two subsurface sources of water
3 List any four types of pipes used in water supply
4 Define P_H value
5 What impurities are removed by filtration?
6 State any two Types of sedimentation tanks
7 List the methods of distribution of water
8 State any two functions of service reservoir
9 Define sewage
10 State any two advantages of water carriage system
11 Write any two empirical formulae used for calculating quantity of storm water
12 List any four sewer appurtenances
13 State the types of filters used in secondary treatment of sewage
14 What is a septic tank?
15 Name the methods of solid waste disposal
16 Write any two merits of incineration
17 Define air pollution
18 State any two sources of noise pollution
19 Define EIA
20 State any two goals of EIA

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 (A) The censes records of a city show the population as follows

Present	: 50,000
Before one decade	: 47,100
Before two decades	: 43,500
Before three decades	: 41,000

Workout the probable population after one, two, three decades by arithmetical increase and geometrical increase methods

OR

(B) i) Describe canal intake with a neat sketch

ii) What is turbidity? How is it measured?

22 (A) Describe the construction and operation of a rapid sand filter with a neat sketch

OR

(B) i) Explain the systems of supply of water

ii) State and explain the types of service reservoirs

23 (A) Describe the procedure for laying and testing of sewers

OR

(B) What are sanitary fittings? State and explain any four sanitary fittings with sketches

24 (A) Explain the treatment of sewage by activated sludge process with the help of a flow diagram

OR

(B) Write short notes on i) Collection and conveyance of solid waste

ii) Energy from waste

25 (A) i) State the effects of water pollution and explain the measures to be taken to prevent water pollution

ii) Write short notes on ozone layer depletion

OR

(B) i) State the limitations of EIA

ii) How is the environmental impact statement prepared?

21052 ENVIRONMENTAL ENGINEERING AND POLLUTION CONTROL

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1 Define per capita demand
2 What is a shallow well?
3 State any two methods by which corrosion can be prevented
4 List any four chemical tests to be conducted on water to find the impurities
5 State any two advantages of rapid sand filter
6 State the common coagulants used for water treatment
7 Name the types of distribution layouts of water supply system
8 State the classifications of service reservoir
9 Define sullage
10 State the methods of disposing sewage
11 State any two types of non-circular sewer sections
12 Give any four types of sewage pumps
13 State the object of screening
14 State the function of soak pit
15 What do you mean by solid waste?
16 What are contact beds?
17 Define soil pollution
18 State any two types of air pollution controlling equipments
19 Define EIS
20 State any one limitation of EIA

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 (A) Explain the various types of surface and sub surface sources of water

OR

(B) i) State and explain different types of pipe joints used in water supply
ii) Write short notes on water borne diseases

22 (A) i) State and explain different methods of disinfection of water
ii) Differentiate between plain sedimentation and sedimentation with coagulation

OR

(B) Mention the various layouts of distribution in water supply system and explain them in detail

23 (A) i) Compare conservancy system with water carriage system
ii) Write short notes on ventilation of sewers

OR

(B) i) Write short notes on grease and oil trap
ii) Draw a typical layout of house drainage system and state the functions of its components

24 (A) Describe the structural features and functioning of a standard rate trickling filter with neat sketches

OR

(B) i) How are solid wastes classified?
ii) State and explain the methods of solid waste disposal

25 (A) i) Describe the harmful effects of air pollution on human beings, animals and plants
ii) What is acid rain? State the effects of acid rain

OR

(B) With the help of flow chart , describe the EIA process

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

ADVANCED CONSTRUCTION TECHNOLOGY

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21071**
Semester : VI Semester
Subject Title : **ADVANCED CONSTRUCTION TECHNOLOGY (ELECTIVE THEORY II)**

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ADVANCED CONSTRUCTION TECHNOLOGY	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be familiar with:

- Pile foundations
- Modified Concrete
- Pre fabrication systems and methods
- Fire protection in buildings
- Earthquake proof construction
- Maintenance and Rehabilitation of buildings
- To take precautionary measures to prevent cracks in buildings
- House modernisation
- Lift modernisation

21071 ADVANCED CONSTRUCTION TECHNOLOGY (ELECTIVE THEORY II)

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**1.1 PILE FOUNDATIONS** Definition – uses of piles – types of piles – Bearing piles and Friction piles - classification based on material – stone piles- Encased piles - Reinforced cement concrete piles cast-in situ pile and pre cast piles description, advantages and disadvantages - load bearing piles and friction piles - purpose - sheet piles-types-description - choice of type of pile - factors to be considered – pile cap and pile shoe – description - load test on piles – description - Pile driving – equipments - types of hammer - choice of hammer - causes of failure of piles – Reinforcement requirements for R C piles **1.2 MODIFIED CONCRETE** Admixtures – definition – function – classification - uses of different types - quantity to be used - light weight concrete - light weight aggregate - production of light weight aggregate - shot crete or guniting – definition - typical arrangement for gunite system - special concrete – Ferro cement-production process – curing - advantages and limitations - fibre reinforced concrete - production process – uses - Pre-stressed concrete - General principle of pre stressing - advantages of pre stressed Concrete - materials used - methods of pre-stressing - steel used - pretension method - post tension method - system of pre-stressing - freyssinet system - Magnel Blaton system - Lee-mc-call system - Causes for losses in prestress – remedial measures – Composite member	**14 Hrs**
II	**2.1 PRE FABRICATION SYSTEM:** Advantages and Disadvantages of Prefabrication system - Terms defined : prefabricated building, module, composite members, modular co-ordination, system; - Basic module - planning modules grid – modules in horizontal plane for residential buildings and industrial buildings - other consideration - Module for components:- flooring scheme, Beams, columns, walls; Staircase,- lintel, sunshade - Tolerance on dimensions:- length, cross sectional dimension, straightness, squareness, twist, flatness **2.2 PRE FABRICATION METHODS** Characteristics to be considered in devising a system - Types of pre fabricated building - load bearing wall type - frame type; Design considerations - bearing for pre cast units, joints; Requirements of an ideal structural joint - manufacture of precast concrete elements – place - process - main, auxiliary and subsidiary process; Stages of precasting –	**14 Hrs**

Unit	Name of the Topic	Hours
	preparation and storage of materials - moulding and curing; Pre fabrication methods: individual method, battery form method, tilting mould method , Flow line production method,- extension method - Handling during transport and storage - Handling arrangement - Transport - inside the factory - stacking yard to erection site, Erection works to be carried out - Equipment required	
III	**3.1 FIRE PROTECTION IN BUILDINGS** General - causes and effects of fire - precautionary measures to minimize dangers of fire – limiting fire spread – factors to be considered - Fire resisting properties of common building material - general rules for fire resisting buildings - alarm system - protection of openings - common wall stair-floor fire extinguishing arrangement – fire protection systems – types - Emergency exit arrangements - Strong room construction **3.2 EARTH QUAKE RESISTING CONSTRUCTION** Indian Seismicity – Earthquake History - Definition of terms used - Behavior of structures in the past Earthquakes – Seismic forces – Effect of seismic forces on Buildings – Planning of Earthquake resistant Buildings - Roofs and Floors- Articulation joints – Expansion Joints – I.S. code provision – Alterations to Buildings – Foundation – Permissible increase in the allowable Bearing capacity of soils - Seismic coefficient for different zones – Construction of framed buildings in Earthquake zones – Walls – Beams etc.	**14 Hrs**
IV	**4.1 MAINTENANCE AND REHABILITATION OF BUILDINGS** Rehabilitation of buildings - demolition of buildings - safety aspects – general - precautions during demolitions - sequence of demolition of operation – demolition process of trusses, girders and beams, walls, flooring - catch plat form – lowering removal and disposal of materials - mechanical demolition - Repairs to building – repairing of plastering works - fixing doors in – Making opening in masonry and fixing doors and windows - Renewing glass panes with wooden fillets – fixing fan clamps in existing R.C.C slab - repair to terrazzo (mosaic) flooring **4.2 PRECAUTIONS TO PREVENT CRACKS IN BUILDINGS** Cracks - general – Hair crack – Structural crack – Horizontal crack in masonry – Vertical/ diagonal cracks at walls - R.C.C beams or pillars - transverse cracks in R.C.C slab and sunshade - Repairs – Methods- materials used for filling cracks.	**14 Hrs**

Unit	Name of the Topic	Hours
V	**5.1 HOUSING MODERNIZATION** Housing modernization and management (building and construction safety, energy efficiency in housing, Property Refurbishment / Upgrade / Modernization / Renovation - Modular kitchens, bathrooms, New windows, doors and timber floors, Roof insulation, dry lining and BER (Building Energy Rating) - Certificates – Plumbing and Electrical to heating efficiency Landscaping and driveways to patios and decking - Drafting a Construction Contract – Transforming from Traditional to Modern Style - Case Studies – Strengthening of Old buildings -Energy-saving houses, Green House, Passive house, Passive house construction, Low-energy house, Zero-energy house, Energy consulting, Energy efficiency: Passive house standard, Quality-tested commercial passive house construction, Office building construction, Residential building construction - Consulting, planning, supervising. **5.2 LIFT MODERNISATION** Independent Lifting Services - Mechanical Modernisation - escalators or pathways - Aesthetic Modernisation -Lift Car Interior-Eco-friendly Modernisation – lift construction - Installation and modernization and maintenance. **REVISION AND TEST**	**14 Hrs** **10 Hrs**

Reference Book :

1. Concrete Technology – M.S. Shetty
2. Fire Resistant Construction – Building Construction by S.P.Arora and S.P.Bindra
3. Earth quake Proof - Building Construction by Dr.Janardhanjha and Prof.Suresh Kumar
4. SinhaIS Code of Practice for Earth quake , IS Code of Practice for Fire resistance, IS Code of Practice for pre stressing (2005)
5. Pile foundation – RD Chellis, MIS
6. Construction and foundation Engg – Sinha & Janatha Shau.
7. Principle Fine safty standards for building Construction – M.Ya Roytman

21071 ADVANCED CONSTRUCTION TECHNOLOGY (ELECTIVE THEORY II)

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. When is sheet piling adopted?
2. Classify the piles based on materials used
3. Define admixtures
4. What are the methods available for mix design?
5. Define pretensioning.
6. Explain the need of High strength concrete and steel in prestressing.
7. What are the advantages of pre stressed concrete?
8. Write the names of pre fabricated elements in a load bearing wall type construction.
9. What are the fire protection measures to be taken in public buildings?
10. Define the seismic coefficient
11. What are the causes of Earth quake
12. Explain seismograph.
13. Define shrinkage cracks
14. What are the factors which influence the cracks?
15. What are the major causes for defects in buildings?
16. What are the materials used for repairs in buildings?
17. Define energy efficiency
18. Write shortly about land scaping
19. What are escalators?
20. What are Independent Lifting Services?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 A) Describe the process of casting a precast concrete pile and draw a neat sketch of a typical concrete pile.

(or)

B) i) What are the composition of cement.
ii) Write the procedure of Mix design by I.S.Code method.

22 A) (i) Draw neat sketches of prestressing floor slab, grid floor , circular pipes.
(ii) What are the methods available for post tensioning and explain any one of them.

(or)

(B) (i) Draw the different applications of precast elements
(ii) State the advantages and disadvantages of Pre fabrication system.

23 (A) (i) Write short notes on Fire-resistance of concrete.
(ii) What are the general guidelines for planning an earthquake resistant buildings?

(or)

(B) (i) What are the Exit requirement as per NBC of India.
(ii) What are the precautions to be taken during Earth quake.

24 (A)(i) Explain the methods of repairing cracks in concrete.
(ii) What are the major causes for defects in building

(or)

B) (i) What are the materials used for repairs in buildings.
(ii) Define structural cracking in concrete and what are the factors to be considered during demolition.

25 (A) (i) Explain briefly about Housing modernization and management.
(ii) What are the features of Lift Car

(or)

(B) (i) Explain about Passive house construction.
(ii) Explain where escalators are provided.

21071 ADVANCED CONSTRUCTION TECHNOLOGY

(ELECTIVE THEORY II)

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. What are factors to be considered during piling.
2. What is meant by pile cap ?.
3. State any two advantages of pre stressed concrete.
4. Give any one requirement for the pre stressing steel.
5. Define the term “module”
6. State any two disadvantages of pre fabrication system.
7. Write any two methods of pre fabrication.
8. State any two main equipments required at the site of a pre fabrication project .
9. Mention the fire precautionary measures.
10. Explain fire protection systems
11. Explain seismograph.
12. What are the causes of Earth quake.
13. What are the major causes for defects in building.
14. What are the materials used for repairs in buildings.
15. How to repair the plastering cracks in buildings.
16. Define shrinkage cracks
17. What is energy rating.
18. What is Low-energy house
19. What are the Renovation to be adopted to kitchens,
20. What is Eco-friendly Modernization

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

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21 (A) (i) Describe a process of casting a precast concrete pile
(ii) Draw a neat sketch of a typical concrete pile
(or)
(B) (i) What are the advantages of pre stressed concrete?
(ii) Explain with a neat sketch Freyssinet system of prestressing

22 (A) (i) Write a short notes on modular co-ordination.
(ii Explain about the different tolerances in Pre fabrication system.
(or)
(B) (i) What are the Characteristics to be considered in devising a system
(ii) What are the stages of pre casting

23 (A) (i) Write short notes on fire resisting building materials
(ii) Write short notes on Fire-resistance of concrete
(or)
(B) (i) Explain the I.S.code provision for Earthquake in Buildings
(ii) What are the causes of Earthquake

24 (A) (i) Write short notes on “Patch repairs for plastering”
(ii) What are the factors which influences the cracks?
(or)
(B) (i) What are the precautions to be taken during demolitions?
(ii) What are the materials used for repairs in buildings
25 (A) (i) Explain Property Refurbishment
(ii) Write briefly about Building Energy Rating
(or)
(B)(i) Explain standards Passive house
(ii) What is quality-tested commercial passive house construction

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

REMOTE SENSING AND G I S

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name	**:**	**DIPLOMA IN CIVIL ENGINEERING**
Course Code	:	1010
Subject Code	:	**21072**
Semester	:	V Semester
Subject Title	:	**REMOTE SENSING AND GIS (ELECTIVE THEORY I)**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
GIS AND REMOTE SENSING	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be familiar :

- To understand the basic concepts of remote sensing
- To know the applications of Geographic information systems in Civil Engineering
- Identify the basic remote sensing concepts and its characteristics
- Implement the photogrammetry concepts and fundamentals of Air photo interpretation
- Use various analysis and interpretation of GIS results

21072 REMOTE SENSING AND GIS (ELECTIVE THEORY I)

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**INTRODUCTION TO REMOTE SENSING** Basic Concepts of Remote Sensing – Energy Sources and Radiation principles – electromagnetic radiation – characteristic of real remote sensing system, platforms, sensors, satellite, Indian Remote Sensing satellite	**14Hrs**
II	**PHOTOGRAMMETRY** Geometric elements of a vertical photograph – Stereoscopic plotting instruments, Ortho photos, Flight planning	**14Hrs**
III	**IMAGE INTERPRETATION & PROCESSING** Fundamentals of Airphoto interpretation - Elements of image interpretation, concepts of digital image processing image Rectification and Restoration, Image enhancement, Image classification, Application of Remote sensing in Civil Engineering	**14Hrs**
IV	**INTRODUCTION TO GIS** Basic Concepts of GIS – Introduction to GIS - History of development of GIS - Elements of GIS, Computer hardware – Software, Data Input, Verification, Storage and Output	**14Hrs**
V	**GIS ANALYSIS** Map Overlay - Vector and raster data model, mapping concept, data storage and database management - development of map overlay, overlay operation Errors and quality control – Current issues and Trends in GIS application in Civil Engineering REVISION AND TEST	**14Hrs** **10 Hrs**

Reference Book :

- Lo & Yeung (2005), Geographic Information Systems, Prentice of India.
- Anji Reddy.M. (1998), Remote Sensing and Geographical information systems.
- Lillesand, T.M. & Kiefer R.W. (1998), Remote Sensing and image interpretation, John Wiley & Sons, Newyork.
- Burrough P.A. (2000), Principle of Geographical Information Systems for land resources assessment, Clarendon Press, Oxford.
- Clarke Parks & Crane (2005), Geographic Information Systems & Environmental Modelling, Prentice-Hall of India.
- Wolf Paul (1998), Elements of Photogrammetry, McGraw Hill, New Delhi.
- Shahab Fazal,"G I S Basics", New Age International Publications, Chennai.

21072 REMOTE SENSING AND GIS (ELECTIVE THEORY I)

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. How are remote sensing images obtained are or converted into digital form?
2. Why are digital forms used?
3. What are the four major areas of computer operations in digital image processing?
4. What is image restoration or preprocessing?
5. What is image enhancement?
6. What is image classification?
7. What is data-set merging?
8. Describe the characteristics of a digital image
9. How are digital numbers used in application to remote sensing images?
10. How are data stored and used by computers?
11. What is GIS?
12. What is projection ?
13. What ae the four functions to be included in all GIS?
14. Which are the areas of GIS application in commercial industry?
15. What is reverse geocoding?
16. What is geo-referencing?
17. What is geo-processing?
18. What is database organization?
19. What are the advantages and disadvantages of employing object-oriented GIS database
20. Give distinction between vector and raster GIS?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 (A) What are the five basic steps for image classification?

OR

(B) Differentiate between unsupervised classification and supervised classification?

22 (A) What are the advantages to be gained by multisensor image merging?

OR

(B) What are the other image variations which computers can produce from the input data?

23 (A) What is the size in pixels of a MSS Landsat image, a TM Landsat image, a HRV multispectral SPOT image and a HRV panchromatic SPOT image?

OR

(B**)** What are the advantages to be gained by multisensor image merging?

24 (A) Describe the difference between raster and vector data models used to represent maps in a GIS

OR

(B) Summarize the various definitions of a GIS .What elements do each have in common?

25 (A) What is the difference between projected coordinated system and geographic coordinate system?

OR

(B) Describe the differences between raster and vector based GIS?

21072 REMOTE SENSING AND GIS (ELECTIVE THEORY I)

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. How are remote sensing images obtained are converted into digital form?
2. How are digital numbers used in application to remote sensing images?
3. How are digital numbers stored and used by computers?
4. What is the numerical range of values most often associated with remote sensing data?
5. What is enhancement?
6. What is the purpose of filtering?
7. Describe the X, Y, and Z parameters of a digital image.
8. Describe the characteristics of a digital image
9. Define GIS:
10. Why does selection of a particular GIS always involve compromise?
11. List four trends in GIS technology?
12. What is a scale.?
13. What is geocoding?
14. How does the "human factor" enter into GIS development and implementation?
15. How would you distinguish among GIS, CAD
16. What are different projection systems
17. What is image enhancement?
18. What is image classification?
19. What is data-set merging?
20. Why are digital forms used?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 A) Differentiate between unsupervised classification and supervised classification ?

OR

B) What are advantages to be gained by multisensory image merging ?

22 A) How many ratio combinations are possible with the four bands of the MSS ?

OR

B) Why is it useful to view GIS as a process rather than merely software of hardware ?

23 A) According to William E.Huxhold (1991) in Chapter 7 An Introduction to Urban Geographic Information Systems

OR

B) Describe the characteristics of a digital image

24 A) What three issues are most critical to the overall success or failure of a GIS project ?

OR

B) Describe the differences between raster and vector based GIS ?

25 A) Paper and digital maps are sometimes referred to as "dumb maps. " Why are they and what would make them "intelligent ?"

OR

B) Explain the difference between attribute and spatial data, give examples

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

SOIL MACHANICS AND FOUNDATION ENGINEERING

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21073**
Semester : V Semester
Subject Title : **SOIL MACHANICS AND FOUNDATION ENGINEERING**
(Elective Theory I)

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
SOIL MACHANICS AND FOUNDATION ENGINEERING	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be familiar with:

- To study the Properties of Soil , Classification and Strength of soils
- To describe about the Sub-soil Sampling
- To study about the Seepage analysis , Bearing Capacity of soil and Settlement of Foundations
- To study about the Types of Foundations , Pile foundations and Pile Groups
- To understand about the Foundations on Expansive soil and Machine Foundations
- To know about the Foundations of Transmission Line Towers

21073 SOIL MECHANICS AND FOUNDATION ENGINEERING (ELECTIVE THEORY I)

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**1.1 SOIL MECHANICS AND INDEX PROPETIES** Introduction - Development of Soil Mechanics - Fields of application of Soil Mechanics - Soil formation - Cohesive and Cohesionless soil - Soil Properties - General, Index and Engineering properties - Detailed description - Atter Berg limits - Simple problems **1.2 HYDRAULIC PROPERTIES OF SOIL** Introduction - Permeability - Co-efficient of permeability - Darcy's law - Factors affecting permeability - Permeability tests - Simple problems - Quick sand conditions	**12Hrs**
II	**2.1 CLASSIFICATION AND STRENGTH OF SOIL** Classification of soil - Introduction - Necessity - Systems of soil classification - Field identification of soil - Shear strength of soil - Introduction - Shear strength - Mohr's stress circle - Mohr-Coulomb failure theory - Shear strength test - Unconfined compression test - Mohr's circle for unconfined compression test - Compaction - Consolidation - Consolidometer - Optimum moisture content - Proctor's Compaction test - Methods of compaction - Degree of compaction - Field density of soil - Tests - Compaction and Consolidation - Comparison **2.2 STABILIZATION OF SOIL AND SUB-SOIL SAMPLING** Stabilization of soil - Introduction - Objects of stabilization - Methods of stabilization - Soil exploration - Introduction - Objects of soil exploration - Methods of soil exploration - Direct , Semi-direct and Indirect methods - Spacing and depth of test borings - Boring log - Sounding and Penetration tests - Geophysical methods - Sub-soil Sampling - Disturbed and Undisturbed samples - Types of samplers - Split spoon sampler - Thin-walled sampler - Chunk sampling	**16Hrs**

Unit	Name of the Topic	Hours
III	**3.1 SEEPAGE ANALYSIS AND SEEPAGE BELOW HYDRAULIC STRUCTURES** Seepage analysis - Introduction - Head , Gradient and Potential - Hydraulic gradient - Seepage pressure - Upward flow (Quick condition or Quick sand) - Types of flow lines - Types of flow (Definition only) - Two dimensional flow (Laplace equation) - Velocity potential -Properties of flow net - Uses of flow net - Seepage below Hydraulic structures - Introduction - Hydraulic gradient - Piping - Exit gradient - Khosla's theory - Seepage flow nets below hydraulic structures **3.2 BEARING CAPACITY AND SETTLEMENT OF FOUNDATIONS** Bearing capacity - Introduction - Terminology - Factors affecting bearing capacity of soils - Methods of determining bearing capacity - Types of failure in soil - General , Local and Punching shear failure - Analytical methods - Rankine's analysis - Terzaghi's analysis - Assumption and limitations - Effect of water table - Methods of improving bearing capacity of soil - Settlement of foundation - Introduction - Causes and Effect of settlement - Plate load test - Simple problems	**14Hrs**
IV	**4.1 FOUNDATIONS** Foundation - Introduction - Definitions - Objectives - Requirements of foundation - Criteria for selection of type of foundation - Types of foundations - Shallow and Deep foundations - Types - Foundation at different levels - Foundation on made up grounds - Deep foundation - Introduction - Pile foundation - Uses of piles - Types of piles - Caisson foundation - Types - Selection of piles - Pile Driving - Capacity of piles - Pile load test - Floating foundation - Negative skin friction - Pile groups - Bearing capacity of pile groups - Settlement of pile group **4.2 FOUNDATIONS IN EXPANSIVE SOIL** Introduction - Identification of expansive soil - Free Swell Test - Differential free swell test - Indian expansive soil - Swell potential and Swelling pressure - Traditional Indian practice - Methods of foundation in expansive soils - Replacement of soils and "CNS" concept - Under reamed pile foundation - Remedial measures for cracked buildings	**16Hrs**

Unit	Name of the Topic	Hours
V	**5.1 MACHINE FOUNDATION** Introduction - Soil dynamics - Free vibration and Forced vibration - Definitions -Natural frequency - Barkan's method Pauw's method - Types of machines and machine foundation - General requirements - Design of machine foundations - Reciprocating type - Centrifugal type - Impact type - Steps to design - Couzen theory - In-situ dynamic investigation of soil - Methods - IS code of practice - Design criteria - Isolation of foundation - Simple problems **5.2 FOUNDATIONS OF TRANSMISSION LINE TOWERS** Introduction - Necessity - Forces on Tower Foundations - General design criteria - Choice and type of foundations - Design procedures - Stability conditions - Description – No problems REVISION AND TEST	**12Hrs** **10Hrs**

Reference Book :

- B C PUNMIA , "Soil Mechanics and Foundation Engineering", Laxmi publications (P) Ltd., 2005
- SWAMI SARAN , "Analysis and Design of Substructures" (LSD) – Second Edition 2010
- V N S MURTHY , "Soil Mechanics & Foundation Engineering"–Sai Kripa Technical Consultants
- Dr S B SEHGAL, "A Text Book of Soil Mechanics", CBS Publishers & Distributors
- WAYNE C.TENG, "Foundation Design", Prentice Hall of India (P) Ltd.,

21073 SOIL MECHANICS AND FOUNDATION ENGINEERING

(ELECTIVE THEORY I)

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1 Define : Cohesive soil
2 Define : Shrinkage limit
3 Define : Void ratio
4 What do you mean by co-efficient of permeability ?
5 Define : Shear strength of soil
6 What is consolidation ?
7 What is meant by soil exploration ?
8 Define : Boring log
9 Define : Hydraulic gradient
10 What is flow net ?
11 Define : Bearing capacity of soil
12 State any two causes for the settlement of foundation
13 Define : Shallow foundation
14 Define : Friction pile
15 What is “CNS” concept ?
16 What is under reamed pile foundations ?
17 Define : Natural frequency
18 State any two assumptions made in Pauw’s method
19 What are the forces acting on the transmission line towers ?
20 State the stability conditions to check the stability of tower foundations

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21.A) i .Write short notes on soil formation
ii.Explain how the water content in soil is determined by oven drying method ?

OR

B) i. Explain with neat sketch that the 'soil mass has a three phase system'
ii. Define " Permeability." Explain with neat sketch any one method to determine the co-efficient of permeability of soil

22 A) i. Explain the purpose and method of unconfined compression test
ii.Describe the Mohr's - Coulomb failure theory

OR

B) i .What are the objects of soil exploration ?
ii.Explain with neat sketches any two types of soil samplers

23 A) i.Write short notes on quick sand conditions
ii.Draw the different types of seepage flow nets below hydraulic structures

OR

B) i.Explain the different types of shear failures of soil.
ii.Explain how the plate load test is carried out to determine the bearing capacity of soil ?

24 A) i.Briefly describe about the foundation on reclaimed soil
ii.What do you mean by pile driving ? Explain how it is to be carried out in the field ?

OR

B) i.Describe free swell test
ii. What are the remedial measures to be carried out for cracked buildings ?

25 A) i.Distinguish between free and forced vibrations
ii.What are the design criteria for design of foundation for impact type machine as per IS code ?

OR

B) i.State the general design criteria for the foundations of transmission line towers
ii.Explain with neat sketches any two types of foundations for the construction of transmission line towers

21073 SOIL MECHANICS AND FOUNDATION ENGINEERING

(ELECTIVE THEORY I)

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1 Differentiate unit weight and density of soil
2 Define : Degree of saturation
3 Define : Darcy's law
4 What do you mean by quick sand conditions ?
5 Define : Optimum moisture content
6 State any two necessities for the classification of soil
7 Mention any two objects of soil stabilizations
8 What is SPT value ?
9 State the different types of flow of fluids
10 List two uses of flow nets
11 Define : Safe Bearing capacity of soil
12 What is punching shear failure ?
13 State any two uses of pile foundations
14 Define : Deep foundations
15 What is swelling pressure ?
16 Mention any two methods of foundations on expansive soil
17 What is damping ?
18 What is frequency ratio ?
19 What are the factors to be considered in the choice of tower foundation?
20 What are the two cases for which the tower foundation are to be checked?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 A) i.Define : Liquidity index and Plasticity index
ii.Explain the liquid limit test on soil with neat sketch

OR

B) i.Explain how the plastic limit of soil is determined in the laboratory
ii.Explain in detail the factors affecting the permeability of soil

22 A) i.Compare compaction and consolidation of soil
ii.Explain with neat sketch the standard Proctor's compaction test to determine the density of soil

OR

B) i.Write short notes on disturbed and undisturbed soil samples
ii. Explain with neat sketch any one type of geophysical method of soil exploration

23 A) i.State the different properties of flow nets
ii.Explain how the uplift pressure and exit gradient are calculated by using Khosla's theory

OR

B) i.What are the factors affecting the bearing capacity of soil ?
ii.What are the assumptions and limitations of Terzaghi's analysis on bearing capacity of soil

24 A) i.Explain with neat sketch the negative skin friction
ii.Explain how the pile load test is carried out to determine the bearing capacity of piles ?

OR

B) i.Explain how the expansive soils are identified ?
ii.Explain with neat sketch about the under reamed pile foundation

25 A) i. What are the general requirements for machine foundations
ii.Briefly describe the resonance method and wave velocity method for dynamic investigation of soil at the site

OR

B) i.Give the necessary information required for the design and conastruction of transmission line tower foundation
ii.Explain how is the safety of a tower foundation checked against Uplift and overturning

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

WATER RESOURCES MANAGEMENT

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21074**
Semester : V Semester
Subject Title : **WATER RESOURCES MANAGEMENT (ELECTIVE THEORY I)**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
WATER RESOURCES MANAGEMENT	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be familiar with:

- To understand water resource potential in India and need for water resource management.
- To understand the components of hydrological cycle and hydrograph.
- To understand the occurrence of ground water and ground water exploration methods.
- To understand the ground water basin management concept.
- To study the classification of rivers and river training works.
- To know the different types of storage works and dam structures.
- To understand the distribution system of canals and management of canal irrigation.
- To understand the concept of water shed management including GIS approach.
- To study the types of detention basins and reclamation of water logged lands.

21074 WATER RESOURCES MANAGEMENT (ELECTIVE THEORY I)

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**1.1 INTRODUCTION** Water resources – world water inventory - Importance of water resources - Necessity for conservation and development of water resources – water resources of India - water resources management - purpose - factors involved in water resources management. **1.2 HYDROLOGY** Introduction – Definition -Application of Hydrology in engineering - Hydrological cycle - Precipitation – forms of Precipitation - measurements of rain fall - Rain gauge - types of rain gauges - rain gauge network – mean rainfall over a drainage basin – methods - Radar and Satellite Measurements of rainfall - runoff - Estimation of runoff - losses – Hydrograph – Unit Hydrograph - uses	14Hrs
II	**2.1 GROUND WATER** Ground water resources- zones of Ground water-Aquifer - types- terms used –porosity, permeability, yield, specific yield, specific retention, coefficient of storage, specific capacity – Darcy's law- measurement of yield of well -pumping test- recuperation test-ground water exploration – geo physical methods -Electrical resistivity method – seismic resistivity method- logs. **2.2 MANAGEMENT OF GROUND WATER** Concept of basin management - Ground water basin investigations - data collection and field work -mining yield - perennial yield - salt balance - basin management by conjunctive use - artificial recharge of Ground water - recharge methods.	14Hrs
III	**3.1 RIVERS AND RIVER TRAINING WORKS** Classification of river - Major rivers in India and Tamil Nadu - Inter linking of rivers in India and its importance – flood - flood forecasting - flood control in India. River training - objectives of river training - classification of river training - methods of river training – levees - guide banks – spurs – types - artificial cut-offs – launching apron - pitching of banks - pitched islands - miscellaneous methods.	14Hrs

Unit	Name of the Topic	Hours
	3.2 STORAGE WORKS Surface storage - purpose of surface storage – tanks – types - tank weirs – tank outlet – reservoirs – types - storage capacity of reservoir - methods of determination of storage capacity of reservoir – reservoir losses – dams - classification of dams - selection of dam site - Earth dams – types - methods of construction- causes of failure of earth dam - remedial measures – spillway - types - spillway crest gates-types – sluiceway - types.	
IV	**4.1 DISTRIBUTION WORKS** Irrigation Canal - Typical cross section of canal - components of canal section - classification of canal -alignment of canal - canal head works – types - components of diversion head works - cross drainage works – types - canal losses - lining of canal – necessity - types of lining. **4.2 MANAGEMENT OF CANAL IRRIGATION** Canal irrigation system - Need for canal irrigation management - objectives of canal irrigation management - methods of improving canal irrigation management - cropping pattern - need for crop rotation - crop water requirement - water delivery system - irrigation scheduling - frequency of irrigation - optimum use of irrigation water - irrigation efficiencies - conservation of water on the field - farmer's participation - irrigation manager.	**14Hrs**
V	**5.1 WATER SHED MANAGEMENT** Water shed - classification of water sheds - integrated approach for water shed management - role of remote sensing and GIS in water shed management - soil and water conservation – Necessity - soil erosion – causes - effects – remedial measures against erosion - contour bunding - strip cropping - bench terracing – check dams - vegetated water way – afforestation - crop residue - land drainage - surface drains - sub surface drains. **5.2 WATER HARVESTING AND RECYCLING** water harvesting - runoff collection - onsite detention basin - ponds - types - Seepage control – methods -evaporation control - Recycling of harvested water - waste water recharge for reuse – methods - water logging - remedial measures - soil reclamation REVISION AND TEST	**14Hrs** 10 Hrs

Reference Book :

- Santhosh Kumar Garg, Hydrology and water resources engineering, khanna publishers,Delhi.
- G.L.Asawa,Irrigation and Water Resources Engineering ,New age international(p) ltd.,publishers, New Delhi.
- David Keith Todd.,Ground water Hydrology,John wiley &sons,Singapore.
- Dilip Kumar Majumdar, Irrigation water management - Principles and Practice, PHI Pvt.Ltd.NewDelhi-1.
- Madan Mohan Das&Mimi Das Saikia, Irrigation and water power Engineering,PHI learning pvt. Ltd., NewDelhi-1
- K.Subramanya, Engineering hydrology,Tata McGraw-Hill publishing company ltd.,New Delhi.

21074 WATER RESOURCES MANAGEMENT

(ELECTIVE THEORY I)

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. State the importance of water resources.
2. State the factors involved in water resources management.
3. Define hydrology.
4. State any two uses of unit hydrograph.
5. Define Darcy's law.
6. Define aquifer.
7. State any two methods of artificial recharge.
8. State the levels of study in ground water basin investigation.
9. Name any four major rivers in India.
10. What are the methods of river training?
11. What is a storage work?
12. Name the reservoir losses.
13. State the classification of canals.
14. State the different types of cross drainage works.
15. Define crop rotation.
16. State any two methods of improving canal irrigation management.
17. Define water shed.
18. State the causes of soil erosion.
19. State the types of pond.
20. Define water harvesting.

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. (A) i) Write short notes on world water inventory.
ii) State the necessity for conserving water resources.

OR

(B) Explain the different types of rain gauges with neat sketches and also state their merits and demerits.

22. (A) i) How do you measure the yield of a well?
ii) Briefly explain the types of aquifers.

OR

(B) Explain the methods of artificial recharge in detail.

23. (A) i) With neat sketches, explain the various types of spurs.
ii) State the objectives of river training works.

OR

(B) With neat sketches, explain the causes of failure of earth dam and suggest suitable remedial measures.

24. (A) i) Explain different types of cross drainage works with sketches.
ii) Explain any three types of canal lining.

OR

(B) Explain the various methods of improving canal irrigation management.

25. (A) i) Explain contour bunding and bench terracing.
ii) Explain surface and sub surface drains.

OR

(B) i) Write short notes on water logging and soil reclamation.
ii) Explain the types of ponds

21074 WATER RESOURCES MANAGEMENT (ELECTIVE THEORY I)

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Name any two surface water sources.
2. Why do you need to conserve water resources?
3. Define runoff.
4. State the methods to find mean rainfall over a drainage basin.
5. Define permeability.
6. State any two methods of ground water exploration.
7. Define mining yield.
8. State the concept of basin management.
9. What do you mean by interlinking of rivers?
10. What are pitched islands?
11. Name the types of earth dams.
12. State any two types of spillway crest gates.
13. Mention the canal losses.
14. State the necessity of lining of canal.
15. State the objective of canal irrigation management.
16. Define frequency of irrigation.
17. Define water shed management.
18. How are watersheds classified?
19. Define water logging.
20. State any two methods of seepage control.

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. (A) i) Write short notes on water resources management.
ii) Write about water resource potential in India.

OR

(B) i) Explain the various components of a hydrological cycle with a neat sketch.
ii) Explain any two methods of estimation of runoff.

22. (A) Explain the geophysical methods of ground water exploration in detail.

OR

(B) i) Describe the data to be collected in a ground water basin investigation.
ii) Write short notes on basin management by conjunctive use.

23. (A) Explain the different methods of river training.

OR

(B) i) How will you compute reservoir capacity from mass diagram?
ii) What are the points to be considered in the selection of a dam site?

24. (A) i) Draw the typical cross section of canal and explain its components.
ii) Explain the classification of canals based on their alignment.

OR

(B) i) Write short notes on farmer's participation in irrigation management.
ii) Explain irrigation scheduling.

25. (A) i) Describe the role of remote sensing and GIS in water shed management.
ii) Mention the effects of soil erosion.

OR

(B) i) Explain the methods of waste water recharge for reuse.

ii) Write short notes on evaporation control.

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

CIVIL ENGINEERING DRAWING II

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name **:** **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code **:** **21054**
Semester **:** V Semester
Subject Title **:** **CIVIL ENGINEERING DRAWING II**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
CIVIL ENGINEERING DRAWING II	6Hrs	96 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be :

- Able to Prepare Public Health Engineering Drawing
- Able to Prepare Bridge Drawing
- Able to Prepare Structural Engineering Drawing With Bar Bending schedule.

21054 CIVIL ENGINEERING DRAWING II

LIST OF DRAWINGS

PUBLIC HEALTH ENGINEERING DRAWING 24 Hours

1. Infiltration gallery (with one infiltration well, one straight gallery pipe, one inspection well and one jack well)
2. Rapid Sand Filter
3. Septic Tank with dispersion Trench / Soak pit
4. Bio gas plant with floating type

BRIDGE DRAWING 18 Hours

5. R.C.C Slab Culvert with splayed wing walls
6. Two span Pipe Culvert
7. Two span Tee Beam Bridge with square returns.

STRUCTURAL ENGINEERING DRAWING WITH BAR BENDING SCHEDULE 42 Hours

8. Simply supported one-way slab
9. Simply supported two-way slab
10. Restrained two-way slab
11. Singly reinforced Simply supported beam
12. Doubly reinforced Continuous beam with two spans
13. Tee Beams supporting continuous slab
14. Dog-legged staircase
15. Lintel cum Sunshade
16. R.C.C Column with square Isolated footing
17. Steel Beam to Steel Column Connection – Seat angle and Web angle Connections.
18. Steel Beam to Steel Beam Connections – Web to Web connections.

REVISION & TEST 12 Hours

REFERENCE:

1. Drawing manual - T.T.T.I – Chand & Co.
2. Structural Drawing and Detailing - Krishnamoorthy

21054 CIVIL ENGINEERING DRAWING II

MODEL QUESTION PAPER - 1

Duration : 3 Hours **Max. Marks :** 75

N.B. 1. Answer any One Question in the drawing sheet supplied.
2. The Drawing should be drawn using pencil and drawing Instruments to scale.
3. Any data, not given may be assumed suitably and should be indicated in the drawing.

I. The following data refer to a rapid sand fillter unit:

Size of unit	:7500x5000mm
Size of inlet chamber	:1000x5000mm
Thickness of wall at top	:450 mm
Thickness of wall at bottom	:600 mm
Thickness of foundation concrete 1:4:8	:450 mm
Diameter of manifolds	:400 mm
Diameter of laterals	:100 mm
Spacing of laterals	:300 mm c/c
Slope of laterals	:1 in 50
Rakers-50 mm dia. at	:300 mm c/c
Raw water inlet	:300 mm dia
Size of wash water troughs	:300x400 mm
Number of troughs	:2
Bottom of trough above sand bed	:450 mm
Free board	:500 mm
Wash water drain pipe	:800 mm dia.

Draw to a suitable scale the following views:

a. Plan of filter unit showing the drainage system. (30)

b. Cross-section of filter unit showing the filter media and wash water through. (15)

c. Longitudinal section of filter unit showing the under drainage system regulating arrangements and back wash. (25)

d. Neatness, scale, details. (5)

II. The following are the details of a doubly reinforced partially fixed beam:

Clear span	:6m
Width of support	:300mm
Size of beam	:300mmx700mm
Reinforcement details:	
Tension reinforecement	: 5 No. of 20 mm dia. Fe 415 steel bars
Compression reinforecement	: 4 No. of 16 mm dia. Fe 415 steel bars.

Both tension and compression reinforcement are placed at an effective cover of 40 mm.

Shear reinforecement :

Use 8 mm dia. 2 legged stirrups of fe 415 steel at 150 mm c/c up to a distance of 1000 mm from the edges of the support s on both sides. beyond this point provide these stirrups at 300 mm c/c.

Use standard curtailment procedures.

Assume any data required suitably.

a. Draw to a suitable scale

i. The longitudinal section of the beam. (20)

ii. The cross section of the beam at mid span. (10)

iii. The cross section of the beam at support. (10)

iv. The top and bottom plan of reinforcement. (15)

b. Prepare a bar bending schedule. (20)

21054 CIVIL ENGINEERING DRAWING II

MODEL QUESTION PAPER - 2

Duration : 3 Hours **Max. Marks :** 75

N.B. 1. Answer One Question either I or II. in the drawing sheet supplied.
2. The Drawing should be drawn using pencil and drawing Instruments to scale.
3. Any data, not given may be assumed suitably and should be indicated in the drawing.

I. The details of a column with square footings are given below :

Column details:

Size of column	:300mm x 300mm.
ongitudinal steel	:4 no. 22 Φ RTS & 4 No. 16 Φ RTS
Ties	:8 mm Φ MS @ 200 mm c/c
Clear cover	:40 mm
Height of column above ground level	:4 m

Footing detials:

Size of footing	:1.2m x 1.2m
Thickness of footing at the edges	:200 mm
Thickness at the junction with column	:500 mm
Bottom cover	: 50 mm
Cover at the sides	: 75 mm

Steel: 16 mm Φ RTS- 9 No. In each direction.

Draw to a suitable scale the following views:

a. Plan of the footing showing details of reinforcements. (20)
b. Plan of the column with reinforcement details. (15)
c. Sectional view of the column with footing. (20)
d. Bar bending schedule. (20)

II. Draw The following views of an infiltration gallery for a town from a river nearby, from the particulars given below:

a. General layout of the scheme showing galleries, manhole wells, infiltration wells, pump house, etc., (not to scale) (15)

b. Longitudinal section of infiltration well, one straight gallery, one inspection well and one jack well. (25)

c. Plan of the above. (25)

d. Cross sectional details of the gallery. (10)

River bed level	:	+100.00m
Maximum flood level (MFL)	:	+102.00m
Lowest summer water level (LSWL)	:	+98.00m
Bottom of gallery	:	+95.30m
Sill level of pipes	:	+95.45m
Diameter of S.W. pipe	:	400 mm Φ - 1 No.
Length of gallery (total)	:	300 m
Length of one gallery	:	60.0m
River bank level	:	+103.20m
Width of gallery	:	2.4m
Diameter of well		
Inner	:	Φ 3.60 m
Outer	:	Φ 4.50 m
Pump house-cum-collecting well		
Inner diameter	:	6 m
Outer diameter	:	6.90 m
Bottom of pump house	:	+94.70m
Floor level of pump house	:	+102.20m
Roof level	:	+106.00m.

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

CONSTRUCTION PRACTICE LAB

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21055**
Semester : V Semester
Subject Title : **CONSTRUCTION PRACTICE LAB**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
CONSTRUCTION LAB PRACTICE	3 Hrs	48 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be familiar :

- To Prepare centre line plan and foundation plan for a building.
- For Setting out foundation in the field for spread footing and column footing for a building.
- To determine the Workability of concrete by Compacting factor, slump cone test and Vee – Bee consistometer test.
- To cast Concrete cubes and to test for compressive strength.
- To determine the fineness Modulus of fine and coarse aggregate.
- For Shape test on coarse aggregate.
- To determine the bulking characteristics of the given sand.
- For Non - Destructive test on hardened concrete.

ALLOCATION OF MARKS

PART A	20 marks
PART B	50 marks
VIVA VOCE	05 marks
RECORD	25 marks
Total	100 Marks

21055 CONSTRUCTION LAB PRACTICE

LIST OF EXPERIMENTS

PART A 21 Hours

1. Prepare and develop a centre line plan and foundation Plan for a given line sketch of a building.
2. Setting out spread footing foundation in the field for a given line plan of a building.
3. Setting the layout of columns and footing foundation in the field for a given line plan of a building (Framed structure).
4. Arrangement of bricks using English bond for one brick thick wall and one and half brick thick wall for right angled corner junction.
5. Arrangement of bricks using English Bond for one brick thick wall, one and half brick thick wall for Tee junction.
6. Arrangement of bricks using English bond for one brick thick, one and half and two brick thick square pillars.
7. Cutting, hooking, cranking and arrangement of reinforcement for:
    a Beam
    b Lintel and sunshade
    c Column and footing

PART B 21 Hours

8. Determination of workability of concrete by slump cone test.
9. Determination of workability of concrete by compaction factor test.
10. Casting of concrete cube and compression test on concrete cube.
11. Determination of Fineness Modulus of fine aggregate sample and plot a particle size distribution curve and also find the effective size and uniformity co-efficient.
12. Determination of Fineness Modulus of coarse aggregate sample and plot a particle size distribution curve and also find the effective size and uniformity co-efficient.
13. Vee- Bee Consistometer Test on concrete.
14. Non Destructive Test on concrete - Rebound Hammer Test.
15. Determination of bulking characteristics of the given sand sample .
16. Shape Test for Coarse aggregate.
    a. Flakiness Index test
    b. Elongation Index test
    c. Angularity number test

PART C 6 Hours

17. Study of other Non Destructive Test on hardened concrete (Not for exams):
    i. Ultra sonic pulse velocity test
    ii. Concrete core Extraction.

21055 CONSTRUCTION LAB PRACTICE

MODEL QUESTION PAPER

Duration : 3 Hours Max. Marks : 75

1. (a) Draw the centre line sketch and the foundation trench plan for the load bearing wall type residence shown in the plan. Sketches are to be drawn in the answer book with pencil and straight edge, but need not be to scale.(A plan of a small residential building with at least three rooms shall be given) (20marks)

(b) Determine the fineness modulus of the given sample of sand by sieve analysis. Draw the particle size distribution curve and find the effective size and uniformity co efficient of the sample. (50marks)

2. (a) Set out the foundation plan on the field for the given line plan of the building (A line sketch of a small building with two or three rooms, with foundation details shall be given) (20marks)

(b) Determine the fineness modulus of the given coarse aggregate by sieve analysis. Draw the particle size distribution curve and find the effective size and uniformity co efficient of the sample. (50marks)

3. (a) Set the layout of columns of the building shown in the sketch, on the field, marking the footing of at least one column.(A line sketch or plan of a small school building with at least eight columns in two straight rows(4+4) shall be given mentioning the size of footing. (20marks)

(b) Draw the bulking characteristic curve for the given sand and find the maximum bulkage and the corresponding moisture content . (50marks)

4. (a) Arrange a layer of bricks by English bond for the corner junction of a 1½ brick thick wall (20marks)

(b) Conduct slump cone test for 1:2:4 mix concrete with w/c ratios 0.55, 0.60 and 0.70 and draw a curve “w/c ratio vs slump. From the graph find the w/c ratio required to produce a slump of 75 mm. (50marks)

5. (a) Arrange two consecutive layers of bricks by English bond for the Tee- junction of a 1 brick thick wall (20marks)

(b) Conduct compaction factor test on 1:2:3 mix concrete with w/c ratios 0.55,0.60 and 0.70 and draw a curve “w/c ratio vs compaction factor. Find, from the graph, the w/c ratio required to have a compaction factor 0.95. (50marks)

6. (a) Arrange two consecutive layers of bricks by English bond for the 1½ brick size square pillar (20marks)

(b) Conduct a Vee-Bee test on 1:2:4 mix concrete with at least three w/c ratios and draw a graph w/c ratio vs Vee Bee time. (50marks)

7. (a) Bend a stirrup for a 230mmx150mm overall size lintel using 6mm dia mild steel bar. (20marks)

(b) Conduct sieve analysis on the given coarse aggregate using standard set of sieves and determine the Flakiness index and Elongation index of the aggregate. (50marks)

8. (a) Bend a 45^0 crank on the given 8mm dia deformed steel bar. (20marks)

(b) (i) Conduct a Rebound Hammer test on the surface of a hardened concrete element and find its rebound index, and hence determine its compressive strength. (25marks)

(ii) Determine the Angularity number of the given coarse aggregate sample. (25marks)

9. (a) The model of a simply supported rectangular beam of total length 2metres,overall size 150mmx200mm, has 2#10mm dia bars at top and 3#12mm dia bars at bottom. 6mm dia stirrups are provided at 200mm c/c. Fabricate the reinforcement for the beam using the given binding wires.(All bars and stirrups of required length and size shall be provided) (20marks)

(b)(i) Cast a 150mm size concrete cube using 1:1½:3 concrete mix with standard compaction. (25marks)

(ii) Conduct a compression test on the already cured concrete cube and find out its ultimate compressive strength. (25marks)

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

CAD IN CIVIL ENGINEERING DRAWING II

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21056**
Semester : V Semester
Subject Title : **CAD IN CIVIL ENGINEERING DRAWING II**

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
CAD IN CIVIL ENGINEERING DRAWING PRACTICE II	6 Hrs	96 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be familiar :

- To prepare Public Health Engineering drawings using CAD
- To know about RCC and Steel bridge structures and draw views using CAD
- To understand and draft structural Engineering drawings using CAD

ALLOCATION OF MARKS

In Board examination, questions will be chosen as follows
By lot one question

Plan / Elevation	-	40 marks
Cross section / longitudinal section	-	30 marks
Viva – voce	-	5 marks
Record works	-	25 marks
Total	**-**	**100 marks**

21056 CAD IN CIVIL ENGINEERING DRAWING PRACTICE II

LIST OF EXPERIMENTS

PREPARATION OF DRAWINGS USING CAD SOFTWARE

I PUBLIC HEALTH ENGINEERING 18 Hours

Draw plan and sectional views of the following

1. Rapid Sand Filter
2. Septic Tank with dispersion Trench / Soak pit
3. R.C.C square overhead tank supported by four columns

II BRIDGE DRAWING 18 Hours

Draw plan and sectional views of the following

4. R.C.C Slab Culvert with splayed wing walls
5. Steel Foot over bridge across a highway
6. Two span Tee Beam Bridge with square returns

III STRUCTURAL ENGINEERING 50 Hours

Draw plan, cross section and longitudinal section

7. Continuous one-way slab (with three equal spans)
8. Simply supported two-way slab
9. Singly reinforced rectangular beam
10. Doubly reinforced Continuous beam (with two equal spans)
11. Tee Beams supporting continuous slab
12. Lintel and Sunshade
13. Dog-legged staircase
14. R.C.C. Column with square isolated footings
15. Steel Beam to Steel Column connections – Seat angle and Web angle connections.
16. Steel Beam to Steel Beam connections – Web to Web connections.

REVISION & TEST 10 Hours

ALLOCATION OF MARKS

In Board examination, questions will be chosen as follows
By lot one question

Plan / Elevation	-	40 marks
Cross section / longitudinal section	-	30 marks
Viva – voce	-	5 marks
Record works	-	25 marks
Total	**-**	**100 marks**

Note:

1. For all the drawings, detailed specifications shall be given. Designs are not to be included in the examinations. The drawings must include Layout plans, full plan, sections, etc., as applicable to each topic.
2. For all the drawings, detailed specifications shall be given and students should draw free hand sketch in the observation book based on the given specifications. The drawings to be drawn using computer and CAD Software.
3. In examination any one of drawings 1 to 16 can be asked by lot.

21056 CAD IN CIVIL ENGINEERING DRAWING PRACTICE II

MODEL QUESTION PAPER

Duration : 3 Hours **Max. Marks :** 75

Prepare drawings using CAD software
(Any one by lot)

1. Draw the *specified views of rapid sand filter for the given detailed specification
2. Draw the *specified views of septic tank with dispersion trench for the given detailed specification
3. Draw the *specified views of septic tank with soak pit for the given detailed specification
4. Draw the *specified views of R.C.C square overhead tank supported by four columns for the given detailed specification
5. Draw the *specified views of R.C.C slab culvert with splayed using walls for the given detailed specification
6. Draw the 8specified views of steel foot over bridge across a highway for the given detailed specification
7. Draw the *specified views of two span Tee beam bridge with square returns for the given detailed specification
8. Draw the *specified views for a continuous one-way slab with given details
9. Draw the *specified views for a simply supported two-way slab with given details
10. Draw the *specified views for singly reinforced rectangular beam with given details
11. Draw the *specified views for doubly reinforced beam with given details
12. Draw the *specified views for TEE beams supporting continuous slab with given details
13. Draw the *specified views for lintel cum sunshade with given details
14. Draw the *specified views for dog legged staircase with given details
15. Draw the *specified views of R.C.C column with square isolated footing with given details
16. Draw the details of seat angle connection between a steel column and steel beam of given details
17 Draw the details of framed connection between the webs of a steel column and steel beam of given details.
18. Draw the details of the web angle connection of webs of two steel beams of given details.

*Specified view means (Plan / Elevation/ Longitudinal section/ Cross section/etc) Any two view depending upon the drawing may be specified in the question paper.

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

COMMUNICATION AND LIFE SKILLS PRACTICAL

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name **:** **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code **:** **20002**
Semester **:** V Semester
Subject Title **:** **COMMUNICATION AND LIFE SKILLS PRACTICAL**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
COMMUNICATION AND LIFE SKILLS PRACTICAL	4 Hrs	64 Hrs	25	75	100	3 Hrs

TOPICS AND ALLOCATION OF HOURS:

Sl. No.	Section	No. of Hours
1	Part-A:Monodic Communication	16
2	Part-B:Dyadic Communication	16
3	Part-C:Professional Communication	16
4	Part-D:Life Skills	16
Total		64

RATIONALE

Nowadays, effective and error free communication is a basic need. Communication through English is the order of the day for entry and survival in any corporate. Training in Monodic communication (one man communication) Dyadic communication (a pair communication) and Professional communication (may be Monodic, Dyadic or Group communication) is attempted through these practical modules. One can improve one's communication skills by enriching one's vocabulary ,particularly active vocabulary and standard everyday expressions and using them in various contexts. Practice alone, both on the campus and outside the campus, can help a learner to grow proficient in the art of Communication.

Language is the most commonly used and effective medium of self-expression in all spheres of human life - personal, social and professional. A student must have a fair knowledge of English language use and various communicative functions. He/she must be able to pursue the present course of study and handle the future jobs in industry. The objective of the course is to assist the diploma holders to acquire proficiency in monodic, dyadic and professional communication skills and selective but most important life skills. At the end of the course, the student will be able to communicate his ideas fearfree and errorfree, in social and professional spheres of life and imbibe life skills.

SPECIFIC INSTRUCTIONAL OBJECTIVES

Communication is crucial as it influences every aspect of one's personal development. Having a sound grounding in reading and writing techniques allows a student to progress on to higher level literacy skills. Many students struggle because their basic decoding is so inaccurate that advanced comprehension is difficult for them. Because of their poor exposure and poor use of English language in various spheres of life they suffer proper communication. They also tend to be 'afraid' of words and in turn they are not able to develop their personal vocabulary. In otherwords, without solid literacy skills, the student's prospects and life chances are limited. It is a fact that Communication skills and Life Skills shapes one's personality.

MONODIC COMMUNICATION

The student is able to:

1. Practice using departmental words and terminology in sentences.
2. Prepare and perform oral presentations.
3. Introduce oneself and others.
4. Deliver welcome address and vote of thanks.
5. Compare a program.
6. Describe the visuals.
7. Take notes, answer very short questions.
8. Comprehend an auditory/oral passage.

DYADIC COMMUNICATION

The student is able to:

1. Adopt various communicative functions.
2. Prepare and perform a dialogue.
3. Adopt the basics of telephone etiquette.

PROFESSIONAL COMMUNICAITON

The student is able to:

1. Prepare a resume.
2. Take part in a group discussion.
3. Communicate through body language.
4. Adopt the interview skills with professional presence.
5. Perform mock interview.

LIFE SKILLS

The student is able to:

1. Prepare for and deal with change.
2. Adopt motivation, goal-setting and self-esteem.
3. Adopt Teamwork skills.
4. Adopt Time management.
5. Adopt Emotional intelligence skills.
6. Assert Positively.
7. Adopt Interview etiquette.
8. Plan career.

Understand Strength, weakness (long term, short term).

LEARNING STRUCTURE

To enable the students to practise monodic communication, dyadic communication professional communication and imbibe life skills through various modes of practical learning and assignments.

PROCEDURE	MONODIC COMMUNICATION	DYADIC COMMUNICATION	PROFESSIONAL COMMUNICATION	LIFE SKILLS
PRINCIPLES	Identifying various platforms	Exposure to dialogue situations, exposure to telephone etiquette.	Exposure to resume writing, group discussion, interviews.	Exposure to selective life skills/problem solving skills.
CONCEPTS	Sharing opinions, feeling, with or without audience.	Understanding the basic communicative functions. Conversing with a neighbour	Writing resume, performing group discussion, facing interviews.	Imbibe and practise the selective life skills.
FACTS	Oral presentation, art of introduction, enhancing the list of active vocabulary, listening skills, note taking skills, describing skills.	Audio tapes, compact disk, mikes, various contexts.	FAQ, Resume models, Audio tapes, compact disk, mikes.	Stories, anecdotes, incidences, case studies and assignments.

20002 COMMUNICATION AND LIFE SKILLS PRACTICAL

SYLLABUS

PART A: MONODIC COMMUNICATION (16 hours/ periods)

a) **Vocabulary enrichment**: recording important words and terminology alphabetically connected to the concerned department – playing antakshari.
b) **Introducing oneself**: using greeting phrases – opening and closing with courteous notes – supplying personal information.
c) **Introducing others**: using greeting phrases – opening and closing with courteous notes – with information.
d) **Welcome address, vote of thanks and compering a program:** keeping notes – and personal information of the dignitaries – concerned.
e) **Making an Oral Presentation**: Preparing the presentation - Talking about people, animals and places – Keywords technique and the rehearsal – Presentation outline – Performing the presentation – answering the questions.
f) **Oral description**: a picture from an English magazine – a visual ad – a natural scene.
g) **Auditory/Oral comprehension** – small passage – small dialogue -very short story – note - taking skill.
h) **News Caption**: giving caption for a news item from an English daily.

PART B: DYADIC COMMUNICATION: COMMUNICATIVE FUNCTIONS (16 hours/ periods)

a) **Dialogue**: preparing and performing - Meeting people, exchanging greetings and taking leave – Giving instructions and seeking clarifications – Thanking someone and responding to thanks - minimum seven exchanges including the courteous openings and closings – ten common contexts.
b) **Telephonic dialogue**: telephonic etiquette - Answering the telephone and asking for someone – Dealing with a wrong number – Taking and leaving messages – Making enquiries on the phone-ordering for supply-bookings and arrangements-handling the complaints – calling for appointment.

PART C: PROFESSIONAL COMMUNICATION **(16 hours/ periods)**

a) Group Discussion - Taking part in a Group Discussion – focus on team spirit.

b) Interview - Frequently asked questions in an interview – Mock interview - Body language.

c) Resume Writing – components.

PART D: LIFE SKILLS **(16 hours/ periods)**

a) Preparing for and dealing with change.

b) Motivation, goal-setting and self-esteem.

c) Teamwork skills.

d) Time management

e) Emotional intelligence skills

f) Career planning.

g) Assertive Skills.

h) Interview skills.

References :-

1) Malcolm Goodale, Professional Presentations with VCD, Cambridge University Press
2) B.Jean Naterop and Rod Revell, Telephoning in English with 2 Audio CDs Cambridge University Press
3) Priyadarshi Patnaik, Group Discussion and Interview Skills with VCD, Cambridge University Press
4) Kamalesh Sadanand and Susheela Punitha, Spoken English: A Foundation Course for Speakers of Tamil, Orient BlackSwan.
5) S. P. Dhanavel, English and Soft Skills, Orient BlackSwan
6) Robert Sherfield and et al, Developing Soft Skills, Pearson Education.
7) Poly Skills: A course in communication skills and Life skills, Cambridge University Press.
8) English and Communication Skills for Students of science and Engineering by S.P.Dhanavel , Orient BlackSwan.
9) Speak Well, edited by Kandula Nirupa Rani, Jayashree and Indira,OrientBlackSwan.
   Fifty ways to improve your telephoning and teleconferencing Skills by Ken Taylor

20002 COMMUNICATION AND LIFE SKILLS PRACTICAL

Model Question Paper - 1

Time: 3 hrs Max Marks: 75

PART –A (35 Marks)

Monodic Communication:

1. Introduce one self (5)
2. Use the mentioned words orally in sentence (2x2 ½ =5)
3. Prepare and present a welcome address for your college annual day programme. (5)
4. Listen to the passage read out from the English daily of the week of the examination. Please note: No prerecorded passage (10)
5. Write a news caption for the passage given from the English daily. (5)
6. a) Describe orally the visual or the picture found in the English daily of the week of the examination. (5)

   (Or)

   b) Make an oral presentation about an animal.

PART – B (15 Marks)

Dyadic Communication:

1. Play antakshari of five pairs of departmental words with your partner. (5)
2. Prepare and perform a dialogue with your partner on the given situation (10)
   (minimum seven exchanges)

   Or

   Prepare and perform a telephonic dialogue on a flight booking.
   (minimum seven exchanges)

PART-C (25 Marks)

Professional Communication:

1. Form a group of six members and perform a discussion on the given theme. (10)
2. Imagine you are V.Gokulraj ,a diploma holder. Prepare a resume for the post of supervisor in Oberoi computers Ltd.Chennai. (10)

   Professional appearance: Interview etiquette-dress code- Body language (5)

20002 COMMUNICATION AND LIFE SKILLS PRACTICAL

Model Question Paper - 2

Time: 3 hrs Max Marks: 75

PART –A (35 Marks)

Monodic Communication:

1. Introduce your friend S.Mohan an a excutive engineer to a group of audience. (5)
2. Use the mentioned words in sentence orally. (2x2 ½ =5)
3. Prepare and present a Vote of thanks in your college sports day programme. (5)
4. Listen to the passage read out from the English daily of the week of the examination.
   Please note: No prerecorded passage (10)
5. Write a news caption for the passage given from the English daily. (5)
6. a) Describe the visual or the picture found in the English daily of the week of the conduct of the examination. (5)

   (Or)

   b) Make an oral presentation about your polytechnic college.

PART – B (15 Marks)

Dyadic Communication:

1. Play antakshari of five pairs of your departmental words with your partner. (5)
2. Prepare and perform a dialogue with your partner on the given situation (10)
   (minimum seven exchanges)

(Or)

Prepare and perform a telephonic dialogue on ordering the supply of a computer

(minimum seven exchanges)

PART-C (25 Marks)

Professional Communication:

1.Form a group of six members and perform a discussion on the given theme. (10)

3. Imagine you are M.Kishore a diploma holder. Prepare a resume for the post of operating engineer in REC Electricals Ltd.Madurai. (10)
   Professional appearance: Interview etiquette-dress code- Body language (5)

NOTES OF GUIDANCE

Role of the media:

To equip a learner with vocabulary, particularly active vocabulary and standard everyday expressions ,using English dailies and watching selective English T.V. channels both in the classroom and outside the classroom is focused. Such a provision is recommended for the students to establish familiarity with the English dailies and selective English T.V. channels.

Minimum two copies of two English dailies in the laboratory room (students can bring their own copies also).Minimum two systems with net connection for information collection in the laboratory itself.

Synopsis of the news item:

During every lab work day, students must choose a news item from the English daily or weekly or monthly, and write a synopsis of the chosen news item, in not more than five lines. The news item should be pasted on the left page and synopsis on the right page (the chosen news item should not be politically, socially or communally controversial). Students should exercise care in choosing the news items. Teachers have to advise them on this aspect. This can be done outside the class hours also but every record exercise should begin with the synopsis of news item of the date of the lab session.

For example, first lab exercise namely departmental vocabulary and antakshari is performed on 15/12/2011. The student should choose a news item from any English daily of 15/10/2011 and record the synopsis on the right page (in not more than 5 lines) under the caption **Synopsis of the news item of the day/date 15/10/2011.**There is no harm in repeating or copying the lines form the passage. The essence of the passage should be there. The cutout news item for presenting the synopsis should be pasted on the left page of the record notebook.

This is to be done with interest for developing one's personality. This work **does not carry any marks** but without which the record exercise should not be valued. This is the precondition for valuing the record exercise. Each record exercise follows the synopsis of the chosen news item.

At the bottom of the synopsis, the student should record the **dictionary meaning** of atleast **one strange word** found in the chosen news item. At the end of every month, a minimum of 10 Headlines of 10 different days i.e. one Headline a day from anyone English daily should be pasted on the right or left page of the Record Note Book. (This work does not carry marks but this is the precondition for marking the record exercises)

External examiner**,** before signing the record notebook, should verify whether the Newspaper works were recorded/pasted in the record notebook.

Verbal communication in any language begins with sounds in isolation, union and word formation. Learning everyday words and expressions is the primary factor. Grammar comes next. One can enrich one's every day vocabulary by reading English magazines and listening to or watching an English channel on television. So an English laboratory should be equipped with a minimum of two copies of two English dailies and English weeklies or monthlies.

Watching English channels helps the students improve their vocabulary and expressions. If there is a provision, students may be permitted to watch selective, mind corruption free English channels (sports, education, news, animal channels and so on) for at least 15 min. during the English lab sessions. This will serve as motivation for the students and help them shed their inhibition.

What is antakshari? (Polar word game)

This game can be played on the stage by two or three students using the departmental words. Suppose Mr. A belongs to Dept.of Electrical and Electronics and he says his departmental word ' **ampere** 'Mr. B has to supply a word beginning with the ending letter of Mr. A's word. The word **ampere** ends with the letter **' e'** so Mr. B says **' electrical** '.Mr. A has to continue with the letter **' l '.** Like that five pairs of words are to be spoken.(**Letter ending only, not sound ending.)** Suppose departmental words are not available in some English letters like

' x ' ' y ' ' z ' the students may be permitted to use common words.

ANTAKASHARI (Five Exchanges)

(Dept. of Mechanical Engineering.)

EXAMPLE:

Mr. A	Mr. B
1. Governo**r**	**R**eservoi**r**
2. **R**ac**k**	**K**elvi**n**
3. Nu**t**	**T**oo**l**
4. **L**athe	**E**missio**n**
5. Naphth**a**	**A**nvil

Introducing oneself:

One is not expected to introduce one's family. One or two sentences on his family will do. Care must be taken to include general proficiency, titles and merits, awards possessing or secured in academic activities like paper presentation, participation in inter polytechnic or intra polytechnic competitions, sports activity, forums like NCC,NSS, hobby, ambition, strengths and weaknesses.

Introducing others – merits – credentials—one or two points on his family.

Vote of thanks / Welcome address.No doubt it should be all-covering but Focus should be on the important persons/invitees/chief guest and the message of the speaker.

Description (pictures from English weekly/daily) Pictures may be displayed through projector or Magazine cuttings may be used. Just five lines on the picture will do.

Auditory/oral comprehension: A Passage from any English daily of the week of the examination is to be read out for two to three minutes in the end examination. Display of recorded passages can be used as an addition in the class room. The use of pre-recorded passage discouraged in the end examination.

Oral presentation: Students must be encouraged to use English magazines and internet for collecting information on the topic, noting keywords and use them in their presentation in his own language. One must be able to talk extempore for 2 min on any topic, given a time of two minutes for organizing his/her thoughts. The topics can be kept simple and general (current events of interest like sporting event for headline of the day). It must be totally an oral activity without the aid of any other media.

News Caption: A news item ,without heading,of not more than ten lines from an English daily of the week of the conduct of Examination is to be given. The caption may be a passive construction or a catchy phrase on the given news item.

Face to face dialogue: Selective nine situations / topics are to be performed in the class room. (Minimum seven exchanges with courteous openings and closings).

Telephonic dialogue: Selective seven situations to be given. (Minimum seven exchanges).

Resume writing: cover letter—the components of a resume like sender's address, recipient's address, career objective to be explained.

Group Discussion: Topics of common interest, avoiding controversial ones, are to be given for discussion. A group may consist of six members.

Students should be exposed to 44 phonemes (sounds) in English language and their symbols.

There shall be no question on this end examination.

COMMUNICATION SKILLS EXERCISES:-

1. Departmental Vocabulary alphabetically (using it in sentence, antakshari).Using the words orally in sentences
2. Introducing oneself and others
3. Vote of thanks / Welcome address
4. Description (pictures from English weekly/daily)
5. Auditory/oral comprehension
6. Oral presentation
7. Face to face dialogue
8. Telephonic dialogue
9. Resume writing
10. Group Discussion

Communication Skills:

Ten Marks for each exercise leading to a maximum of hundred marks in total.

The total marks to be reduced to an average of ten marks.

Texts of the performed activities to be recorded in the Record Note book. Synopsis of the news item of the day/date is mandatory at the beginning of every record exercise.

Life Skills:

i) Preparing for and dealing with change.
j) Motivation, goal-setting and self-esteem.
k) Teamwork skills.
l) Time management
m) Emotional intelligence skills
n) Career planning.
o) Assertive Skills.
p) Interview skills.

Life skills are to be intensely inculcated through lectures, quotes, anecdotes and case studies. An excellent awareness of the eight essential life skills is to be created through continuous internal assessment. Five assignments in these topics are to be recorded in the record note book.

- A minimum of five assignments on five different topics.
- Each assignment to be assessed for twenty marks.
- The total marks to be reduced to an average of ten marks.
- All the topics to be covered in the lab.

TIME MANAGEMENT IN THE END EXAM.

For written part 30 min

- Written part of the examination should be the first / beginning of the examination, monadic oral exam to start during the written exam.
  Written Part exercises:

- auditory / oral comprehension.
- Resume writing.
- Giving news caption for the passage.
- During the written examination time of 30 minutes, monodic communication examination may also take place simultaneously.

MONODIC COMMUNICATION (ONE MAN COMMUNICATION)

Oral part – 75 min.

Both internal and external examiners (simultaneously) are to examine the students.

Five minutes for each student. 15 students for external & 15 students for internal and within 75 minutes both internal and external examiners complete the monadic communication exam.

DYADIC COMMUNICATION (ONE PAIR COMMUNICATION)

- 5 min for each pair.
- 15 pairs in total. 8 pairs for external and 7 pairs for internal examiner. (8x5=40 min) within **40 min** both internal and external examiners completes the dyadic communication exam.
- The students examined by the external for monadic exam are to be examined by the internal for dyadic and vice versa.

PROFESSIONAL COMMUNICATION

- 30 min for group discussion.
- 6 members in each group.
- 5 min for discussion for each group.
- Both internal and external examiners to supervise / examine simultaneously one group each.
- Within fifteen minutes all the six groups to be examined.

LABORATORY REQUIREMENT

1. An echo-free room for housing a minimum of sixty students.
2. Necessary furniture and comfortable chairs
3. Public Address System.
4. A minimum of two Computers with internet access, with Audio for Listening Skill and related software packages.
5. A minimum of Two different English dailies.

6. A minimum of one standard Tamil daily.
7. Headphone units – 30 Nos. with one control unit with a facility to play and record in Computer.
8. A minimum of Three Mikes with and without cords.
9. Colour Television (minimum size – 29”).
10. DVD/VCD Player with Home Theatre speakers.
11. Clip Chart, white board ,smart board.
12. Projector.
13. video camera.
14. Printer,Xerox,scanner machines **desirable.**
15. English Weeklies/monthlies/journals like ELTOI **desirable.**
16. Frozen thoughts –monthly journal for Lifeskills by Mr.Rangarajan / www.frozenthoughts.com

Mark Pattern

End Examination –	**75 Marks**
Monodic Communication –	35 Marks
Dyadic Communication –	15 Marks
Profession Communication –	20 Marks
Professional Appearance –	5 Marks

Internal Assessment	**25 Marks**
Communication skills Record Notebook	10 Marks
Life skills assignments	10 Marks
Attendance	5 Marks

20002 COMMUNICATION AND LIFE SKILLS PRACTICAL

Allocation & Statement of Marks

Duration:3Hrs.

Name of the Candidate Reg. No.

A. Monodic communication : 35 Marks

Introduction (5 mks)	Use in sentence (5 mks)	Vote of thanks / welcome address (5 mks)	Auditory/Oral comprehension (10 mks)	Description/ Oral presentation (5 mks)	News caption (5 mks)	Total (35 mks)

B. Dyadic communication: 15 Marks

Antakshari (5 mks)	Dialogue (10 mks)	Total (15 mks)

C. Professional communication: 20 Marks

Group Discussion (10 mks)	Resume (10 mks)	Total (20 mks)

D. Internal Assessment: 25 Marks

Record Notebook Commn.skills (10 mks)	Assignments Life Skills (10 mks)	Attendance (5 mks)	Total (25 mks)

E. Professional Appearance: /5 Marks

Total : /100 Marks

Internal Examiner **External Examiner**

FACE TO FACE DIALOGUE TOPICS

1. Between Friends (On any acceptable topic).
2. Between a conductor and a passenger.
3. Between a doctor and a patient.
4. Between a Shopkeeper and a Buyer.
5. Between a Teacher and a Student.
6. Between a tourist and a guide.
7. In a Bank.
8 At a railway enquiry counter.
9. Lodging a complaint.

Note: A resourceful teacher may add a few more topics of common interest.

TELEPHONIC DIALOGUE TOPICS

1. Placing an order.
2. Making Enquiries.
3. Fixing appointments
4. Making a hotel reservation.
5. Dealing with a wrong number.
6. Travel arrangements.
7. Handling complaints.

MECHANICAL DEPARTMENTAL VOCABULARY FOR ANTAKASHARI AND USING IN SENTENCES

EXAMPLE:

A:

1. Anvil – made of cast Iron used in foundry shop.
2. Axle – A metal rod that connects two wheels.
3. Alloy – alloy is a mixture of two or more metals.
4. Addendum – distance between top of gear teeth and pitch circle.
5. Annealing – It is a heat treatment process for softening the metals.

B:

1. Bearing – it is which supports the shaft.
2. Bolt – it is a type of fastener. Combined with screw.
3. Brake – it is used to halt an auto mobile vehicle.
4. Beed – steel wiring used in tyres to withstand stress.
5. Baffles – it is used to reduce noise, filter dust particles in auto mobile.

C:

1. Cam – it is a lobe like structure, which actuates the valve.
2. Crown – the slope like structure in the piston.
3. Calipers' – they are measuring instruments.
4. Clutch – it is used to disengage and engage the fly wheel and main shaft.
5. Chamber – it is the distance between vertical line and tyre center line.

D:

1. Damper – it is a type of shock absorber, reduces the vibration.
2. Differential – it controls the speed of rotating wheel in the rear axis.
3. Diaphram – it is used to separate two layers.
4. Detonation – it is the continuous knocking with serious effect on cylinder head.

E:

1. Evaporator – it absorbs heat to vapourise liquid into air
2. Engine-the place where fuel is burnt and heat energy is converted. mechanical energy
3. Electrolyte-it is a liquid substance which is used to transfer current or any metal particle.
4. Emission-the release of burnt gas from automobile.
5. Elongation-the increase of dimension due to application of load.

F:

1. Filter-which is used to remove dust particles.
2. Friction-the resistance on wear occur due to rubbing of two metals.
3. Fly wheel-the wheel like structure used to balance the uneven weight in engine.
4. Fuel – it is a substance that burns with oxygen in the air.
5. Factor of safety - it is the safety limit after which the material will break down.

G:

1. Governor – it is used to control the flow of fuel according to load.
2. Gear – it is used to transmit power from one place to another.
3. Generator – it is used to generate power.
4. Gasket – it prevents the leakage and to provide sealing effect.
5. Goggle – the protective device used to guard the eyes.

H:

1. Hub – it is the center part of wheel.
2. Hammer – it is used to beat sheet metals.
3. Hydraulics – it deals with fluid for various function.
4. Hatching – it is used to highlight the parts in drawings.
5. Head stock – it is the main function unit of lathe.

I:

1. Ignition – it is the function by which fuel is burnt.
2. Injection – it is the process of spraying fuel into engine block.
3. Impeller – it is which converts kinetic energy into pressure energy.
4. Inventory – it is the place where raw materials are stored.
5. Idling – it is the condition at which the automobile engine at stationary state.

J:

1. Jig – it guides the tool and hold the job.
2. Jaw – it is teeth like structure used to hold work pieces.
3. Jog mode – Jog mode is used to give manual feed for each axis continuously.
4. Junk – it is known as waste material in industry.
5. Journal – It is a type of bearing.

K:

1. Keyway – it is a specific path made in shaft to joint parts.
2. Knocking – the sound produced due to Burning of uncompleted burnt fuel.
3. Kelvin – it is the degree of hotness.
4. Knurling – it is the process of lathe done to work piece to improve the gripness.
5. Knuckle joint – It is a type of joint used to connect two work pieces.

L:

1. Lubrication – process of reducing heat by applying cooling substances.
2. Layering – it is used to draw parts of a machine separately and combine together.
3. Lever – it is a supported arm used to engage gears.
4. Lathe – it is the father of machines used in turning operations.
5. Lead screw - it is the screw through which the carriage travels.

M:

1. Manometer – it is used to measure the pressure of fluids.
2. Milling – process of removing metal from work piece by rotating cutting tool.
3. Manifold – it is a passage made for flow of fuel in automobile.
4. Moulding – it is the process of passing hot liquid metal into mould made through sand.
5. Module – it is a metric standard used to identify or specify pitch.

N:

1. Nozzle – it is used to reduce the pressure and increases the velocity.
2. Nut – it is a type of fastener used to couple with screw.
3. Nomenclature – Dimensional property of specific part on component is notified by nomenclature.
4. Neck – Distance between drills body and shank.
5. Naphtha – kind of inflammable oil.

O:

1. Orthography – it is the three dimensional view of an object.
2. Ovality – Elliptical shape of piston.
3. Over haul – it is the complete checking and servicing of a machine or vehicle.
4. Optimum temperature – suitable temperature condition for certain process on working.
5. Offset – it is by which the axis of certain job is defined.

P:

1. Pinion – a small gear is called pinion.
2. Pulley – A cylindrical object used to connect belt for transmitting power.
3. Pump – it is which transfers fluid from one place to another.
4. Piston – it is which transfer power from combustion chamber to connecting rod.
5. Port – it is the opening in two stroke engine for movement of fuel and exhaust.

Q:

1. Quilt – it is used to give automatic feed in machines.
2. Quality control – it is an inspection processl.

R:

1. Reaming – it is the operation used to finish inner surface of a hole.
2. Reservoir – it is used to store fuel or any liquid.
3. Rack – it is a spur gear with infinite radius.
4. Retainer – it is used to bring back to the original position.
5. Radiator – it is the part used in automobile for cooling water.

S:

1. Shackle – it is a rod connected to leaf spring.
2. Spring – it is a circular rod which compresses on load and retracts when released.
3. Strainer – it is used to remove micro particles.
4. Shock absorber - it is used to reduce vibration and give cushioning effect.
5. Suspension- it is used to absorb shocks and give cushioning effect.

T:

1. Tail stock – it is used in lathe to support the job.
2. Tool – it is a metal.removal device.
3. Torque – it is the twisting load given on a work piece.
4. Trimming – it s the process of removing excess metal .
5. Turning – it is a metal cutting process used to reduce diameter.

U:

1. Universal joint-it is used to connect propeller shaft and differential unit.
2. Universal divider head- it is used to index various components.

V:

1. Valve – valve is the part used in automobile for flow of fuel and exhaust to cylinder head.
2. Vent hole – it is the hole made in casting for ventilation purpose.
3. Vulcanizing – it is the process of adding carbon to rubber.
4. Vibration – it is caused due to the movement in an uneven surface.
5. Velocity-rate of change of displacement.

W:

1. Wheel-it is a circular object which rotates and moves the vehicle.
2. Wiper-it is used in wind shield to remove water droplets.
3. Work piece-it is the material in which various processes are done to make a component.
4. Wage-it is the amount paid to a worker for his work.
5. Washer-washer is a component used in fasteners to reduce gap.

Y:

1. Yawing-the turning of wind mill towards direction of air is called yawing.
2. Yoke-it is which holds the other end of spindle in milling machine.
3. Yield stress-It is the stress above which it will attain the breaking stress.
4. Young's modulus-it is the ratio between stress and strain.

Pl.note: Suppose departmental words are not available in some English letters like

' x ' ' y ' ' z ' the students may be permitted to use common words. This is only an example. Another student of Mechanical Engineering can have different sets of words under each letter of the English alphabet.Like that there may be variety of sets. The most important point is that One is not supposed to murmur but speak the words intelligibly in an audible manner. Swallowing the words will deprive a student of winning a selection in an interview. In the same way, students of other Departments can have different sets of words

TELEPHONE LANGUAGE AND PHRASES IN ENGLISH

Answering the phone

" Good morning/afternoon/evening, Madras Enterprises, Premila speaking."

" Who's calling, please?"

Introducing yourself

" This is Raghavan speaking."

" Hello, this is Raghavan from Speak International."

Asking for someone

" Could I speak to Mr. Raman, please?"

" I'd like to speak to Mr Raman, please."

" Could you put me through to Mr Raman, please?"

" Could I speak to someone who …"

Explaining

" I'm afraid Mr. Raman isn't in at the moment".

" I'm sorry, he's in a meeting at the moment."

" I'm afraid he's on another line at the moment."

" Putting someone on hold"

" Just a moment, please."

" Could you hold the line, please?"

" Hold the line, please."

Problems

" I'm sorry, I don't understand. Could you repeat that, please?"

" I'm sorry, I can't hear you very well. Could you speak up a little, please?"

" I'm afraid you've got the wrong number."

" I've tried to get through several times but it's always engaged."

" Could you spell that, please?"

Putting someone through

" One moment, please. I'll see if Mr Raman is available."

" I'll put you through."

" I'll connect you."

" I'm connecting you now".

Taking a message

" Can I take a message?"

" Would you like to leave a message?"

" Can I give him/her a message?"

" I'll tell Mr. Raman that you called"

" I'll ask him/her to call you as soon as possible."

" Could you please leave your number? I shall ask him to get back to you."

Pl.note: The above ones are samples only. A resourceful teacher may add more.

DAY-TO-DAY EXPRESSIONS (For dialogues)

COMMON PARLANCE

How are you?
Fine. Thank you.
How are you?
Me too.
How do you do?
How do you do?
It's good to see you again.
Glad to meet you.
Thank you.
Thanks very much.
Welcome.

Hello! How is everything?
Just fine. Thanks. What's new?
Nothing much.

I'm pleased to meet you.
The pleasure is mine.
I've heard Paul speak about you often.
Only good things! I hope.

Look who's here!
Are you surprised to see me?
Sure. I thought you were in Chennai.
I was, but I got back yesterday.

Sorry, May I help you?
So kind of you.
That's so nice of you.
Nice talking to you.
Nice meeting you.
It's getting late, and I've to go now.
Certainly. Come back soon.
In that case, I'll be seeing you.
Fine.
Thank you.
Welcome
So long. See you later.
Take care. Bye.
Good-bye.

Could you tell me the time, please?
Certainly. It is 5.35 p.m.
My watch says 5.40 p.m.
Then your watch is five minutes fast.

Excuse me. Can you tell me the way to …?
May I come in?
How is the weather today?
It is pleasant. / sunny / rainy / warm /windy.

I am sorry, Can you repeat what you have said.
I am sorry, I can't hear you properly.
It is not audible. Can you please repeat it?
Beg your pardon; I don't get your words clearly.
How do you feel now?
Are you ok?
I am fine. And how about you?
I am fine. Thank you.

GROUP DISCUSSION

Let me begin with introducing this concept,
Well, this is to convey that
At the outset, I am here to convey
At this juncture, I would like to
May I intervene?
May I add?
Kindly permit me to say
If you could allow me to say
Let me add a few words
Let me first answer your question
Can you please allow me to convey
Excuse me; I would like to add further

On behalf of my colleagues,
On their behalf
Firstly/ secondly/ thirdly.
Finally/ conclusively/ at the end / Summing up
Eventually/ in the event of
In spite of / otherwise/ although/ though

Please Note:

- The above ones are samples only.
- A resourceful teacher may add more.
- A potential student may exhibit variety.

VI SEMESTER

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

CONSTRUCTION MANAGEMENT WITH MIS

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21061**
Semester : VI Semester
Subject Title : **CONSTRUCTION MANAGEMENT WITH MIS**

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
CONSTRUCTION MANAGEMENT WITH MIS	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be able to :

- Describe the Role of government and construction agencies in the field of housing
- Describe the organization set up of PWD
- Mention the construction activity and fixing the construction agency.
- Describe the aspects of inspection and quality control methods
- Describe the banking system.
- Carryout the Feasibility study of a project
- Understands the process of Planning for civil engineering projects.
- Explain the significance of CPM and PERT Techniques.
- Understand the types of contract system
- Study the organization chart of a construction company.
- Understands the concepts and requirement of Entrepreneurship
- Perform the Computation of Net present value.

21061 CONSTRUCTION MANAGEMENT WITH MIS

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**1.1 CONSTRUCTION SECTOR IN INDIA** Construction Management – Definition- Need – Scope - Objectives and & functions - Role of government and private construction agencies – Types of construction sectors - Public and Private functions of construction management in national development - Construction practice:- the owner, consultant, and contractor - Duties and responsibilities - Various stages of a construction project. **1.2 FEASIBILITY STUDY** Study of necessity of project– Technical feasibility, Financial feasibility, Ecological feasibility, Resource feasibility, Recovery from the project, Economical Analysis –Building Economics – Preliminary studies-Analysis – valuation. **1.3 PLANNING OF CIVIL ENGINEERING PROJECT** Objectives of planning – Public Project - Preliminary planning – Design factors – Site utilization- – Reconnaissance survey – Preliminary survey – Analysis and plotting of data – Estimate : preliminary and detailed estimate –Project report – Land acquisition – Administrative approval – Technical sanction – Budget provision- Private project – Advantages of planning to client and engineer – limitations -Stages of planning by owner and contractor. **1.4 CONTRACT MANAGEMENT** Types of contracts - Contract documents - Contractual obligations - Specifications - Tender notice – Types - Tender documents - Earnest money deposit (EMD) and Security deposits (SD) - Scrutiny and acceptance of a tender - Contract agreement – Contractual changes and termination of contract – Work order – Execution of agreement – Sub contract - Rights and duties of sub-contractor.	**14 Hrs**
II	**2.1 CONSTRUCTION ORGANISATIONS AND THEIR** **SUPERINTENDENCE** Forms of business organizations - sole proprietorship – Partnership - Joint stock company,- Co-operative society,- and State enterprises- Advantages and Disadvantages -delegation of responsibility, personnel requirements and division of works – Decentralization - Construction supervision and Superintendence – Requirements and Responsibilities of Executives of the project – Qualities of Efficient construction Manager - Pay rolls and Records - Purchase and delivery of construction materials and equipments – Percentage completion report - Insurance record - Project office requirement - Organisation chart of a small / medium / large construction company (broad outline only).	**14 Hrs**

Unit	Name of the Topic	Hours
II	**2.2 DEPARTMENTAL PROCEDURE AND ACCOUNTING** Organisation of P.W.D. - Responsibilities of officers - Accounting procedure (administrative sanctions, technical sanctions, payment of bills) – Imprest and Temporary accounts – Cash book - Works register - Accounting for consumable materials - Record for tools and plants – Importance of M-book and its entries – Work charged establishment – Nominal muster roll (N.M.R) – Daily labour reports (D.L.R)	
III	**3.1 SCHEDULING AND TIME MANAGEMENT** Scheduling – Definition – Preparation of Schedule – uses and advantages – Classification of Schedules – Methods of scheduling – Bar chart – Job layout – Work breakdown chart(WBC) – Network for projects management – Activity – Event – Dummies – Basic assumptions in creating a network – Rules for developing networks – Fulckerson's rule for numbering the events - Critical Path Method Critical and Subcritical paths – Critical and Non critical activities/events - – Significance of critical path – Simple Problems - PERT – Time estimate – EST, EFT, LST, LFT - Earliest expected time – Latest allowable occurrence time –Floats - Slack. Standard deviation - Variance – Simple problems. **3.2 RESOURCE MANAGEMENT** Definition – Need for resource management – Optimum utilization of resources- finance, materials, machinery, human resources - Resource planning – Resource levelling and its objectives – Construction planning – Stages – Operations – Schedule –Crashing – Need for crashing an activity – Methods and tips for crashing – Time Vs Cost optimization curve – Cost slope and its significance in crashing – simple problem on resource levelling (not for examination)	**14 Hrs**
IV	**4.1 QUALITY MANAGEMENT AND SAFETY** Importance of quality – Elements of quality – Quality assurance techniques (inspection, testing, sampling) Importance of safety – Causes of accidents – Role of various parties (designer / employer / worker) in safety management – Benefits – Approaches to improve safety in construction. **4.2 CONSTRUCTION DISPUTES AND THEIR SETTLEMENT** Introduction – Development of disputes – Categories of disputes – Modes of settlements - Arbitration **4.3 CONSTRUCTION LABOUR AND LEGISTATION** Need for legislation - Payment of wages Act - Factories Act – Contract labour(Regulation and abolition) Act – Employees Provident Fund (EPF) Act. **4.4 ETHICS IN ENGINEERING** Human values - Definition of Ethics - Engineering ethics - Engineering as a profession - Qualities of professional - Professional institutions - Code of ethics - Major ethical issues - Ethical judgement - Engineering and management decision - Value based ethics.	**14 Hrs**

Unit	Name of the Topic	Hours
V	**5.1 ENTREPRENEURSHIP** Definition – Role and Significance – Risks and Rewards – Concepts of Entrepreneurship – Profile and requirement of entrepreneur - Programmes existing in India – SISI, DIC, TANSIDCO – Funding and technical assistance to Entrepreneurship- NIDCO,ICICI,IDBI,IFCI,SFC **5.2 INFORMATION MANAGEMENT AND COMPUTERS** Introduction – Definition of MIS – Out lines of MIS – Use of computers in construction industry – Requirements of MIS – A data base approach – Definition –Benefits - A data base approach to contractor's account and its advantage – Basic concepts of estimation – Project management and operations simulation packages – Construction automation and Robotics. **5.3 FINANCIAL MANAGEMENT** Elements of cash flow – Time value of money – Interest rate of capital – Present value computation - NPV method – IRR method – simple problems - Global banking culture - Types of banks –Activities of Banks – Corporate finance – Personal, retail and rural banking – Treasury management. **REVISION AND TEST**	**14 Hrs**

Reference Book :

1. Sanga Reddy. S, "Construction Management",Kumaran Publications, Coimbatore.
2. Sengupta.B, &H.Guha. "Construction Management and Planning ",Tata McGraw Hill Publishing Company Ltd., New Delhi
3. Seetharaman. S, " Construction Engineering & Management ",Umesh Publications, NaiSarak, New Delhi
4. Boyd.C. & Paulson Jr, "Computer Applications in Construction ",Tata McGraw Hill Publishing company Ltd., New Delhi.
5. Rangwala.S.C.,"Construction of Structures and Management of Works" Charotar Publishing House, Anand 388 001, 2000
6. B C Punmia, " Project Planning and control with PERT and CPM", Laxmi Publications.

21061 CONSTRUCTION MANAGEMENT WITH MIS

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. What is meant by Construction management?
2. What are the classifications of construction planning?
3. What is meant by Project Report?
4. What is the necessity of EMD?
5. Mention the different types of Construction organizations?
6. State any two requirements of a project office.
7. What is cash book?
8. What is nominal muster roll?
9. What ist meant by Project scheduling?
10. What is the Bar chart?
11. What is the expansion of CPM?
12. What is PERT?
13. Define Quality Control ?
14. When disputes are developed between the Owner and contractor ?
15. Define labour wage act ?
16. What is the function of trade Union?
17. Define entrepreneurship.
18. What is SIDCO?
19. Define MIS.
20. What is the function of rural bank?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

1. (A) (i) What are the objectives of construction management ? (6)
(ii) What are the factors to be considered in the feasibility study of a project ? (6)

OR

(B) Explain the function of construction management in National development (12)

22.(A) Describe in detail the different forms of Business organizations. Also mention the **m**erits and demerits (12)

OR

(B) (i) What do you mean by check measurement? Explain (6)
(ii) Write short notes on (6)
1. Nominal muster roll.
2. Daily labour report.
3. Work charged Establishment

23.(A) Draw a critical path and determine the project duration time for the following details. (12)

Activity	0-1	0-2	1-3	2-3	3-4	4-5	4-6	5-6
Duration in days	18	4	5	4	6	6	8	8

OR

(B) Explain the terms “material resource” and “human resources” (12)

24. (A) Describe in details the different forms of quality assurance Techniques (12)

OR

(B) (i) What are the causes of accidents in the construction site? (6)
(ii) What is the need of labour legislation ? (6)

25. (A) (i) Write any four requirements of an entrepreneur (4)
(ii) How computers are being used in the field of construction industry? (8)

OR

(B) Calculate the net present value of a machine from the following data and also find the profitability index . (12)

Initial investment Rs.50, 000/- Expected life 5 years
Salvage value Rs.5000/- PV factor for 5 years 0.621 @10%

Year	Cash inflow	P.V discount factor @10%
1	Rs.20,000	0.909
2	Rs.16,000	0.826
3	Rs.14,000	0.751
4	Rs.12,000	0.688
5	Rs. 8,000	0.621

21061 CONSTRUCTION MANAGEMENT WITH MIS

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Define “Ecological Analysis” with respect to Construction Project .
2. What is meant by “Public Sector”.
3. State any two limitations in planning of Construction projects?
4. What is sub contract?
5. Expand P.W.D and C.P.W.D
6. What is the purpose of Measurement book?
7. What is meant by engineering ethics?
8. What is meant by pay roll?
9. Define “variance”.
10. Define resource management.
11. What do you mean by “Cost slope”?
12. Define the term nominal cost.
13. What is meant by accident?
14. What is arbitration?
15. What is EPF?
16. What is the purpose of Contract Labour Act?
17. Define database.
18. What is meant by cash outflow?
19. Name any two types of banks.
20. Write the basic concept of estimation.

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 (A) Explain in detail the various stages of a construction project?

OR

(B) Explain objectives of planning and site utilization ?

22 (A) (i) What do you understand by decentralization?Explain (4)

(ii) Explain the basic difference between construction supervision and construction superintendence? (8)

OR

(B) Explain the duties and responsibilities of chief engineer and superintending engineer of State P.W.D.

23 (A) The following are the three estimates of activities. In weeks. Compute the average expected time for each activity. Draw the project network. Identify the critical path. What is the duration of the project.:

Activity	1-2	1-3	1-5	2-4	3-4	4-5	4-6	5-6
To	2	4	2	1	5	3	2	1
Tm	3	5	2	2	6	4	3	2
Tp	5	5	4	4	8	9	6	5

OR

(B) (i) Write short notes on (6)
1.Work breakdown Chart[WBC]
2.Time Vs Cost optimization curve.
3. Resource Levelling.
(ii) What are the advantages of network analysis? (6)

24 (A) (i) Explain the importance of safety in construction? (6)
(ii) What are the causes of disputes? (6)

OR

(B) Explain the Engineering Ethics and Integrity?

25 (A) Mention the different types of entrepreneurial development programs existing in India? (12)

OR

(B) (i) Mention the objectives of MIS? (4)
(ii) Describe the scheme of financial assistance provided by commercial bank to business enterprises and professionals (8)

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DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

HYDRAULICS

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21062**
Semester : VI Semester
Subject Title : **HYDRAULICS**

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
HYDRAULICS	6 Hrs	96 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be able to:

- To define the properties of fluids and their physical quantities.
- To list different types of pressures and various pressure measuring devices.
- To calculate hydrostatic forces on plane surfaces immersed in water.
- To explain types of forces, energy and application of Bernoulli's theorem.
- To describe different types of Orifices and Mouthpieces and to derive discharge formulae and their practical applications.
- To state the different losses of head of flowing liquids in pipes and their equations.
- To describe different types of Notches and Weirs, and deriving the discharge formulas and their Practical applications.
- To describe different types of Channels and their discharge formulas and to determine the condition for maximum discharge ;.
- To explain the procedure of Canal Linings and explain the different forms of ground water resources
- To explain the construction details, specifications and efficiencies of Reciprocating Pumps and Centrifugal Pumps.

21062 HYDRAULICS

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**1.1 INTRODUCTION** Hydraulics – Definition - Properties of fluids - Mass, force, weight, specific volume, specific gravity, specific weight, density, relative density, compressibility, viscosity, cohesion, adhesion, capillarity and surface tension - Dimensions and Units for area, volume, specific volume, velocity, acceleration, density, discharge, force, pressure and power. **1.2 MEASUREMENT OF PRESSURE** Pressure of liquid at a point – Intensity of pressure - Pressure head of liquid – Conversion from intensity of pressure to pressure head and vice-versa - Formula and Simple problems - Types of pressures - Static pressure, Atmospheric pressure, Gauge pressure, Vacuum pressure and Absolute pressure – Simple problems - Measurement of pressure - Simple mercury barometer - Pressure measuring devices- Piezometer tube - Simple U-tube manometer - Differential manometer – Micrometer - Problems. **1.3 HYDROSTATIC PRESSURE ON SURFACES** Pressure on plane surfaces - Horizontal, vertical and inclined surfaces-Total pressure-Centre of pressure - Depth of centre of pressure - Resultant pressure – Problems on Practical application - Sluice gates, Lock gates and Dams- Descriptions.	**18 Hrs**
II	**2.1 FLOW OF FLUIDS** Types of flow – Laminar and turbulent flow - Steady and unsteady flow – Uniform and Non-uniform flow - Equation for continuity of flow (law of conservation of mass) – Energy possessed by a fluid body - Potential energy and Potential Head – Pressure energy and Pressure Head - Kinetic Energy and Kinetic Head - Total Energy and Total Head – Bernoulli's theorem – (No proof) – Problems on Practical applications of Bernoulli's theorem – Venturimeter - Orificemeter (Derivation not necessary) - Simple problems. **2.2 FLOW THROUGH ORIFICES AND MOUTHPIECES** Definitions- Types of orifices - Vena contracta and its significance – Hydraulic coefficients Cd, Cv and Cc - Formula - Simple problems - Large orifice – Definition – Discharge formula – Simple problems - Practical applications of orifices – Types of mouthpieces - External and internal mouthpieces - Discharge formula - Simple problems. **2.3 FLOW THROUGH PIPES** Definition of pipe-Losses of head in pipes – Major losses - Minor losses - Sudden enlargement, sudden contraction, obstruction in pipes (no proof) - Simple problems – Energy / Head losses of flowing fluid due to friction - Darcy's equation - Chezy's equation (No derivation) – Problems - Transmission of power through pipes – Efficiency - Pipes in parallel connected to reservoir - Discharge formula - Simple problems.	**18 Hrs**

Unit	Name of the Topic	Hours
III	**3.1 FLOW THROUGH NOTCHES** Definitions- Types of notches – Rectangular, Triangular and Trapezoidal notches – Derivation of equations for discharges - Simple problems - Comparison of V-Notch and Rectangular Notch. **3.2 FLOW THROUGH WEIRS** Definitions - Classification of weirs - Discharge over a rectangular weir and trapezoidal weir – Derivation – Simple problems – End contractions of a weir – Franci's and Bazin's formula – Simple problems - Cippoletti weir – Problems - Narrow crested weir – Sharp crested weir with free over fall - Broad crested weir - Drowned or Submerged weirs - Suppressed weir - Stepped weir – Problems - Definition of terms - Crest of sill, Nappe or Vein, Free discharge - Velocity of approach – Spillways and Siphon spillway - Definition.	
IV	**4.1 FLOW THROUGH OPEN CHANNELS** Definition - Classification - Rectangular and Trapezoidal channels – Discharge – Chezy's formula, Bazin's formula and Manning's formula - Hydraulic mean depth – Problems - Conditions of rectangular/trapezoidal sections - Specific energy, critical depth – Conditions of maximum discharge and maximum velocity - Problems - Flow in a venturiflume –Uniform flow in channels – Flow through a sluice gate – Types of channels – Typical cross-sections of irrigation canals - Methods of measurements of velocities – Channel losses - Lining of canals – Advantages of lining of canals - Types of lining- Cement concrete lining with sketches - Soil cement lining with sketches – LDPE lining.	**16 Hrs**
V	**5.1 GROUND WATER** Aquifer - Water table – Exploring the availability of ground water - Taping of ground water - Open well - Bore well-Types of well construction - Yield of a open well – Equation - Specific capacity or specific yield of a well -Test for yield of well – Methods of rain water harvesting - Sanitary protections – No problems. **5.2 PUMPS** Pumps – Definition – Difference between a pump and a turbine-Classification of pumps - Positive displacement pumps and roto-dynamic pressure pumps - Characteristics of modern pumps -Maximum recommended suction, lift and power consumed- Reciprocating pump - Construction detail and working principle - Types - Single acting and Double acting -Slip -Air vessels-Discharge and Efficiency- Problems - Centrifugal pump – Advantages and disadvantages over a reciprocating pump - Layout -Construction details – Priming of centrifugal pump – Working of the pump – Classification – Functions of Foot valve, Delivery valve and Non-return valve – Fundamental equation of centrifugal pump - Characteristics of a centrifugal pump – Discharge, power and efficiency - Problems - Specifications of centrifugal pumps and their sections- Hand pump - Jet pump- Deep well pump - Plunger pumps - Piping system. **REVISION AND TEST**	**18 Hrs** **10 Hrs**

Reference Book :

1. Dr. Jagadish Lal - Hydraulics, Fluid Mechanics and Hydraulic Machines-Metropolitan Book
2. Company- New Delhi
3. P.N. Modi & S.M. Sethi - Fluid Mechanics - Standard Publishers – New Delhi
4. S. Ramamirtham-Hydraulics,Fluid Mechanics and Hydraulics Machines- Dhanpat Rai & Sons, New Delhi
5. K.L.Kumar - Fluid Mechanics – Eurasa Publshing House – New Delhi
6. R.K. Bansal - Fluid Mechanics - Lakshmi Publications
7. Prof. S. Nagarathinam - Fluid Mechanics - Khanna Publishers – New Delhi
8. K.R. Arora - Hydraulics, Fluid Mechanics and Hydraulics Machines –Standard Publishers & Distributors, New Delhi
9. B C S Rao, “Fluid Mechanics and Machinery” Tata-McGraw-Hill Pvt. Ltd., New Delhi

21062 HYDRAULICS

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Define the term: fluid
2. Differentiate cohesion from adhesion
3. What are the types of mechanical pressure gauges?
4. Define total pressure
5. Distinguish between steady and unsteady flow
6. What are the limitations of Bernoulli's theorem ?
7. What is an orifice? How are orifices classified ?
8. Mention the various minor losses of head of water
9. What is the use of a notch ?
10. Define crest and nappe
11. What is a weir? How are weirs classified ?
12. State the purpose of spillway in a dam ?
13. What is uniform flow and non-uniform flow in open channels
14. How are canals classified ?
15. List the advantages of canal lining
16. Define the term" Critical Depth" with respect to open channel flow.
17. What is the principal source of ground water?
18. Define Aquifer
19. Differentiate pump and turbine.
20. What is meant by centrifugal pump ?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. (A)(i) A capillary tube of diameter $2.5x10^{-3}$m is dipped in water. The surface tension at the contact surface is $73.5x10^{-3}$N/m. If the angle of contact is 25^0, determine the capillary rise.

(ii)The pressure of water at a point in a pipe line is $5N/m^2$. What is the corresponding pressure head in terms of water ? What is the corresponding pressure head in terms of kerosene of specific gravity 0.8.

OR

(B)(i) To measure the pressure at a point in a pipe line carrying water, a sensitive manometer having a basin of area 60 times the area of the tube is employed. The deflection of mercury between the limbs is 0.90m. The mercury is 0.3m below the centre of pipe in the basin. Determine the pressure head in terms of water.

(ii) A triangular plate of base 3m and altitude 4m is immersed in a liquid of specific 0.8. Its base is parallel to and at a depth of 1m from the free liquid surface. Its plane makes 30^0 to the free surface. Its base is nearer to the free liquid surface. Compute, (1) Total pressure on one side of the plate and (2) Depth of centre of pressure.

22 (A)(i) A horizontal pipe line of 100mm diameter discharges under a pressure of $343.4x10^3$Pa. The mean velocity is 1.2m m/s. Determine,(a)pressure head (b)velocity head and (c)total head.

(ii) A jet issuing from an orifice of 30mm diameter under a head of 2m falls 1m vertically in a horizontal distance of 2.75m from the vena contracta. The actual discharge is 100 litres in 37 seconds. Find (1) coefficient of discharge, (2) coefficient of velocity and (3) coefficient of contraction.

OR

(B) (i) A rectangular orifice, 2m wide and 4m deep is discharging water from a tank. The water level is 10m above the upper edge of the orifice. Taking C_d=0.6.Find the discharge.

(ii) A pipe line connects two reservoirs whose difference in water level is 15m. The length of the pipe is 600m. If the discharge is 300 lps, find the diameter of the pipe line, taking **f** as 0.02.

23 (A)(i) A triangular notch is discharging under a head of 0.7m. If the coefficient of discharge of the notch is 0.60,find the discharge. Angle of the notch is 60^0.

(ii) A trapezoidal notch, 600mm wide at the bottom has side slopes 1:1. If the discharge over the notch is 300 lps, determine the head causing flow over the sill of the notch. Take C_d as 0.62.

OR

(B) (i) A weir,10m long is divided into 4 bays by vertical posts, each 300mm wide. Determine the discharge if the head of water over the weir is 1m. Take C_d as 0.60.

(ii) Determine the discharge over a sharp crested weir of length 20m under a constant head of 0.10m. Take C_d as 0.60.

24(A) (i) Calculate the hydraulic mean depth for a rectangular channel having a bottom width of 2m, and depth of flow 1.75m.

(ii) Design an economical rectangular channel to carry $90m^3/s$ with a bed fall of 1 in 1500. In the Chezy's formula, C=50.

OR

(B) (i) Design a most economical rectangular section to carry $0.30m^3/s$ for a bed slope of 1 in 1000. Take, C=60.

(ii) An economical trapezoidal channel has a bed width of 4m and side slopes of 1:1. It has a bed fall of 1 in 1600. Taking C as 60, determine the discharge.

25 (A) (i) State various methods of tapping ground water.
(ii) Give a brief note on "Open wells".

OR

(B) (i) What are the different types of heads for a centrifugal pump?
(ii) A centrifugal pump, installed in a well for irrigation, pumps 2400litres of water per minute to a height of 25m through 120m long and 150mm diameter pipe. The overall efficiency of the pump is 60%. Taking friction factor as 0.04, calculate the power required to drive the pump.

21062 HYDRAULICS

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Define vapour pressure
2. What is a viscosity of a liquid ?
3. Define intensity of pressure
4. What is piezometer ?
5. Define: Discharge
6. Distinguish between, laminar and turbulent flow
7. What is mouthpiece ?
8. How are mouthpieces classified ?
9. Define the term, jet of water
10. What is meant by “velocity of approach”
11. What is a Cippoletti weir ?
12. What is a stepped weir ? Where it is used ?
13. What is “Critical depth”
14. How are canals aligned ?
15. Define the term, “hydraulic mean depth”
16. Define open channel
17. What is yield of a well ?
18. List the factors affecting yield of wells
19. List the factors involved in the selection of pump
20. What are the different efficiencies of centrifugal pump ?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21.(A) (i) The specific gravity of a liquid is 0.85. What will be its specific weight, density and specific volume?

(ii) A U-tube mercury manometer is used to measure differential pressure between two points of a horizontal pipe line carrying oil of specific gravity 0.8. Calculate the differential pressure head in terms of Pa, if the deflection of mercury is 0.20m.

OR

(B) (i) Derive an expression for total pressure on a inclined immersed plane surface.

(ii) A circular plate, 3m diameter is immersed in a liquid of relative density 0.9. Its peripheral distance are 2m and 4m from the free surface of the liquid. Compute, (i) Total resultant thrust on the plate and (ii) Position of its application from the free liquid surface.

22 (A) (i) A pipe line tapers from 100mm to 200mm diameter. The velocity at smaller section is 10m/s. Find the velocity at the larger section and the discharge.

(ii) An orifice meter is provided in a 500mm dia. pipe to carry 200 lps of water at a pressure head of 0.5m of mercury. If the coefficient of the meter is 0.64, calculate the diameter of the orifice.

OR

(B) (i) Under a constant head of 0.10m, the co-ordinates of the jet from the vena contracta are 0.4m and 0.42m. If $C_d = 0.62$. Determine (i) C_v and (ii) C_c.

(ii) A large rectangular orifice, 2mx1m is provided to the side of a tank. The water level in the tank is 0.3 m above its top edge. If the coefficient of discharge is 0.63, what will be the discharge through this orifice ?

23(A) (i) With a coefficient of discharge of 0.62, a rectangular notch of 0.9m width discharges 120 lps. Find the head causing flow.

(ii) A rectangular notch, 4m wide discharges water at the rate of 1000 lps. Calculate the head over the notch, if $C_d = 0.64$

OR

(B)(i) A submerged weir,2.25m long, has upstream and downstream water levels 1.5m and 0.50m above the crest of the weir. Find the discharge over the weir. Take C_d for free portion as 0.60 and that for submerged portion as 0.80.

(ii) An ogee weir, 4m long has a head of 0.50m. If $C_d = 0.62$, find the discharge.

24 (A)(i) Design an earthen trapezoidal channel with a velocity of flow of 1m/s and to discharge $10m^3/s$, having side slopes of 2 in 1

(ii) A rectangular channel is 2m wide and the depth of flow is 1m. If the discharge is 1.18 cumecs and K is 1.54, using Bazin's formula, find the longitudinal slope of the channel.

OR

(B) (i) A trapezoidal channel of most economical section has side slopes of 1:1. It is required to discharge $10m^3/s$. The bed slope is 1 in 1500. Take C=50. Design the section.

(ii) Design a trapezoidal channel with a velocity of flow of 1.0m/s to discharge $4.50m^3/s$. Assume side slopes of 1 to1 and C = 50

25 (A) (i) Explain different types of bore wells.
(ii) Write brief notes on "Open wells".

OR

(B) (i) Explain in detail, the piping system and the system of supply of water.

(ii) A single acting reciprocating pump has a piston diameter of 300mm and a stroke of 450mm. It operates at a speed of 45 rpm and lifts 25 litres of water per second to a height of 6m. Determine (i) Theoretical discharge (ii) Coefficient of discharge (iii) Percentage slip (iv) Theoretical power required and (v) Efficient of the pump

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DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

STEEL STRUCTURES

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21081**
Semester : VI Semester
Subject Title : **STEEL STRUCTURES (ELECTIVE THEORY II)**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
STEEL STRUCTURES	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be able:

- To understand the behaviour of structural steel in its plastic stage;
- To learn plastic analysis of simple members;
- To design simple steel members to resist axial forces;
- To design simple flexural members;
- To design welded / bolted connections for steel members.

21081 STEEL STRUCTURES (ELECTIVE THEORY II)

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**INTRODUCTION TO PLASTIC ANALYSIS AND LIMIT STATE DESIG** **Plastic Analysis*:*** Analysis of Steel Structures– Methods– Elastic, Plastic and Dynamic Analysis and Advanced method of analysis based on IS:800-2007– Idealized Stress vs Strain curve for Structural Steel– Requirements and Assumptions of Plastic method of analysis– Formation of Plastic hinges in Flexural members– Plastic Moment of Resistance and Plastic Modulus of Sections– Shape Factors of rectangular / circular/ I / T-Sections– Collapse load– Determination of Collapse loads for Cantilever, Simply supported and Fixed beams by any (Statical or Kinematical method– Problems. **Limit State Design:** Advantages of Limit State Design of Steel structures– Basis for design– Classification of Limit States– Characteristic and Design Actions– Ultimate and Design Strengths- Partial Safety Factors for Loads and Materials– Design requirements– Strength requirements: Stability, Fatigue and Plastic collapse– Serviceability requirements: Deflection limits, Vibration, Durability and Fire resistance –Geometrical properties of gross and effective cross sections– Classification of Cross Sections as per IS:800-2007– Internal, external(outstands) and tapered elements of sections– Maximum Effective Slenderness Ratio of members – Necessity of Bracings and Expansion joints in Steel Structures	**14 Hrs**
II	**DESIGN OF TENSION AND COMPRESSION MEMBERS BY L.S.M** **Tension Members**- Design Strength of Tension members against yielding of gross section, against rupture of critical section and due to block shear– Design requirements–Problems on determination of design strength of given members and designing tension members using rolled steel sections for given loads– Design of bolted and welded connections for tension members –Problems. **Compression Members**- Effective Length and Effective Sectional Area of Compression members – Design Stress and design strength– Buckling Class of cross sections– Imperfection factor– Stress reduction factor– Thickness of elements– Eccentricity of loads on columns– Single angle and double angle struts–Bolted and welded connections for struts– Design of Built up Columns– Connecting the components of built up columns by tacking bolts/ welds– Requirements of connections– Laced Columns– Single and Double laced systems– Requirements of lacing bars- Design of Lacings– Battened Columns– Requirements of battens– Design of battens– Problems	**14 Hrs**

Unit	Name of the Topic	Hours
II	**Column Bases**- Slab base and Gusseted base – Code Provisions (IS:800-2007) – Minimum thickness and Effective Area of Base plate– Design of Slab base and Gusseted base for Axially loaded columns using bolts / welds.	
III	**DESIGN OF FLEXURAL MEMBERS FOR BM AND SF BY L.S.M** **Laterally Supported Beams**– Classification of Steel beams –Effective span– Design principles- Web Buckling and Web Crippling– Minimum thickness of Web – Sections with webs susceptible /not susceptible to buckling under shear before yielding– Design Bending Strength of sections with Low shear –Effect of holes in Tension zone– Nominal shear strength and Design shear strength of sections– Limiting deflection of beams – Design of laterally supported Simple beams for Bending moment and Shear force using single / double rolled steel sections (symmetrical cross sections only) – Problems – Un symmetrical (Bi-Axial) bending – Design of laterally supported Purlins for sloped roof trusses (for given vertical UDL with BM coefficient 0.085) – Simple problems. **Laterally Un-Supported Beams**- Lateral Torsional Buckling of compression flange – Maximum permitted Slenderness Ratio of Compression flange – Design Bending Strength of laterally un supported beams – Bending stress reduction factor–Imperfection parameter–Elastic lateral buckling moment of doubly symmetric sections– End Torsional Restraints and Intermittent Bracing of Compression flange– Requirements, Types and their Effects– Design of laterally un supported beams for bending and shear using symmetrical rolled steel sections– Problems.	**14 Hrs**
IV	**DESIGN OF SECTIONS FOR COMBINED ACTIONS** ***Sections subjected to Bending moment and High Shear force***-– Effect of high shear on flexural capacity of sections–Limiting value of shear force for full moment capacity of sections– Reduced design strength of Plastic/Compact/Semi Compact sections subjected to high shear– Design of support sections of cantilevers and continuous beams– Problems **Sections subjected to Bending moment and Axial Compression (Beam-Column)**- Columns carrying eccentric loads, Columns subjected to vertical and horizontal loads (wind loads), Columns of frames, Principal rafters with purlins at non nodal points – Material failure and Buckling failure– Interaction equations – Overall buckling– Design problems(with axial compression and uni-axial BM only).	**14 Hrs**

Unit	Name of the Topic	Hours
IV	**Sections subjected to Bending moment and Axial Tension**– Bottom chord members of Bridge girders–Tie members of trusses with hanging loads–Reduced effective moment– Interaction equations– Design Problems	
V	**DESIGN OF CONNECTIONS AND DETAILING** **General**- Types of connections– Bolted, Riveted and Welded connections– Rigid and Flexible connections– Components of connections– Basic requirements of connections- Clearance for holes– Minimum and Maximum spacing of fasteners– Minimum edge/ end distances– Requirements of Tacking fasteners. **Bolted Connection**– Types of bolts– Bearing type Bolts– Nominal and Design shear strengths of bolts– Reduction factors for Long joints, Large grip lengths, Thick packing plates– Nominal and Design bearing strengths of bolts– Reduction factors for over sized and slotted holes– Nominal and Design tensile strengths (tension capacity) of bolts – Friction grip type Bolts– Advantages– Requirements as per IS 3757– Nominal and Design Slip resistance of bolts in shear– Slip factors– Nominal and Design tensile strengths of friction bolts– Simple design problems (Combined actions not included). **Welded Connection**- Types of welds– Fillet welds– Minimum and maximum sizes– Effective length of weld- Fillet welds on inclined faces–- Design strengths of shop/site welds– Butt welds– Effective throat thickness and effective length of butt weld– Strength of butt weld- Intermittent welds–- Slot or plug welds– Reduction factor for long joints– Stress in the weld due to individual forces– Design requirements of connections– Simple Design problems(Combined actions not included). **Detailing**- Beam to Beam and Beam to Column connections – Seat angle and Web angle connections– Designing and detailing of simple connections for vertical forces (Moment resisting connections are not included) – Simple problems –Connection details of Truss members at Joints(neat sketches). **REVISION AND TEST**	**14 Hrs** **10 Hrs**

Reference Book :

1. M.R.Shiyekar "Limit State Design in Structural Steel", PHI Learning Pvt Ltd, 2011
2. K.S.Sai Ram "Design of Steel Structures" Pearson-Porling Kindersley Pvt Ltd
3. Dr.Subramaniam "Steel Structures"

21081 STEEL STRUCTURES (ELECTIVE THEORY II)

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Define the term “Shape factor”
2. What do you mean by “Collapse load”?
3. State any two advantages of limit state design with respect to steel structures.
4. Why expansion joints are to be provided in steel structures?
5. List the three different design strengths of a tie member.
6. What is the advantage of bolted connection?
7. Why lacings are provided in compression members?
8. How a slender compression member generally fails?
9. Why steel beams are provided with lateral supports?
10. Specify minimum thickness of web for a beam to avoid web buckling, as per IS:2007?
11. What is the effective length of a beam for torsional buckling under normal loading condition when its ends are partially restrained against torsion but not restrained against warping?
12. Which member of a steel roof system is subjected to bi-axial bending?
13. When a flexural member is said to be under high shear?
14. When a column is called “beam column”?
15. Give two examples for members subjected to combined bending and tension.
16. What will be the reduced effective moment of a beam section when it is under tension?
17. List the different types of bolts?
18. What is meant by tacking fasteners?
19. Specify the value of minimum edge distance for a 20 mm dia bolt hole in case of hand flame cut edges.
20. Define “effective length of butt weld”.

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. (A) i) What are the assumptions made in the plastic method of analysis?.
ii) Explain briefly the serviceability requirements of structural elements to be considered in the limit state design.

OR

(B) A simply supported steel beam of effective span 6 metres is subjected to a point load at 2 metres from the left support. The plastic moment of resistance of the section is 200kN.m. Find the collapse load by kinematical method.

22. (A) Design the tie member of a roof truss to carry an axial force of 200 kN, due to live and dead loads, using double angles, which are to be connected back to back on either side of 8mm thick gusset plates by 4 numbers 16mm dia bolts at each end.

OR

(B) Design the slab base and concrete pedestal for a steel column ISMB350@52.4kg/m carrying an axial design load of 1000 kN. The pedestal is of M20 grade concrete and the SBC of soil is 300kN/m^2. Yield strength of steel is 250 N/mm^2. Suggest suitable size of weld if f_u=460 N/mm^2.

23. (A) (i) Differentiate the behaviours of laterally supported and laterally un-supported beams.
(ii) When a beam section has to be designed for the combined effects of bending and shear?

OR

(B) Design a simply supported steel beam using suitable I-Section to carry an udl of 50 kN/m on an effective span of 5 m. The beam is not supported laterally. Yield strength of steel used is 300 MPa. Assume both flanges to be fully restrained against torsional rotation and warping at both ends.

24. (A) A steel column of effective length 4.0 metre is subjected to an axial compression of 600KN and a bending moment of 25kN.m about its major axis. Select suitable rolled steel I-section for the column by limit state method, taking f_y of steel as 340 MPa. Check for overall member strength is not necessary.

OR

(B) An ISLB400@569N/m is used as a laterally supported cantilever beam. The support section of the beam is subjected to a design shear force of 360kN. Determine the design bending strength of the section if f_y of steel is 300 MPa.

25. (A) (i) Explain different types of bolts.
(ii) Draw a neat sketch of beam to column seat angle connection using fillet welds.

OR

(B) A single angle tension member ISA 100x100x8 mm carries an axial force of 150kN. Find out the minimum overlapping length required, on a 10mm thick gusset plate, at its end if
(i) 5mm size fillet welds of permissible design shear strength 150 N/mm^2 are used and
(ii) 16mm dia bolts of design bolt value 50kN are used.

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

TOWN PLANNING

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21082**
Semester : VI Semester
Subject Title : **TOWN PLANNING (ELECTIVE THEORY II)**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
TOWN PLANNING	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be familiar :

- To understand the principle of Town Planning and surveys.
- To study the requirements of housing and slum clearance.
- To study the requirement of Public buildings, parks and play grounds.
- To study the requirements and types of Urban roads and Traffic management
- To study the Importance of housing and slum clearance programmes
- To prepare Master plan and for Re-planning of existing Towns.
- About Building bye laws and other miscellaneous topics.

21082 TOWN PLANNING (ELECTIVE THEORY II)

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**1.1 TOWN PLANNING PRINCIPLES** General - Evolution of planning - Objects of town planning – Economic justification for town planning - Principles of Town planning - Necessity of town planning - Origin of towns - Growth of towns – Stages in town development - Personality of town - Distribution of land - Forms of planning - Site for an ideal town - Requirements of new towns - Planning of a modern town - Powers required for enforcement of Town planning scheme - Cost of Town planning - Present position of Town Planning in India. **1.2 SURVEYS** General – Necessity - Collection of Data - Types of surveys for planning a new town - Uses of surveys. **1.3 ZONING** Meaning of the term - Uses of land, objects and Principles of Zoning - Advantages of Zoning - Importance of Zoning - Aspects of Zoning – Transition Zone – Economy of Zoning - Zoning powers - Maps for Zoning.	**14 Hrs**
II	**2.1 HOUSING** General - Importance of housing - Demand for houses - Building site - Requirements of residential buildings -Classification of residential buildings - Design of residential areas - Rural Housing - Agencies for housing -Investment in housing - HUDCO – CIDCO - Housing problems in India. **2.2 SLUMS** General - Causes of slums - Characteristics of slums - Effects of slums - Slum clearance - Problems in removing slums - Improvement Works - Open plot scheme - Slum clearance and rehousing - Prevention of slum formation - Resources for slum clearance programmes - The Indian slums.	**14 Hrs**
III	**3.1 PUBLIC BUILDINGS** General – Suitable Location of Public Buildings – Classification of Public Buildings - Principles of design of public buildings - Town centres - Grouping of public buildings – Requirements of Public buildings – Green House– Civic aesthetics. **3.2 PARKS AND PLAY GROUNDS** General – Types of recreation - Necessity of open spaces - Location of urban green spaces - Classification of parks - Park systems - Park design – Finance for parks – Parkways – Playgrounds - Space standards - Landscape architecture.	**14 Hrs**

Unit	Name of the Topic	Hours
III	**3.3 MASTER PLAN** General – Objects – Necessity - Factors to be considered - Data to be collected - Drawings to be prepared - Features of master plan - Planning standards – Report – Stages of preparation – Method of Execution - Conclusion. **3.4 RE-PLANNING EXISTING TOWNS** General - Objects of re-planning – Analyzing the defects of existing towns - Data to be collected –difficulties in Master Planning existing towns / cities - Urban renewal projects- merging of suburban areas – Decentralization - Satellite Towns - Surface drains – Refuses of Towns – Refuse disposal methods.	
IV	**4.1 URBAN ROADS** General - Objects - Requirements of good city road – Factors to be considered – Classification of urban roads – Types of street systems - Through and By-pass roads – Outer and inner ring roads - Expressways – Freeways – Precincts - Road aesthetics. **4.2 TRAFFIC MANAGEMENT** General - Object – Traffic survey - Traffic congestion – Traffic control - Traffic diversion - Road junction –Parking - Traffic capacity of road - One way traffic - Road traffic problems – Use of islands and flyovers at crossings – causes of road accidents - Traffic signal – Advantages and disadvantages of Automatic Light signals – Road sign – Road marking - Name boards of streets - Direction boards - Street lighting in a town – Traffic problem of existing towns – Peculiarities of traffic.	**14 Hrs**
V	**5.1 BUILDING BYE -LAWS** General - Objects of bye-laws - Importance of bye-laws - Function of local authority - Responsibility of owner - Applicability of bye-laws - Set backs to buildings – Necessity of setbacks - Light plane – Plot coverage - Floor space index- Maximum Height of buildings - Off-street parking – Fire protection - Minimum width of streets and plot sizes – Some other terms - Principles underlying in framing building bye-laws – Building bye-laws for residential area of a typical town planning scheme – Building bye-laws for other types of buildings -Development control rules - General rules of metropolitan Area - CMDA rules. **5.2 MISCELLANEOUS TOPICS** Airports – Location - size - Noise control - Parts of an airports - Betterment and compensation – City blocks –Conurbations - Cul-de-sac streets - Focal point - Green belt - Public utility services - Rapid transit – Remote sensing application – Urban planning using remote sensing – Site suitability analysis Location of Bus Terminus, Whole sale markets, Exhibition Centres etc., – Location for water/sewage treatment plants, location for waste disposal etc.,– Transportation planning. **REVISION AND TEST**	**14 Hrs** **10 Hrs**

Reference Book :

1. Town Planning - S.C. Rangwala,: Charotar Publisher (2011), Publisher
2. K.S.Rangwala and P.S.Rangwala,. 'Town Planning ",Charotar Publishing House,15th Edition,1999.
3. Michael Hord, R. Remote sensing methods and application, John Wiley and Sons, NewYork, 1986.
4. National Building Code of India- Part-III.(2005).
5. Municipal and Panchayat bye-laws, CMDA Rules and Corporation bye-laws.
6. KA. Ramegowda, Urban and regional planning , University of Mysore
7. Principles and practice of town and country planning Lewis B. Keeble, Estates Gazette, University of Michigan,2010

21082 TOWN PLANNING (ELECTIVE THEORY II)

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. What is meant by the term “Town planning”
2. What is meant by zoning ?
3. What are the requirements of New towns ?
4. What is meant by Transition zone ?
5. Define “Housing”
6. How a slum can be improved?
7. Write a critical note on good housing ?
8. Define “HUDCO”
9. Define “parkway”
10. Name the groups of shops
11. Define “Green House”
12. Write a notes on “Business centre”
13. What are the major role of an urban road?
14. What are the types of traffic signals?
15. Give a sketch of (i) By-pass road (ii) Outer ring road
16. What is the use of road signs ?
17. Define floor space Index(FSI).
18. Expand the term CMDA
19. Where is the rapid transit system employed?
20. Write notes on light plane

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. (A)(i) Explain the various principles of town planning
(ii) Explain town planning in Ancient India

OR

(B) (i) Explain different types of surveys undertaken in the process of Town Planning
(ii) Explain about aspects of Zoning

22 (A) (i) Explain about classifications of Residential Buildings
(ii) Why was CIDCO formed? Give an idea about its functions and achievements

OR

(B) (i) Mention the aspects to be considered in the design of residential buildings.
(ii) Describe the agencies involved in housing industry.

23 (A) (i) Explain the various objects of re-planning of existing towns.
(ii) Write short notes on
(a) Different categories of refuse
(b) Advantages of water carriage system in refuse disposal

OR

(B) (i) State the data to be collected for the re-planning of a town
(ii) What are the drawings to be prepared for the master plan

24 (A) (i) Explain the essential features of freeways
(ii) Explain the general principles to be observed in the design of road junction

OR

(B)(i) What are the various usual form of road marking
(ii) What are the factors which contributes road accidents?

25. (A) (i) Mention the requirements to be considered for approval of plan by local authority
(ii) Briefly mention few building-laws of typical municipality for residential area

OR

(B)(i) Enumerate the various parts of an airport
(ii) What are the application of remote sensing in transportation planning

21082 TOWN PLANNING (ELECTIVE THEORY II)

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Mention the objects of town planning
2. Enumerate the objects of zoning
3. Mention the stages involved in the Lewis Mumford method
4. Name any two surveys of Town planning ?
5. What are the methods adopted for slum clearance ?
6. Mention any two agencies for housing
7. What is the effect of slum?
8. Mention any two requirements of housing
9. Write shorts notes on “green house”
10. Which types of trees can be planted in the clayey soil ?
11. What is a garden city?
12. What are the maps required for master plan ?
13. What are the types of urban roads ?
14. What is a sub Arterial road
15. What are the factors considered in the selection of road junction ?
16. Write the necessity of rapid transport in a city
17. What are the objects of Bye laws ?
18. Distinguish plinth area and carpet area
19. . Write notes on National Housing Policy
20. List the drawings to be submitted to the municipality for approval ?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. (A) (i) What are the principles of town planning ? Explain them briefly.
(ii) What are the objects of zoning ? Explain the advantages of zoning

OR

(B) (i) Discuss the growth of towns according to origin
(ii) Distinguish natural growth and planned growth

22 (A) (i) Explain the advantages of housing finances
(ii) What are the objectives of NHP

OR

(B) (i) Describe the various housing programe by HUDCO
(ii) What are the factors to be considered while selecting a building site ?

23. (A) (i) State the data to be collected for Replanning of a town
(ii) Explain the principles of a Garden city

OR

(B)(i) What is a master plan? What are the objects of master plan ?
(ii) List the drawings to be prepared for the master plan

24. (A) (i) Write short notes on a) Arterial road
b) Rectangular street system

OR

(B) (i) Describe the travel and transport strategy and policy
(ii) Explain the transport policy of Tamil Nadu

25. (A) Write about i) Reforms of Bye laws ii) Supervising agencies

OR

(B) (i) What are the drawings to be submitted for plan approval ?
(ii) What are the details to be provided with the application for getting an approval for a building ?

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DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

EARTHQUAKE ENGINEERING

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name **:** **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code **:** **21083**
Semester **:** VI Semester
Subject Title **:** **EARTHQUAKE ENGINEERING (ELECTIVE THEORY II)**

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
EARTHQUAKE ENGINEERING	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be able:

- To know the causes and consequences of earthquakes;
- To understand the magnitude and effects of earthquakes on structures;
- To understand the behaviour of various types of buildings during earthquakes;
- To know about the design concepts of earthquake resisting buildings;
- To know the methods of evaluation and retrofitting of damaged structures.

21083 EARTHQUAKE ENGINEERING (ELECTIVE THEORY II)

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**INTRODUCTION TO EARTH QUAKE** Objective of earthquake engineering - Engineering Seismology - Structure of the earth - Temperatures and Pressures with respect to depth - Plate Tectonics - Evolution of Indian Sub Continent - Seismotectonics of India - Severe earthquakes in Indian sub continent - Causes of earthquake - Definition of terms : Fault line, Active Fault, Focus or Hypo centre, Epicentre, Epicentre distance, Focal depth, Peak ground acceleration, Foreshocks, Aftershocks, Aseismic, Isoseismal, Seismic gap - Ground shaking - Seismic waves -Body waves - P-waves and S-waves - Surface waves - Reyleigh and Love waves – Earthquake Intensity - Earthquake size - Magnitude - Wave magnitude, Duration magnitude, Moment magnitude - Energy released - Classification of Earthquake based on magnitude - Consequences of earthquake - Ground motion, Ground rupture, Liquefaction, Landslides, Fire, Tsunamis, etc- Seismic Zoning Map of India (2002) - Earthquake frequency - Prediction of Earthquake risk -Measurement of Earthquake - Instruments used - Various scales - Richter's Magnitude Scale .	12 Hrs
II	**SEISMIC EFFECTS ON STRUCTURES** Nature of ground motion - Effects of source, path and site - Ground shaking effect on structures - Effects of Amplitude, Duration and Distance of Earth quake - Damage potential of earthquakes -Effects of Inertia forces, Seismic load, Deformations in structures, Horizontal and Vertical shaking of structures, Transfer of inertia forces from top to bottom - Effects of Soil - Influence of ground condition on earthquake motion - Causes for Seismic damages in buildings: Soft storey failure, Floating columns, Plan irregularity, Vertical irregularity, Lack of confinement of concrete, Long cantilevers with heavy dead loads, Insufficient shear reinforcements in columns, Poor quality construction, Poor quality materials, Corrosion of reinforcement, Pounding of adjacent buildings - Short column effect - Effects of size and shape of buildings - Horizontal and vertical layout of buildings - Effect of shifting of filler wall locations from floor to floor, non uniform rigidity distribution - Ductility and flexibility of buildings.	12 Hrs

Unit	Name of the Topic	Hours
III	**BEHAVIOUR OF STRUCTURES DURING EARTHQUAKES** Characteristics of buildings affecting their behavior - Symmetry, regularity, stiffness, flexibility, strengthtime period, damping, ductility, materials and method of construction - Ductile, Brittle and Fatigue fractures - Behavior of structures on sloped ground - Behaviour of Structures with load bearing walls – Brick / Stone /Mud masonry - Large inertia forces due to heavy weight, Very low tensile / shear strengths and brittleness of walls, Stress concentration at corners of openings, Unsymmetrical openings, Poor mortars, Free standing masonry walls, Wall enclosures without roof – Cracks in load bearing walls due to flexure and shear caused by earthquake – Improvements in the behavior of reinforced masonry structures - Behaviour of RCC Structures – Framed / Shear wall / Dual structures - Shear failure of columns - Types of damages in beams - Functions of stirrups in seismic beams - Outward bulging of concrete and buckling of compression reinforcement of beams - Effect of joints on the ductile behaviour of RCC / Steel members - Behaviour of Steel structures - Types of joints, Joint collapse, Joint ductility - Behaviour of Non-Structural elements in buildings during earthquakes - Behaviour of brittle elements - Behaviour of structural members under cyclic loading - Soil characteristics and its impact on various types of structures during earth quake – Twisting of buildings	**14 Hrs**
IV	**CONCEPTS OF DESIGN OF EARTHQUAKE RESISTING BUILDINGS** EarthQuake proof building - EarthQuake resisting building - Acceptable damages to building elements under minor and frequent earth quakes, moderate and occasional earthquakes, and strong but rare earth quakes - General requirements of structures for earthquake resistance and structural safety - Concepts of ductility, deformability and damageability - Concept of base isolation - Ductile performance of structures - Reinforcement detailing for ductility of RC structures - Flexible building elements - Special requirements for RC columns and beams to resist earthquake - Confining steel in columns - Special confining reinforcement for Short columns - Maximum spacing of ties and minimum lapping length of main bars in columns - Ductile detailing of RC buildings - Joints of framed structures – Reinforcements in Beam Column Joints - Providing Shear walls – Arrangement of shear walls - Boundary elements of shear walls – Reinforcements for shear walls - Advantages of shear walls in stilt floors of RC buildings - Earthquake resistant features for masonry buildings - Protection of openings in masonry walls - Masonry bond - Horizontal bands or Ring beams at plinth / lintel / roof levels in masonry - Horizontal / Vertical reinforcements in masonry walls - Framing of thin load bearing walls – Reinforcement for hollow block masonry - Reduction of earthquake effects - Base isolation technique - Types - Seismic dampers - Types of Dampers: Viscous, Friction, Yielding dampers – Seismic vibration control.	

Unit	Name of the Topic	Hours
V	**RETROFITTING OF BUILDINGS** Evaluation, Repair, Restoration and Seismic Strengthening of Buildings: Assessment of structural and non structural damages caused by earthquakes, major and minor damages, Feasibility study for retrofitting – Structural level retrofitting method and Member level retrofitting method - Repair materials: Shotcrete, Epoxy resins, Epoxy mortar, Gypsum Cement mortar, Quick setting mortars, Mechanical Anchors - Techniques to restore original strength: Repair of minor and medium cracks, Repair of major cracks , crushed concrete and fractured / excessively yielded / buckled reinforcement - Seismic strengthening techniques: Modification of roofs or floors, Insertion of new slab, Stiffening existing slab, Anchoring the slab to supporting walls / beams - Inserting new walls - Strengthening existing walls: Grouting, Use of wire mesh, Connecting the walls, Pre stressing, Providing buttress - Strengthening of RC members: Reinforced concrete rings around existing columns, Jacketing the existing weak beams, Welding new steel to the old steel and replacing the cover, Pre stressing of old beams - Introduction of additional load bearing elements in the structure - Strengthening of Foundations : Improving drainage, Providing apron, Adding RC strips with keys – Strengthening of soft or weak stories of Existing buildings - Bracing of roof truss frames, Anchoring of roof trusses to supporting walls . **REVISION AND TEST**	**16Hrs** **10 Hrs**

Reference Book :

1. Earthquake Resistant Design of Structures by Pankaj Agarwal and Manish Shrikhande (2010) PHI Learning Pvt Ltd
2. Guidelines for Earthquake Resistant Non Engineered Construction by The Associated Cement Companies Ltd
3. Criteria for Earthquake Resistant Design of Structures - General Provisions and Buildings, IS: 1893 (Part 1) - 2002
4. Code of practice for ductile detailing of RC structures subjected to Seismic forces, IS:13920-1993.
5. Earthquake Tips by C.V.R.Murty, IIT, Kanpur, Sponsored by BMTPC, New Delhi.
6. Geotechnical Earthquake Engineering Hand Book by Robert W.Day – McGRAW - HILL
7. Introduction to Earthquake Engineering by Shunzo Okamoto – University of Tokyo Press
8. Repair and Seismic strengthening of buildings - Guidelines, IS:13935 - 2002
9. Dr Kamalesh Kumar, “Basic Geotechnical Earthquake Engineering”, New Age International Publications, New Delhi, 2009
10. Robert W. Day, “Geotechnical Earthquakes Engineering Hand Book, Tata McGraw-Hill, New Delhi, 2002

21083 EARTHQUAKE ENGINEERING (ELECTIVE THEORY II)

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1 Define the term “Epi centre”

2 Name any one of the severe earth quake of India

3 When Tsunami is generated due to earth quake ?

4 Name the different types of seismic waves

5 Define “inertia force” on structures due to earth quake

6 What is meant by “soft storey” ?

7 Whether the building as a whole is to be ductile or brittle for good seismic performance ?

8 List any two effects on a masonry wall due to a minor earth quake

9 What do you mean by stress concentration ?

10 What is the reason for twisting of buildings ?

11 Why buildings on slopes are more vulnerable to earth quakes ?

12 When a masonry wall is called reinforced masonry ?

13 What type of damages are expected during moderate and occasional earthquakes ?

14 Specify the requirement of a shear wall

15 Define “base isolation”

16 What are the different types of Dampers ?

17 What do you mean by retrofitting of buildings ?

18 What are the materials used for filling the cracks in masonry walls ?

19 How a damaged RC column could be repaired ?

20 Mention any two methods recommended for strengthening the old masonry structures

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 (A) i) Explain briefly the structure of the earth, with a neat sketch
ii) Explain in detail how the earthquakes are being measured

(OR)

(B) i) Write short notes on Plate Tectonics
ii) How earth quakes are classified based on their magnitude ?

22 (A) Explain in detail with necessary sketches the effect of ground shaking on different types of structures

(OR)

(B) How Architectural features affect buildings during earthquakes ? Explain with neat sketches

23 (A) List out the various characteristics of buildings which affect their behavior during earthquakes and explain how they affect

. (OR)

(B) Write short notes on:
(i) "joint collapse" in steel structures, (ii) "flexural cracks in load bearing walls" and
(iii) "effect of cyclic loading"

24 (A) Explain in detail the special requirements for RC columns and beams to resist the effect of earthquakes

(OR)

(B) (i) How shear walls are to be arranged in a building with stilt floor ?
(ii) How the vibration of building elements due to earthquake can be controlled ?

25 (A) (i) Write a note on "stiffening of slabs"
(ii) Explain any one method of strengthening of foundation

(OR)

(B) (i) Explain how a soft storey of an existing multi-storey building can be strengthened
(ii) What is the necessity of bracing of roof truss frames ?

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

BUILDING SERVICES

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21084**
Semester : V Semester
Subject Title : **BUILDING SERVICES (ELECTIVE THEORY I)**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
BUILDING SERVICES	5 Hrs	80 Hrs	Internal Assessment	Board Examination	Total	
			25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be familiar with:

- To know principles of electrical services in buildings
- To describe electrical layout
- To explain mechanical services
- To know the principles of air conditioning
- To explain lighting in building
- To describe ventilation system
- To know fire protection in building
- To describe acoustics and sound installations
- To explain the types of maintenance work in building
- To describe defects and repair works in building

21084 BUILDING SERVICES (ELECTIVE THEORY I)

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**1.1 ELECTRICAL SERVICES** Conventional symbols for electrical Installations – Main – Submain – Wiring accessories – Wire, Cable, Switches, Wall plugs, Fuses and Cutouts – H.R.C type, round type, cartridge type – Distribution boxes, circuit breaker, Junction boxes – 2 pin and 3 pin sockets, lamp holder, ceiling roses, change over switches –Various systems of wiring – wooden casing wiring, cleat wiring, CTS wiring, conduit wiring – Insulation – Earthing – Electrical meters – Use of generators, inverters, emergency lamps. **1.2 ELECTRICAL LAYOUT** Planning of Electrical Installations and distribution – Preparation of Electrical layout for a small residence, small work shop, show room, school building etc – Estimation of load.	**14Hrs**
II	**2.1 MECHANICAL SERVICES** Lifts – Definition – Location – Sizes – Component parts – Lift well, Travel, Pit, Hoist way, Machine, Buffer, Door Locks – Suspended rope, Lift car, Landing Door, Call Indicator, Call Push - Different types of Elevators – Freight elevators, Passengers elevators, Hospital elevators – Dumbwaiters and vertical conveyors – Escalators – Locations and Functions – Advantages of Escalators. **2.2 AIR CONDITIONING** Definition – Purpose – Principles – Temperature control, Air velocity control,. Humidity control – Air Conditioning Systems – Component parts – Air pumps, Air delivery system, Air Distribution system – Cleaners – Filters, Spray washers, Electric precipitators – Types of Air Conditioners – Central type – Window Type –Split unit.	**14Hrs**
III	**3.1 LIGHTING** Natural and Artificial Lighting – Requirements of good lighting – Day light factors – Day light Penetration – Aims of good lighting – General Principles of openings to afford good lighting – Reflection factors –Illumination – Units of measurement – Lux, candela, Luminous flux –Orientation of buildings – External reflected component – Internal reflected component – Necessity of artificial lighting – Arrangement of luminaries – Distribution of Illumination – Utilization factor – Temperature rise due to artificial lighting – Remedial measures.	**14Hrs**

Unit	Name of the Topic	Hours
	3.2 VENTILATION Definition - Necessity – Types – Natural / Mechanical Ventilation – wind effect – Factors to be considered in the design of Ventilation – respiration, vitiation of air, air changes, heat balance of body – General rules for Natural ventilation – Advantages and Disadvantages of Mechanical Ventilation – Methods of Mechanical Ventilation – Combined Systems.	
IV	**4.1 FIRE PROTECTION** Causes and Effects of fire – Precautionary Measures – Factors to be considered for limiting fire spread area – Characteristics of fire resisting materials – General requirements for fire resisting buildings – Fire protection systems – Fire exits – General requirements as per NBC 2005 – maximum travel distance – Horizontal exit, roof exit / fire lifts, external stairs – Fire fighting installations. **4.2 ACOUSTICS AND SOUND INSULATIONS** Acoustics of Buildings – Characteristics of Sound – Pitch or frequency, intensity, tone – Measurement of intensity of sound - Bel & Decibel – Behavior of sound and its effects - Transmission, reflection, absorption - Echoes, reverberation – common acoustical defects - Requirements of good Acoustics – Principles and factors to be considered in acoustical designs – Sound absorbents – Types – Absorption coefficients - Sound Insulation of buildings - General factors to be considered and constructional measures to be followed for noise control in residential buildings.	**14Hrs**
V	**5.1 MAINTENANCE OF BUILDINGS** Introduction - Maintenance works in buildings - Painting – Flooring – sinking of floors – Doors and windows – Termite attack – Sanitary appliances – Water supply and drainage system – leakages – Cracks in concrete – Types – Cracks in walls – types - Common methods of crack repair – preventive maintenance - corrosion of steel elements - special precautions for repairs of building **5.2 DEFECTS AND REPAIR WORKS IN BUILDINGS** Defects in buildings - Prevention of defects in buildings – Major causes of defects – Treatment of toilet sunken portion – Improper laying of weathering course - Maintenance works - Specification for weathering course - Lime jelly concrete with tiles - Thermal insulation combined with water proofing for flat concrete roofs - Water proofing - Expansion joints - Repair of rain water leakage in buildings. REVISION AND TEST	**14Hrs** 10 Hrs

Reference Book :

1. National Building code of India – 2005, Bureau of Indian Standards, New Delhi
2. Building construction, P.C.Varghese, PHI Learning Pvt. Ltd, New Delhi
3. Building construction, Dr.B.C.Punmia, Laxmi Publications (p) Ltd, New Delhi
4. A text book on Building services, R.Udyakumar, Eswar Press, Chennai
5. Building repair and maintenance management, P.S.Gahlot, CBS Publishers & distributors (p) Ltd.
6. Maintenance of Buildings, A C Panchdhari, New Age International Publications, Chennai.

21084 BUILDING SERVICES (ELECTIVE THEORY I)

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Mention any two symbols for electrical installations.
2. What is the use of junction box?
3. Define Earthing.
4. Mention the use of electrical meter.
5. What is the use of lift?
6. Write any two types of elevators.
7. Mention any two purposes of air conditioning.
8. Write any two parts of air conditioner.
9. Write any two requirements of good lighting.
10. Define lux.
11. Write the necessity of ventilation.
12. Mention any two disadvantages of mechanical ventilation.
13. Write any two causes of fire.
14. Define fire alarm system.
15. Write any two characteristics of sound.
16. Define noise absorption coefficients.
17. Write any two types of maintenance works in buildings.
18. Write any two types of cracks in concrete.
19. Write any two defects in buildings.
20. Define expansion joint.

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 (A) Explain the various wiring systems adopted in building

OR

(B) Draw a neat sketch of layout of electrical fittings in a residential building

22 (A) Describe escalator and its uses

OR

(B) Explain in detail about indoor air conditioners

23 (A) Describe about necessity of artificial lighting

OR

(B) What are the methods of Mechanical Ventilation and explain any one in detail?

24 (A) Explain the factors to be considered for limiting fire spreading area?

OR

(B) State the different factors to be considered in acoustical design

25 (A) Describe maintenance of water supply and drainage system in building

OR

(B) Explain about thermal insulation combined with water proofing for flat concrete roofs

21084 BUILDING SERVICES (ELECTIVE THEORY I)

MODEL QUESTION PAPER - 2

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. What is the use of two way switches?
2. What is meant by CTS wiring
3. Define inverters
4. Mention any two electrical installations
5. What is meant by Hoist?
6. Mention the function of dumbwaiters
7. Define Humidity
8. What is the use of Spray washers?
9. What is meant by artificial lighting
10. Define luminous flux
11. Define mechanical ventilation
12. Write any two advantages of natural ventilation
13. Define fire exit
14. Write any two fire fighting installations
15. What is meant by frequency of sound?
16. Write any two sound insulation materials
17. Write any two maintenance works for doors and windows
18. What is meant by preventive maintenance?
19. Write any two causes of defects in buildings
20. Write any two water proofing materials

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21 (A) Explain the various methods of Earthing

OR

(B) Draw a neat sketch of layout of electrical fittings for a school building

22 (A) Explain in detail the different types of elevators

OR

(B) What are the types of air conditioners and explain any one type in detail

23 (A) i) What are the requirements of good lighting?
ii) What are the aims of good lighting?

OR

(B) What are the methods of Natural Ventilation and explain any one method in detail

24 (A) What are the characteristics of fire resisting materials?

OR

(B) State the different factors to be considered and construction measures to be followed for noise control in residential buildings

25 (A) What are the various types of cracks in concrete and explain the reasons in detail.

OR

(B) Explain the causes for about repair of rain water leakage in buildings and the remedial measures.

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

ESTIMATING AND COSTING II

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21064**
Semester : VI Semester
Subject Title : **ESTIMATING AND COSTING II**

TEACHING AND SCHEME OF EXAMINATION:

No of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
ESTIMATING AND COSTING II	5 Hrs	80 Hrs	25	75	100	3 Hrs

OBJECTIVES:

On completion of the course, the student will be able:

- To write specifications for various materials and for different items of works.
- To write Technical reports on the proposed projects
- To prepare data for various items of works using Standard data & Schedule of Rates.
- To prepare detailed estimate of quantities of various items of works for P.H.Engineering structures using Trade System.
- To prepare detailed estimate of quantities of various items of works for Bridges and Road works using Trade System.
- To calculate the value of a building / property; to fix rent for a building adopting suitable method.

21064 ESTIMATING AND COSTING II

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**1.1 Specification Writing** Specification – Necessity – Importance of specifications- Types of specifications – General specification , Detailed specification and Standard specification - Essential requirements of specifications – General and Technical provisions of detailed specifications - Specifications for various materials like Cement, Sand, Brick, Timber, Stone aggregate, Reinforcement steel, Tiles, Bitumen, Water etc- General specification for a building – General specification for a Culvert - General specification for a Concrete / Tar Road project - Examples—Detailed specifications for works such as Earth work excavation, Foundation concrete, Stone / Brick masonry, Doors / Windows, RCC in columns / beams / slabs, Plastering, Flooring, Painting / Varnishing, DPC, A.C sheet roofing, Rain water pipes, Centering for roofing, Weathering course, Under reamed Piles, Water bound macadam / Tar roads, Surface dressing with bitumen, Revetments, etc- Examples - Steps involved in writing Standard specification – Advantages of Standard specifications - Writing standard specifications with reference to Tamil Nadu Building Practice / Indian Standards / NBC - Examples **1.2 Report writing** Definition of report – Types – Necessity - Documents to accompany the report - Points to be considered while writing technical reports Writing typical Technical reports for the proposed projects such as: Construction of Buildings (Residential / Hospital / School/ Community Hall) Laying a village road (WBM / Tar / Concrete road) Construction of a bridge/ culvert across a river Construction of a Pedestrian Sub-way/ Foot over bridge across a City road Water supply system for a village Sewage treatment plant for a residential colony in a sub urban area Construction of a new bus terminus in a developing town	10 Hrs
II	**2.1 Valuation** Value - Difference between Cost and Value - Purpose of valuation – Definition of terms: Capital cost, Gross income and Net income, Outgoings, Capitalized value and Capital value, Scrap value, Salvage value, Obsolescence, Sinking fund, Depreciation, Years purchase, Book value, Market value, Rateable value, Deferred value of land, Lease, Mortgage, Annuity, Amortization - Factors affecting the value of a property - Classification of Properties - Types of Leases - Problems on determination of Sinking Fund - Problems on calculation of Depreciation - Methods of valuation of Buildings - Valuation based on Comparision / Rent / Profit / Present value - Methods of valuation of Lands - Mathematics of Valuation – Valuation Tables - Problems on Valuation of Buildings / Properties	18 Hrs

Unit	Name of the Topic	Hours
II	**2.2 Rent Calculation** Fixation of rent – Definition of terms: Standard rent, Fair rent or Reasonable rent, Economical rent, Market rent, Rent certificate - Rent control – Factors influencing the rent of a building - Problems on rent calculation – Fixing rent of a Private building used by Government – Fixing rent of a Government building used by its employees – Fixing rent of a Government building rented to Private parties	
III	**3.1 Analysis of rates for Sanitary and Water supply works** Earth work in trenches - Timbering of trenches - Laying stone ware / RCC / GI pipes – Lead joint for cast iron pipes - Cutting and jointing G.I.Pipes, PVC Pipes and Stoneware Pipes - Constructing a man hole in the sewage line of a residence - Providing a dispersion trench for the septic tank of a residential flat – Supplying a Ferro cement circular ring for well sinking - Laying PVC Plumbing lines concealed in to brick masonry walls - Supplying and fixing Indian type water closets with flushing tanks - Supplying and fixing European type water closet with flushing tank - Supplying and fixing a wash basin with tap **3.2 Analysis of rates for Bridge/ Road works and Miscellaneous items** Random Rubble Stone masonry in Abutments and Piers - Providing form work for Deck slabs - R.C.C for Columns / Beams / Deck Slab – Parapets - Hand rails - Earth filling in embankments - Soling for a WBM road - Laying WBM road over the existing soling - Surface dressing - Surface Blinding - Providing Pre mix carpet - Laying Concrete roads - Apron and Revetment works in Canals -Wooden frames for doors - Paneled doors - Glazed windows - Steel Grill gates – Steel grills for windows - Supplying and fixing Aluminum partitions - Providing wooden shutters to lofts - Expansion joint in R.C roof (Exposure to use of software in Analysis of rates - not for examination)	**12 Hrs**
IV	**Taking Off Quantities of P.H.Engineering Structures using Trade System** Preparing detailed estimate using Trade system and Take off quantities for all items of works in the following P.H. Engineering Structures: 1 Septic tanks with dispersion trench / soak pit 2 Open Well with Masonry Steining 3 Rain water harvesting- Shallow Recharge Well 4 Square RCC Over Head Tank on Four columns with Staging	**16 Hrs**

Unit	Name of the Topic	Hours
V	**Taking off Quantities of Road / Bridge Structures using Trade System** Preparing detailed estimate using Trade system and Take off quantities for all items of works in the following Road / Bridge Structures: 1 Water Bound Macadam Road 2 Cement Concrete Road with side drains 3 Single span Slab Culvert 4 Tee Beam Bridge **REVISION AND TEST**	**16 Hrs** **8 Hrs**

Reference Book :

1. Rangawala, “Estimating & Costing” , Charotor Publishing;
2. N.A.Shaw, “Quantity Surveying & Valuation”, Khanna Publishers;
3. L.N.Dutta, “Estimating & Costing”, Dhanpat Rai & Sons
4. Bridie, “Estimating & Costing”
5. Indian Standard Code of Practice, IS:1200.
6. Civil Estimating, Casting and Valuation – Kalson Publication Ludhiuyana.
7. Vazirani & Chandolu,” Estimating and Costing” 2001.

21064 ESTIMATING AND COSTING II

MODEL QUESTION PAPER - 1

Time : 3 Hrs Max Marks : 75

PART- A

Marks 15 x 1 = 15

Note : Answer any 15 Questions. – All Questions carry equal marks

1. Differentiate general specification and detailed specification.
2. What particulars are to be incorporated in a detailed specification of materials?
3. Write any two points to be considered while writing a technical report for a project.
4. What are the details required for writing a general report on a project?.
5. Define the term “salvage value”
6. Write the formula used to calculate the annual installment of sinking fund
7. Define “fair rent”.
8. Write any two factors which govern the rent of a building.
9. Why rates are to be analysed separately for each project site?
10. What particulars you need to arrive at a reasonable rate for earth work in trenches?
11. Write any two materials for which the lead cost is more than their actual cost.
12. What do you mean by “observed data”?
13. Write any three items of works involved in the construction of a man hole.
14. How you estimate the quantity of steel reinforcement for various RCC elements?.
15. Write any two items of works for which lump sum provisions are being made in the estimate of an over head tank.
16. Where steining walls are provided?
17. Write any three items of works involved in the laying of a water bound macadam road.
18. What are the works involved in the construction of side drains for a road?.
19. State the unit of measurement for the fabrication of steel for the deck slab of a culvert.
20. What will be the unit of measurement for the wearing coat of a bridge?

PART- B

Marks 5 x 12 = 60

Note : i) Answer all Questions choosing either division (A) or division (B) of each question.
ii) All divisions carry equal marks.

21. A (i) Write a detailed specification for the coarse aggregate to be used in reinforced cement concrete.

(ii) Write general specification for any six items of works involved in the construction of a slab culvert.

OR

B (i) Write a detailed report about the proposed new bus terminus for a developing town.

(ii) List out the documents and sketches to be enclosed with the above report.

22 A (i) Write a small note on valuation.

(ii) A building was constructed in the year 2011 for a total cost of Rs.40 lakhs. Its salvage value in year 2030 is expected to be Rs.15 lakhs. Find the book value of the building in the year 2020 by sinking fund method, and also determine the annual installment of sinking fund, assuming the rate of interest as 8%.

OR

B. (i) How the nominal lease rents are fixed for Government buildings when they are rented to service associations of the department employees?

(ii) A person is having a house building worth Rs.12,00,000 at present market value, constructed 10 years back in a plot area of 240 m^2. The present market value of land in the locality is Rs.3000 per m^2. The cost of amenities provided to the building is Rs.1,20,000. Allowing a rate of depreciation of 2% and taking the nominal interest on investments as 9%, fix a fair monthly rent to the building.

23. (A) (Analyze and determine the rates for the following items of work with the given data.

i) Supplying and laying of stone ware glazed pipes and specials for sewers 100 mm dia, lowering in trenches upto a depth of 1.5m, jointing with cement mortar 1:1 including testing but excluding earth work excavation – 1 m

(ii) Casting and supplying 1200mm dia, 300mm high, 25mm thick ferro cement ring for well sinking -1No

OR

(B) (i) 20 mm thick Premix Chipping carpet – 1m^2.
(ii) Rough stone dry packing for aprons and rivetments – 1 m^3.

Material and Labour requirement:

1.Supplying and laying of stone ware glazed pipes – 30m

600mm length 100mm dia pipes	50	No.
Cement	18	kg
Sand (medium)	0.11	m^3
Spun yarn	2.0	kg
Bitumen, Tools&Plants, Testing etc	Rs.400.00(LS)	
Mason Category I	1.0	No.
Mason Category II	4.0	No.
Mazdoor Category I	5.0	No.
Mazdoor Category II	3.0	No..

2. Casting and supplying 25mm thick ferro cement ring for well sinking -10 Nos

Stone chips	0.30	m^3
Sand (medium)	0.15	m^3
Cement	107	kg
3mm gauge wire mesh	12	m^2
Chicken mesh	24	m^2
Mason Category I	2.4	No.
Mazdoor Category I	4.0	No.
Mazdoor Category II	4.0	No.
Labour for shifting and curing	Rs.200 per 10 Nos	
Cement mortar 1:4	0.09	m^3
Mason Category II	1.6	No.
Mazdoor Category I	0.5	No.
Mazdoor Category II	1.1	No.

3. 20 mm thick Premix Chipping carpet – 100m^2.

Binder Asphalt	255	kg
Stone chips	2.7	m^3
Sand	0.3	m^3

Hire charges for Boiler, Roller, Mixer and cost of fire wood, brushes etc LS :Rs.950.00

4.Rough stone dry packing for aprons and rivetments – 10 m^3

Rough stones	11	m^3
Wooders	3.5	No.
Mazdoor Category I	10.6	No.
Mazdoor Category II	7.1	No.

Cost of materials and lead particulars:

Material	Unit (Rs)	Cost (kM)	Lead	Rate for Lead/kM) (Rs)	Handling charges (Rs)
Cement	50kg	280.00	4	2.00	5.00
Sand	m^3	250.00	30	20.00	60.00
Rough Stone	m^3	800.00	20	20.00	80.00
Stone chips	m^3	520.00	20	18.00	40.00
SW pipe 100mm dia	0.6m	60.00	4	0.50	0.50
Spurn yarn	1kg	16.00	--	--	--
Binder Asphalt	1kg	21.00	--	--	--
3mm gauge wire mesh	$1m^2$	150.00	--	--	--
Chicken mesh	$1m^2$	40.00	--	--	--

Cost of Labour:

Mason Category I	Rs.550.00 per day
Mason Category II	Rs.500.00 per day
Wooder	Rs.450.00 per day
Mazdoor Category I	Rs.400.00 per day
Mazdoor Category II	Rs.275.00 per day

24. A. Take the quantity of R.C.C in column footings for the over head tank shown in Sketch 1 using Trade system

OR

B. Take the area of plastering of the side walls (inner and outer) of the over head tank shown Sketch 1 using Trade system

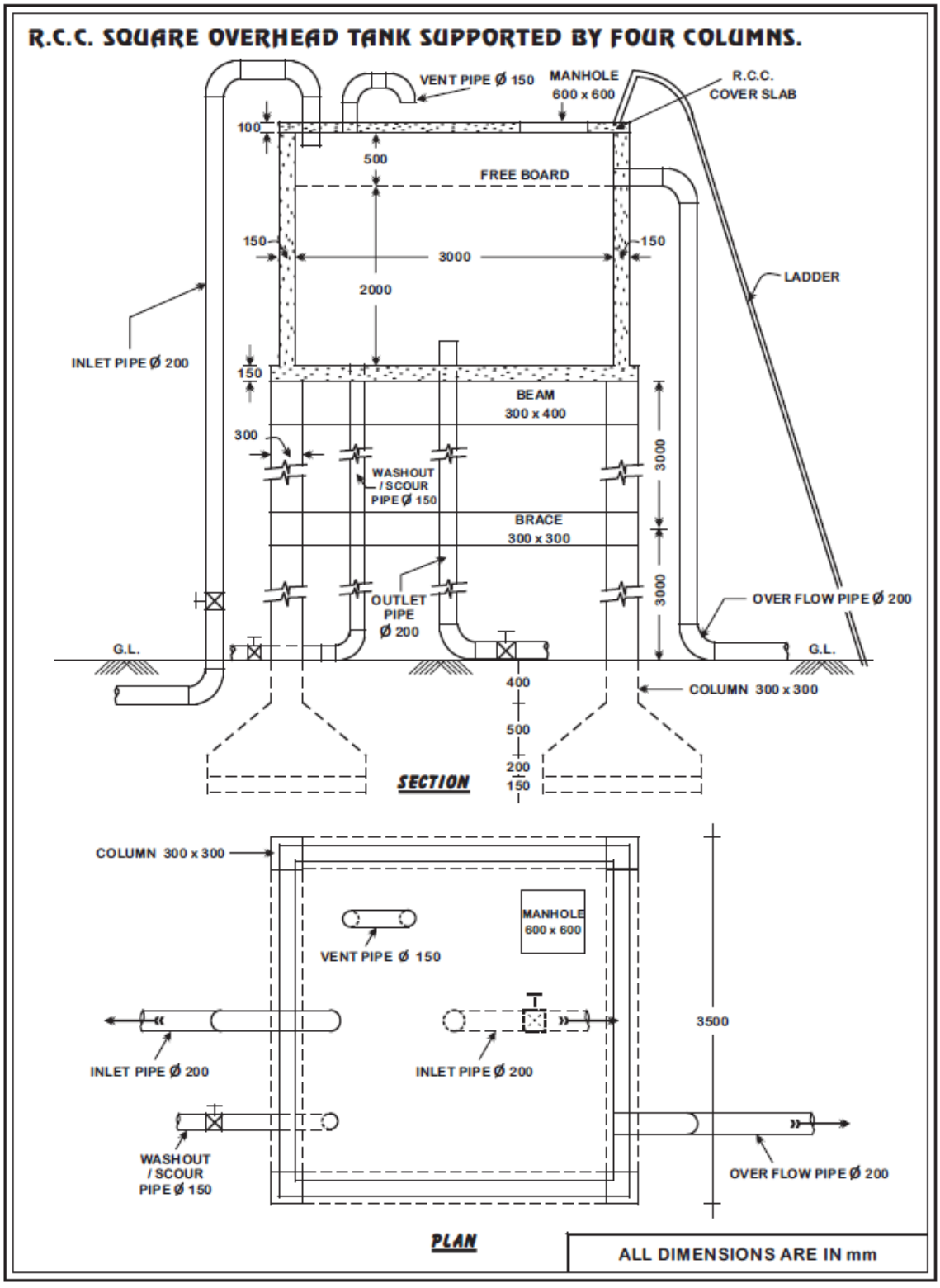
(Sketch 1 – A plan and sectional elevation of a RCC over head tank with flat RCC roof.)

25. A. Take the quantity of brick work in abutment and wing walls of the Tee-beam bridge shown in Sketch 2, using Trade system

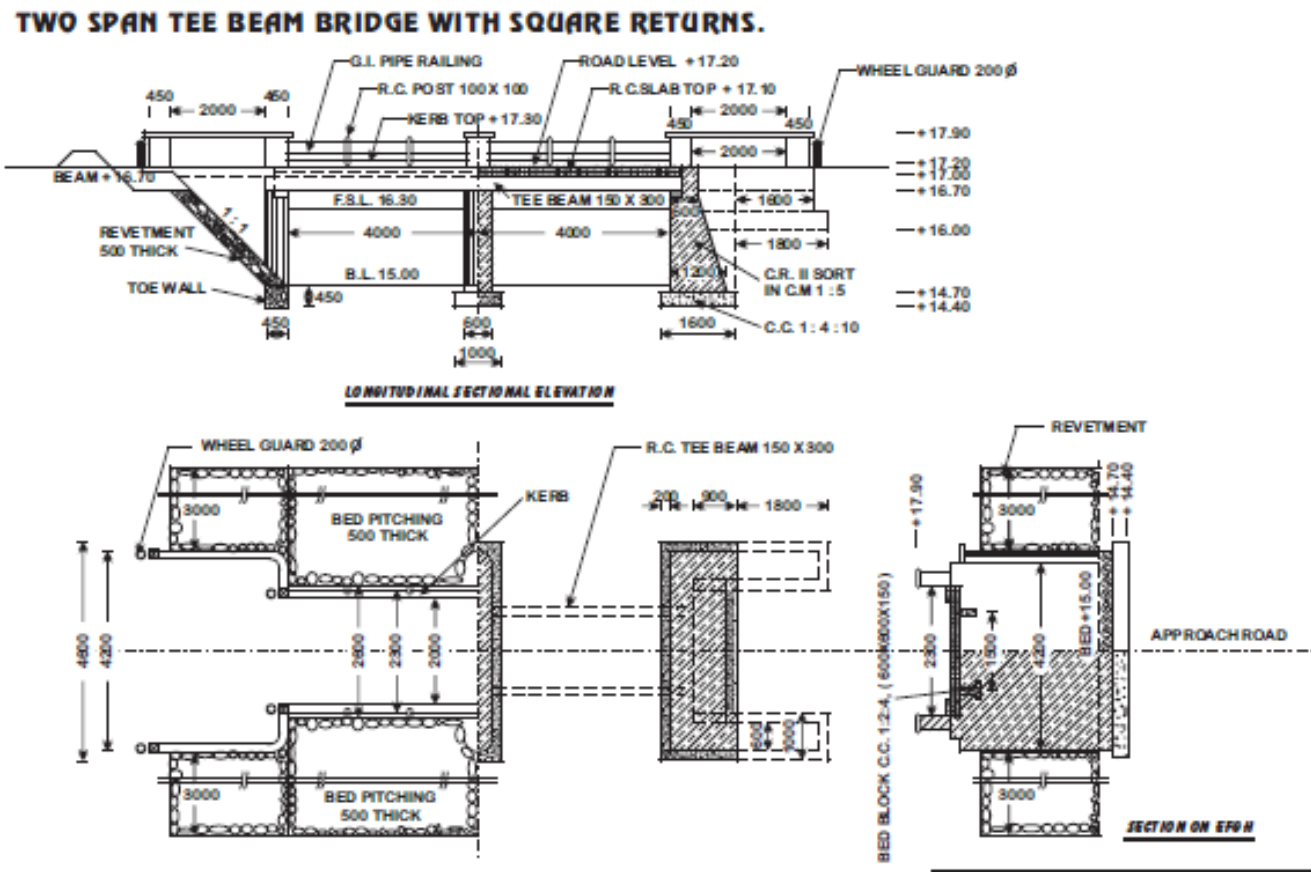
OR

B. Take the quantities of RCC in Beams and Slabs of the Tee beam bridge shown in Sketch 2 using Trade system.

(Sketch 2 – A sectional plan and sectional elevation of a single span Tee beam bridge).


R.C.C. SQUARE OVERHEAD TANK SUPPORTED BY FOUR COLUMNS.
VENT PIPE Ø 150
MANHOLE 600 x 600
R.C.C. COVER SLAB
100
500
FREE BOARD
150
3000
150
2000
LADDER
INLET PIPE Ø 200
150
BEAM 300 x 400
300
WASHOUT / SCOUR PIPE Ø 150
3000
BRACE 300 x 300
3000
OUTLET PIPE Ø 200
OVER FLOW PIPE Ø 200
G.L.
G.L.
400
COLUMN 300 x 300
500
200
150
SECTION
COLUMN 300 x 300
MANHOLE 600 x 600
VENT PIPE Ø 150
3500
INLET PIPE Ø 200
INLET PIPE Ø 200
WASHOUT / SCOUR PIPE Ø 150
OVER FLOW PIPE Ø 200
PLAN
ALL DIMENSIONS ARE IN mm

SKETCH – 1



Half Plan at Top and Bottom

SKETCH -2

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

HYDRAULICS AND PLUMBING LAB PRACTICE

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name	**:**	**DIPLOMA IN CIVIL ENGINEERING**
Course Code	:	1010
Subject Code	**:**	**21065**
Semester	**:**	VI Semester
Subject Title	**:**	**HYDRAULICS AND PLUMBING LAB PRACTICE**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
HYDRAULICS AND PLUMBING LAB PRACTICE	3 Hrs	48 Hrs	25	75	100	3 Hrs

Objectives:

On completion of the course the student will be familiar with:

- measuring the fluid pressure using manometers
- setting of rain gauges
- determination of co-efficent of discharges of Orifice, mouthpiece, orifice meter,venturimeter, notchec etc.,
- determination of pipe friction factor
- drawing characteristic curves for centrifugal and Reciprocating pumps.
- Cutting , threading and joining G.I pipes
- Planning and providing plumbing lines to bathrooms,pumps etc.,

ALLOCATION OF MARKS

S.No	Description	Part - A Max. Marks(60)	Part - B Max.Marks(10)
1	Procedure	10	2
2	Tabulation and Observation	25	2
3	Calculations	15	0
4	Sketch / Graph	5	4
5	Accuracy of result	5	2
6	Viva-Voce	5	

21065 HYDRAULICS AND PLUMBING LAB PRACTICE

LIST OF EXPERIMENTS

HYDRAULICS LAB **32 Hrs**

1. Measurement of Fluid Pressure using Manometers and Pressure Gauges (Not for Examinations)
2. Verification of Bernoulli's theorem.
3. Flow through Venturimeter – Determination of Co-efficient of Discharge.
4. Flow through Orificemeter – Determination of Co-efficient of Discharge.
5. Setting of Rain Gauge in the campus and methods of measuring the Rainfall as per standard Norms may be explained to the students and Rain fall Records may be maintained in the Laboratory for reference. (Not for examination)

Flow through orifice :

6. Determination of Co-efficient of Discharge by Time fall - Head method
7. Determination of Co-efficient of Discharge by Constant head method

Flow through external cylindrical mouth piece :

8. Determination of Co-efficient of Discharge by Timing fall in head method
9. Determination of Co-efficient of Discharge by Constant head method

Flow through pipes :

10. Determination of friction factor for the given GI pipe / PVC pipe.

Flow through notch :

11. Determination of Co-efficient of Discharge for Rectangular Notch / V-Notch

Pumps :

12. Reciprocating pump – To draw characteristic curves.

13. Centrifugal pump – To draw characteristic curves

PLUMBING LAB **10 hours**

1. Identifying Pipe fittings used in water supply and Sanitary Wares, (with actual models displayed on board- Examination Viva voce only)
2. Cutting, Threading and Joining of G.I. pipes/ Cutting and Pasting of PVC pipes using solvents.
3. Making a Bathroom connection from an existing Water supply Main (making Indents, drawing a neat sketch of the connection with details).
4. Making Suction and Delivery pipe connections to a centrifugal pump (making Indents, drawing a neat sketch of the connection with details).

REVISION & TEST **6 Hrs**

Note : In the examination the students have to be given one experiment from

A) HydraulicsLab	(60 marks)
B) and one exercise from Plumbing Lab	(10 marks)
VIVA-VOCE	(5 marks)

REFERENCE :

1. Hydraulic Lab Manual Compiled - T.T.T.I. - Chennai – 113

2. Ghosh and Talapohia - Experimental Hydraulic - Khanna Publishers - New Delhi

21065 HYDRAULICS AND PLUMBING LAB PRACTICE

MODEL QUESTION PAPER

Duration : 3 Hours **Max. Marks :** 75

Sl.No	Questions	Marks
I.	Determine the co-efficient of discharge of orifice / mouthpiece by constant head method and draw a graph H Vs Qa.	60
II.	Determine the co-efficient of discharge of orifice/ mouthpiece by Variable Head method. Draw a graph T Vs ($\sqrt{H1} - \sqrt{H2}$.)	60
III.	Verify the Bernoulli's theorem by conducting an experiment in the Bernoulli's apparatus. Draw the hydraulic gradient line and total energy line.	60
IV.	Determine the co-efficient of discharge for the given venturimeter and draw a graph H Vs Qa.	60
V.	Determine the co-efficient of discharge for the given orificemeter and draw a graph H Vs Qa.	60
VI.	Determine the co-efficient of discharges of rectangular / triangular / trapezoidal notch and draw a graph H Vs Qa	60
VII.	Determine the friction factor for the given pipe and draw a graph h_f Vs Qa.	60
VIII.	Draw the characteristic curves and determine the efficiency of the given Centrifugal pump	60
IX.	Draw the characteristic curve and determine the efficiency of the given reciprocating pump	60
X.	Make suction and delivery pipe connection for a centrifugal pump.	10
XI.	Make bathroom connection using P.V.C pipes/GI pipes	10
XII.	Provide a thread on the given G I pipe and fix the coupling given.	10

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

COMPUTER APPLICATIONS IN CIVIL ENGINEERING PRACTICE

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name	**:**	**DIPLOMA IN CIVIL ENGINEERING**
Course Code	:	1010
Subject Code	**:**	**21066**
Semester	**:**	VI Semester
Subject Title	**:**	**COMPUTER APPLICATIONS IN CIVIL ENGINEERING PRACTICE**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
COMPUTER APPLICATIONS IN CIVIL ENGINEERING PRACTICE	5 Hrs	80 Hrs	25	75	100	3 Hrs

RATIONALE:

In Diploma level Engineering education skill development plays a vital role. The skill development can be achieved by on hand experience in handling various instruments, apparatus and equipment. This is accomplished by doing engineering related experiments in practical classes in various laboratories.

GUIDELINES:

- All the experiments given in the list of experiments should be completed and given for the end semester practical examination.
- In order to develop best skills in handling Instruments/Equipment and taking readings in the practical classes, every two students should be provided with a separate experimental setup for doing experiments in the laboratory.
- The external examiners are requested to ensure that a single experimental question should not be given to more than four students while admitting a batch of 30 students during Board Examinations.

21066 COMPUTER APPLICATIONS IN CIVIL ENGINEERING PRACTICE

LIST OF EXPERIMENTS

I ELECTRONIC SPREAD SHEET USING SOFTWARE **15 Hours**

Solving problems involving estimation, analysis and design

1. Prepare the Estimate sheet with given data (provide all the measurement details) and calculate the quantity using formula bar.
2. Prepare the Abstract sheet for the given data and calculate Amount and Total Amount using Formula bar (Use separate column for rates and units)
3. Design and Analysis problems
   i) Calculate Area and Elongation using Formula bar
   ii) Calculate Effective depth'd' and Area of Steel 'Ast 'using Formula Bar
4. For given dimension of Masonry/R.C.C Dam ie. top width, bottom width, height of Dam , height of water, Specific weight of masonry/R.C.C. , Sp.wt of Water etc,. Find the base pressure and check the stability of the dam
5. Finding centre of gravity; I_{ZZ} and I_{YY} of I, L,T and channel sections

Note : In addition to the above, similar exercises may be given for practice

II RCC DETAILING USING SOFTWARE **24 Hours**

Generation of detailed drawings for given specification and Preparation of Bar Bending schedule using available R.C.C detailing package for the following works:

Cross section and longitudinal section of:

6. Continuous one way slab (with three equal spans)
7. Simply supported two-way slab
8. Restrained / Continuous two - way slab (any one panel)
9. Singly reinforced rectangular beam
10. Doubly reinforced continuous rectangular beam with two equal span
11. Single span Tee Beams supporting continuous slab
12. Dog-legged staircase
13. Lintel and Sunshade
14. R.C.C Column with square Isolated footing

III STEEL DETAILING USING SOFTWARE **12 Hours**

Detailed drawing generation for given specification using available steel detailing package for the following works with CAD environment:

15. C.S and L.S of beam with single I-section, Channel section and Double I and Channel section
16. Sectional elevation of column, beam and joints
17. Sectional elevation of simple roof truss and their joints

(Detailing of members with welded joints like column with base plate, beam joints and roof truss joints)

IV RCC STRUCTURES ANALYSIS USING SOFTWARE **12 Hours**

18. Carry out the analysis and design of RCC structures (single storey buildings) using any available Software Package

V USING PROJECT MANAGEMENT SOFTWARE **6 Hours**

19. Develop the CPM / PERT Network for the proposed simple building project using available Project Management Software Packages

VI DRAWING MAPS USING GIS SOFTWARE **6 Hours**

20. Develop Aerial map of given area using available GIS software

REVISION & TEST **5 Hours**

21066 COMPUTER APPLICATIONS IN CIVIL ENGINEERING PRACTICE

MODEL QUESTION PAPER

PART A (Any one by lot)

1. Using MS excel prepare the detailed estimate sheet with given data and calculate the quantity using formula bar
2. Using MS excel prepare the abstract sheet with given data and calculate the quantity using formula bar
3. Using MS excel prepare the abstract sheet with given data and calculate amount and total amount using formula bar
4. Using MS excel calculate the area and elongation using formula bar
5. Using MS excel calculate the effective depth and area of steel for a rectangular singly reinforced RC beam using formula bar
6. Using MS excel calculate the base pressure and check the stability of the masonry / RCC dam
7. Using MS excel find centre of gravity given I, T, L and Channel section

PART B (Any one by lot)

8. Generate detailed drawing for cross section and longitudinal section of a lintel cum sunshade for the given specification and bar bending schedule using RCC detailing package
9. Generate detailed drawing for plan & section of a column & footing (Square footing) the given specification and bar bending schedule using R.C.C detailing package
10. Generate detailed drawing for plan & sectional view of one-way slab continuous slab (three equal spans) for the given specification and bar bending schedule using R.C.C detailing package
11. Generate detailed drawing longitudinal section and cross section of continuous rectangular beam (three equal spans) for the given specification using software packages
12. Generate detailed drawing for plan & sectional view of two way simply supported slab for the given specification using software packages
13. Generate detailed drawing for plan & sectional view of dog legged staircase for the given specification using software packages
14. Draw the cross section & longitudinal section of beam with single I section, channel section using software packages
15. Draw the cross section & longitudinal section of doubly I section and channel section using software packages
16. Draw the sectional elevation of simple column & footing using software packages
17. Draw the sectional elevation of simple roof truss using software packages
18. Carryout the analysis and design of R.C.C structures single storey building using software packages
19. Develop the CPM / PERT network for the proposed simple building project using software packages

IN BOARD EXAMINATION, QUESTIONS WILL BE CHOSEN AS FOLLOWS

By lot one question each in Part A & Part B

Part A	-	30 marks
Part B (Plan / Cross section / longitudinal section)	-	40 marks
Viva - voce	-	5 marks
Record works	-	25 marks
	Total	**- 100 marks**

DIPLOMA IN CIVIL ENGINEERING

L - SCHEME
2011 - 2012

PROJECT WORK

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMILNADU

L-SCHEME
(Implements from the Academic year 2011-2012 onwards)

Course Name : **DIPLOMA IN CIVIL ENGINEERING**
Course Code : 1010
Subject Code : **21067**
Semester : VI Semester
Subject Title : **PROJECT WORK**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject Title	Instructions		Examination			
	Hours /Week	Hours /Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
PROJECT WORK	6 Hrs	96 Hrs	25	75	100	3 Hrs

OBJECTIVES:

The objective of the project work is to enable the students to work in convenient groups of not more than six members in a group on a project involving theoretical and experimental studies related to Civil Engineering. Every Project Work shall have a Guide who is a member of the faculty of Civil Engineering of the college. The hours allotted for this course shall be utilized by the students to receive directions from the Guide, on library reading, laboratory work, computer analysis or field work and also to present in periodical seminars the progress made in the project. Each student shall finally produce a comprehensive report covering background information, literature Survey, problem statement, Project work details and conclusions.

This experience of project work shall help the student in expanding his / her knowledge base and also provide opportunity to utilise the creative ability and inference capability.

WORKS INVOLVED IN PROJET WORK:

Collection of Data from various Journals and Civil Engineering Magazines about the list of Projects given below- Select a suitable project based on the data collected and available resources in your locality -Surveyed Site Plan – Site particulars – Preparation of Architectural Drawings – soil type in the location – Specification for materials & construction procedure - Structural design – Preparation of Detailed Estimate, Data as per Current schedule of Rates and Abstract Estimate – Structural Drawings – Preparation of Report about the project.

IMPORTANT DOCUMENTS TO BE REFERRED FOR THE ABOVE ACTIVITIES:

Sl. No	Activity	Reference
1.	Preparation of Architectural Drawings	1. Building Regulations of Locality 2. National Building Code , etc.
2.	Structural design	1. Relevant IS code for masonry, steel structures etc. 2. IS 456 for Reinforced Cement Concrete. 3. Hand book on detailing for reinforcement (SP-34)
3.	Specification of material and work procedure	1. Construction procedure by State Govt. organization viz. PWD , Highways, etc. 2. Construction procedure by Central Govt. organization viz. CPWD , Railways, etc. 3. Specification by Architect etc.,

Minimum Marks for Pass is 50 out of which minimum 35 marks should be obtained out of 75 marks in the board Examination alone.

- Implement the theoretical and practical knowledge gained through the curriculum into an application suitable for a real practical working environment preferably in an industrial environment
- Get exposure on industrial environment and its work ethics.
- Understand what entrepreneurship is and how to become an entrepreneur.
- Learn and understand the gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key dates, asynchronous document sharing and discussions, as well as to prepare collaborative edition of the final project report.
- Understand the facts and importance of environmental management.
- Understand and gain knowledge about disaster management

INTERNAL ASSESSMENT:

The internal assessment should be calculated based on the review of the progress of the work done by the student periodically as follows.

Detail of assessment	Period of assessment	Max. Marks
First Review	6th week	10
Second Review	14th week	10
Attendance	Entire semester	5
Total		**25**

EVALUATION FOR BOARD EXAMINATION:

Details of Mark allocation	Max Marks
Marks for Report Preparation, Demo, Viva-voce	45
Marks for answers of 15 questions which is to be set by the external examiner from the given question bank consisting of questions in the following three topics Entrepreneurship, Disaster Management and Environmental Management. Out of fifteen questions five questions to appear from each of the above topics i.e. 5 questions x 3 topics = 15 questions 15 questions x 2marks = 30 Marks	30
Total	**75**

DETAILED SYLLABUS

ENTREPRENEURSHIP, ENVIRONMENTAL & DISASTER MANAGEMENT

1. ENTREPRENEURSHIP

1.1 Introduction – Entrepreneur - characteristics of Entrepreneur - contributions of an Entrepreneur - functions of entrepreneur - Barriers to entrepreneurship - Roll of government in Entrepreneurial development.

1.2 Small scale industries (SSI) - SSI role in country's economic growth – importance of SSI - starting of an SSI - Government organization and Non-governmental organizations supporting SSI - DIC,NSIC,SIDO,KVIC, Development banks and their objectives - role of commercial banks in assisting SSI - Women entrepreneurs and opportunities – Subsidy and concessions to Small Scale Industries.

2. ENVIRONMENTAL MANAGEMENT

2.1 Introduction – Environmental Ethics – Assessment of Socio Economic Impact – Environmental Audit – Mitigation of adverse impact on Environment – Importance of Pollution Control – Types of Industries and Industrial Pollution.

2.2 Solid waste management – Characteristics of Industrial wastes – Methods of Collection, transfer and disposal of solid wastes – Converting waste to energy – Hazardous waste management Treatment technologies.

2.3 Waste water management – Characteristics of Industrial effluents – Treatment and disposal methods – Pollution of water sources and effects on human health.

2.4 Air pollution management – Sources and effects – Dispersion of air pollutants – Air pollution control methods – Air quality management.

2.5 Noise pollution management – Effects of noise on people – Noise control methods.

3. DISASTER MANAGEMENT

3.1 Introduction – Disasters due to natural calamities such as Earthquake, Rain, Flood, Hurricane, Cyclones etc – Man made Disasters – Crisis due to fires, accidents, strikes etc – Loss of property and life..

3.2 Disaster Mitigation measures – Causes for major disasters – Risk Identification – Hazard Zones – Selection of sites for Industries and residential buildings – Minimum distances from Sea – Orientation of Buildings – Stability of Structures – Fire escapes in buildings - Cyclone shelters – Warning systems.

3.3 Disaster Management – Preparedness, Response, Recovery – Arrangements to be made in the industries / factories and buildings – Mobilization of Emergency Services - Search and Rescue operations – First Aids – Transportation of affected people – Hospital facilities – Fire fighting arrangements – Communication systems – Restoration of Power supply – Getting assistance of neighbors / Other organizations in Recovery and Rebuilding works – Financial commitments – Compensations to be paid – Insurances – Rehabilitation.

LIST OF QUESTIONS

1. ENTREPRENEURSHIP

1. Define the term Entrepreneur.
2. What is Entrepreneurship? Explain.
3. List the various stages of decisions an entrepreneur has to make before reaching the goal of his project.
4. What is innovation?
5. State briefly the role of an entrepreneur in the economic growth of a country.
6. List the characteristics of an Entrepreneur.
7. What are the critical elements of an Entrepreneur?
8. State the major functions of an Entrepreneur.
9. What are barriers to Entrepreneurship?
10. Define Small Scale Industry.
11. What are the qualities of Entrepreneur?
12. What are the benefits of Entrepreneur?
13. What are the various SSI that can flourish in your district?
14. Identify the infrastructural needs for an industry.
15. What are the various agencies involved in the establishment and development of various SSI?
16. Name some of the agencies funding SSI.

17. Explain the roles played by Government in Entrepreneural development.
18. What are the various concessions and incentives available for a SSI.
19. Name some consumer products with wide demand that can be manufactured by a SSI?
20. What is feasibility study?
21. What is the importance of SSI?
22. What is DIC? State its functions.
23. What is NSIC? State its functions.
24. What is SIDO? State its functions.
25. Name the Development Banks in India working towards Entrepreneurial development.
26. State the role of commercial bank in assisting SSI sector.
27. What are the different phases of Entrepreneurial Development programme?
28. What is an Industrial Estate?
29. What are the facilities available in an Industrial Estate?
30. Identify the various training agencies associated with SSI.
31. List the governmental agencies from whom you shall get financial assistance for a SSI.
32. What is KVIC? State its objectives.
33. Name some state finance corporations.
34. What are the steps involved in preparing a feasibility report?
35. What are the factors to be considered regarding raw materials for a SSI?
36. What are the features of a SSI?
37. What are the advantages of becoming an Entrepreneur?
38. Name the Organizations offering assistance for the development of Women entrepreneurs.
39. State the business opportunities for Women entrepreneurs.
40. State the different subsidies given to SSI's.

2. ENVIRONMENTRAL MANAGEMENT

1. What is the responsibility of an Engineer-in-charge of an Industry with respect to Public Health?
2. Define Environmental Ethic.
3. How Industries play their role in polluting the environment?
4. What is the necessity of pollution control? What are all the different organizations you know, which deal with pollution control?
5. List out the different types of pollutions caused by a Chemical / Textile / Leather / Automobile / Cement factory.
6. What is meant by Hazardous waste?

7. Define Industrial waste management.
8. Differentiate between garbage, rubbish, refuse and trash based on their composition and source.
9. Explain briefly how the quantity of solid waste generated in an industry could be reduced.
10. What are the objectives of treatments of solid wastes before disposal?
11. What are the different methods of disposal of solid wastes?
12. Explain how the principle of recycling could be applied in the process of waste minimization.
13. Define the term 'Environmental Waste Audit'.
14. List and discuss the factors pertinent to the selection of landfill site.
15. Explain the purpose of daily cover in a sanitary landfill and state the minimum desirable depth of daily cover.
16. Describe any two methods of converting waste into energy.
17. What actions, a local body such as a municipality could take when the agency appointed for collecting and disposing the solid wastes fails to do the work continuously for number of days?
18. Write a note on Characteristics of hazardous waste.
19. What is the difference between municipal and industrial effluent ?
20. List few of the undesirable parameters / pollutants anticipated in the effluents from oil refinery industry / thermal power plants / textile industries / woolen mills / dye industries / electroplating industries / cement plants / leather industries (any two may be asked)
21. Explain briefly the process of Equalization and Neutralization of waste water of varying characteristics discharged from an Industry.
22. Explain briefly the Physical treatments "Sedimentation" and "Floatation" processes in the waste water treatment.
23. Explain briefly when and how chemical / biological treatments are given to the waste water.
24. List the four common advanced waste water treatment processes and the pollutants they remove.
25. Describe refractory organics and the method used to remove them from the effluent.
26. Explain biological nitrification and de-nitrification.
27. Describe the basic approaches to land treatment of Industrial Effluent.
28. Describe the locations for the ultimate disposal of sludge and the treatment steps needed prior to ultimate disposal.
29. List any five Industries, which act as the major sources for Hazardous Air Pollutants.
30. List out the names of any three hazardous air pollutants and their effects on human health.
31. Explain the influence of moisture, temperature and sunlight on the severity of air pollution effects on materials.
32. Differentiate between acute and chronic health effects from Air pollution.
33. Define the term Acid rain and explain how it occurs.

34. Discuss briefly the causes for global warming and its consequences
35. Suggest suitable Air pollution control devices for a few pollutants and sources.
36. Explain how evaporative emissions and exhaust emissions are commonly controlled.
37. What are the harmful elements present in the automobile smokes? How their presence could be controlled?
38. What is the Advantage of Ozone layer in the atmosphere? State few reasons for its destruction.
39. Explain the mechanism by which hearing damage occurs.
40. List any five effects of noise other than hearing damage.
41. Explain why impulsive noise is more dangerous than steady state noise.
42. Explain briefly the Source – Path – Receiver concept of Noise control.
43. Where silencers or mufflers are used ? Explain how they reduce the noise.
44. Describe two techniques to protect the receiver from hearing loss when design / redress for noise control fail.
45. What are the problems faced by the people residing along the side of a railway track and near to an Airport? What provisions could be made in their houses to reduce the problem?

3. DISASTER MANAGEMENT

1. What is meant by Disaster Management? What are the different stages of Disaster management?
2. Differentiate Natural Disasters and Man made Disasters with examples.
3. Describe the necessity of Risk identification and Assessment Surveys while planning a project.
4. What is Disasters recovery and what does it mean to an Industry?
5. What are the factors to be considered while planning the rebuilding works after a major disaster due to flood / cyclone / earthquake? (Any one may be asked)
6. List out the public emergency services available in the state, which could be approached for help during a natural disaster.
7. Specify the role played by an Engineer in the process of Disaster management.
8. What is the cause for Earthquakes? How they are measured? Which parts of India are more vulnerable for frequent earthquakes?
9. What was the cause for the Tsunami 2004 which inflicted heavy loss to life and property along the coast of Tamilnadu ? Specify its epicenter and magnitude.
10. Specify the Earthquake Hazard Zones in which the following towns of Tamilnadu lie: (a) Chennai (b) Nagapattinam (c) Coimbatore (d) Madurai (e) Salem.
11. Which parts of India are experiencing frequent natural calamities such as (a) heavy rain fall (b) huge losses due to floods (c) severe cyclones

12. Define basic wind speed. What will be the peak wind speed in (a) Very high damage risk zone – A, (b) High damage risk zone, (c) Low damage risk zone.
13. Specify the minimum distance from the Sea shore and minimum height above the mean sea level, desirable for the location of buildings.
14. Explain how the topography of the site plays a role in the disasters caused by floods and cyclones.
15. Explain how the shape and orientation of buildings could reduce the damages due to cyclones.
16. What is a cyclone shelter ? When and where it is provided ? What are its requirements ?
17. What Precautionary measures have to be taken by the authorities before opening a dam for discharging the excess water into a canal/river ?
18. What are the causes for fire accidents ? Specify the remedial measures to be taken in buildings to avoid fire accidents.
19. What is a fire escape in multistoried buildings ? What are its requirements ?
20. How the imamates of a multistory building are to be evacuted in the event of a fire/Chemical spill/Toxic Air Situation/ Terrorist attack, (any one may be asked).
21. Describe different fire fighting arrangements to be provided in an Industry.
22. Explain the necessity of disaster warning systems in Industries.
23. Explain how rescue operations have to be carried out in the case of collapse of buildings due to earthquake / blast / Cyclone / flood.
24. What are the necessary steps to be taken to avoid dangerous epidemics after a flood disaster?
25. What relief works that have to be carried out to save the lives of workers when the factory area is suddenly affected by a dangerous gas leak / sudden flooding ?
26. What are the difficulties faced by an Industry when there is a sudden power failure? How such a situation could be managed?
27. What are the difficulties faced by the Management when there is a group clash between the workers? How such a situation could be managed?
28. What will be the problems faced by the management of an Industry when a worker dies because of the failure of a mechanical device due to poor maintenance? How to manage such a situation ?
29. What precautionary measures have to be taken to avoid accidents to labourers in the Industry in a workshop / during handling of dangerous Chemicals / during construction of buildings / during the building maintenance works.
30. Explain the necessity of medical care facilities in an Industry / Project site.
31. Explain the necessity of proper training to the employees of Industries dealing with hazardous products, to act during disasters.
32. What type of disaster is expected in coal mines, cotton mills, Oil refineries, ship yards and gas plants?

33. What is meant by Emergency Plan Rehearsal? What are the advantages of such Rehearsals?
34. What action you will take when your employees could not reach the factory site because of continuous strike by Public Transport workers?
35. What immediate actions you will initiate when the quarters of your factory workers are suddenly flooded due to the breach in a nearly lake / dam, during heavy rain?
36. What steps you will take to avoid a break down when the workers union of your Industry have given a strike notice?
37. List out few possible crisis in an organization caused by its workers? What could be the part of the middle level officials in managing such crisis?
38. What types of warning systems are available to alert the people in the case of predicted disasters, such as floods, cyclone etc.
39. Explain the necessity of Team work in the crisis management in an Industry / Local body.
40. What factors are to be considered while fixing compensation to the workers in the case of severe accidents causing disability / death to them?
41. Explain the legal / financial problems the management has to face if safely measures taken by them are found to be in adequate.
42. Describe the importance of insurance to men and machinery of an Industry dealing with dangerous jobs.
43. What precautions have to be taken while storing explosives in a match/ fire crackers factory?
44. What are the arrangements required for emergency rescue works in the case of Atomic Power Plants?
45. Why residential quarters are not constructed nearer to Atomic Power Plants?

LIST OF SUGGESTED PROJECTS

COMPARITIVE STUDY

- ☐ Conventional and Composite concrete mixtures
- ☐ Light weight construction materials
- ☐ Prefabricated and R.C.C. Structures
- ☐ Cost and construction procedures for steel and R.C.C. Structures
- ☐ Cost and Construction procedures for Prestressed and R.C.C. Structures

ADMIXTURES

- ☐ Economy of using flyash in concete

MIX DESIGN

- ☐ Comparative study of mix design by different methods

SPECIAL TYPES OF CONCRETE CONSTRUCTION

- ☐ Bamboo as a reinforcing material
- ☐ Ferro cement products – water Tanks, Septic tank
- ☐ Fibre reinforced concrete
- ☐ Self Compacting concrete

PAPER PROJECTS

- ☐ Residential Houses
- ☐ Primary Health center
- ☐ School Buildings
- ☐ Guest House
- ☐ Panchayat Union Office Building.
- ☐ Bank Building
- ☐ Post Office Building
- ☐ College Building
- ☐ Hospital Building
- ☐ Hotel Building
- ☐ Hostel Building
- ☐ Factory Building
- ☐ Auditorium
- ☐ Shopping Centre
- ☐ Community Hall
- ☐ Theatre
- ☐ Market Building
- ☐ Multistoried Car park
- ☐ Rural Bus Stand
- ☐ Stadium
- ☐ Swimming Pool
- ☐ Over head tank for a village
- ☐ New village road with culvert

☐ Small Bridge

☐ Plate girder bridge

☐ Septic Tank for a Colony

ENVIRONMENTAL MANAGEMENT PROJECTS

☐ Treatment of Wastewater and recirculation for a Colony.

☐ Solid waste management in a Colony.

☐ Hydrological data Collection for a river basin/water shed

☐ Industrial effluent Collection and analysis .

MISCELLANEOUS

☐ Using Factory waste (such as steel, flyash, thermo cool etc) as substitute for Building materials

☐ Low cost Housing

☐ Rehabilitation of structures

ALLOCATION OF MARKS :

a) Sessional mark for Project Work & Viva Voce:

Project Review I	… **10 marks**
Project Review II	… **10 marks**
Attendance	… **05 marks**
Total	… **25 marks**

Proper record to be maintained for the two Project Reviews, and It should be preserved for 2 Semesters and produced to the flying squad and the inspection team at the time of inspection/verification.

b) Mark Allocation for Project Work & Viva Voce in Board Examination:

Viva Voce	**25 marks**
Demonstration/Presentation	**20 marks**
Total	**45 marks**

c) Written Test Mark (from 3 topics for 1 hour duration): $

i) Entrepreneurship 5 questions X 2 marks	**10 marks**
ii) Environment Management 5 questions X 2 marks	**10 marks**
iii) Disaster Management 5 questions X 2 marks	**10 marks**
	30marks

$ **-** Selection of Questions should be from Question Bank, by the External Examiner. No choice need be given to the candidates.

PROJECT WORK & VIVA VOCE IN BOARD

Examination		**45 Marks**
Written Test Mark (from 3 topics for 1 hour duration)		**30 Marks**
	TOTAL	**75 Marks**

A neatly prepared PROJECT REPORT has to be submitted individually during the Project Work & Viva Voce Board examination.

SANDWICH DIPLOMA COURSE-INDUSTRIAL TRAINING

21091 Industrial Training I (Report writing & Viva Voce)

21092 Industrial Training II (Report writing & Viva Voce)

1. Introduction

The main objective of the sandwich Diploma course is to mould a well rounded technician acclimated with industrial environment while being a student in the institution.

The Sandwich Diploma Course study is pursued by students, in 7 Semesters of 3 ½ years duration, the subjects of 3years-Full Time Diploma Course being regrouped for academic convenience.

While in the 4th semester students under Industrial Training for 6 months(December through May). They also do course work in the institution for one day in a week, While in the 7th semester they undergo another spell of 6 months (June through November) Industrial training.

The Apprenticeship (Amendment) Act 1973 is followed in regulating the Industrial training procedure for Sandwich Course.

I SEM	II SEM	III SEM	IV SEM	V SEM	VI SEM	VII SEM

Institutional Study

Industrial Training

2. Attendance Certification

Every month students have to get their attendance certified by industrial supervisor in the prescribed form supplied to them. Students have also to put their signature on the form and submit it to the institution supervisor. Regularity in attendance and submission of report will be duly considered while awarding the Internal Assessment mark.

3. Training Reports

The students have to prepare two types of reports:

- Weekly report in the form of diary to be submitted to the concerned staff in-charge of the institution. This will be reviewed while awarding Internal Assessment marks.
- Comprehensive report at the end of each spell which will be used for Board Examination.

3.1 Industrial Training Diary

Students are required to maintain the record of day-to-day work done. Such record is called Industrial training Diary. Students have to write this report regularly. All days for the week should be accounted for clearly giving attendance particulars (Presence, absence, Leave, Holidays etc). The concern Industrial supervisor is to check periodically these progress reports.

3.2 Comprehensive Training Report

In addition to the diary, students are required to submit a comprehensive report on training with details of the organisation where the training was undergone after attestation by the supervisors. The comprehensive report should be incorporating study of plant/product/process/construction along with intensive in-depth study on any one of the topics such as processes, methods, tooling, construction and equipment, highlighting aspects of quality, productivity and system. The comprehensive report should be completed in the last week of Industrial training. Any data, drawings etc should be incorporated with the consent of the Organisation.

a. Scheme of Evaluation

1.1 Internal Assessment Marks

First Review (during 3rd month)	: 10 marks
Second Review (during 5th month)	: 10 marks
Attendance *	: 05 marks (Awarded same as in Theory)
Total	: 25 marks

1.2 Board Examination

Presentation about Industrial Training	: 20 marks
Comprehensive Training Report	: 30 marks
Viva-voce	: 25 marks
Total	: 75 marks

*** For awarding marks to attendance, the Industrial Training attendance has to be considered.**

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