TAMIL NADU PUBLIC SERVICE COMMISSION

NOTIFICATION NO: 8/2014 **DATED: 24.03.2014**

Applications are invited only through online mode upto 23.04.2014 for Direct Recruitment to the following posts included in the Combined Engineering Services Examination.

Sl. No.	Name of the Post	Name of the Service	No. of Vacancies	Scale of Pay
1	**Assistant Engineer (Civil),** Water Resources Department, PWD (2012-2013) (Post Code No. 1656)	**Tamil Nadu Engineering Service** (Service Code No.011)	**50**	**Rs. 9300 - 34800 + Grade pay Rs.5100/- p.m.**
2	**Assistant Engineer (Civil),** Buildings, PWD (2012-2013) (Post Code No. 3656)	**Tamil Nadu Engineering Service** (Service Code No.011)	**21**	
3	**Assistant Engineer (Electrical)** PWD (2013-2014) (Post Code No.1657)	**Tamil Nadu Engineering Service** (Service Code No.011)	**9**	
4	**Assistant Director of Industrial Safety and Health** (Formerly named as Assistant Inspector of Factories) (2012-2013) (Post Code - 1664**)**	**Tamil Nadu Factory Service** (Service Code No. 011)	**18**	

2. IMPORTANT DATES:-

Date of Notification	**24.03.2014**	-
Last date for submission of applications	**23.04.2014**	-
Last date for payment of Fee through Bank or Post Office	**25.04.2014**	-
Date and Time of Written Examination in OMR Format		
Paper – I (Optional Subject)	**27.07.2014 FN**	**10.00 A.M. to 01.00 P.M**
Paper – II (General Studies)	**27.07.2014 AN**	**02.30 P.M. to 04.30 P.M**

3. QUALIFICATIONS:-

A. AGE (as on 01.07.2014):

Sl. No.	Category of Candidates	Minimum Age (should have completed)	Maximum Age
1.	SCs, SC(A)s, STs, MBCs/DCs, BCs, BCMs and Destitute Widows of all Castes.	18 Years	No Age limit
2.	'Others' [i.e. candidates not belonging to SCs, SC(A)s, STs, MBCs/DCs, BCs and BCMs].	18 Years	30 Years (should not have completed)

Note:-

"Others" [i.e Candidates not belonging to SCs, SC (A)s, STs, MBCs/DCs, BCs, BCMs] who have put in five years of service in the State/Central Government are not eligible even if they are within the age limit.

B. EDUCATIONAL QUALIFICATION (as on 24.03.2014)

Candidates should possess the following or its equivalent qualification awarded by an University or Institution recognised by the University Grants Commission for the purpose of its grant or Board recognized by the Government of India or by any State Government:

Sl. No.	Name of the post	Qualification
1	**Assistant Engineer (Civil)** in Water Resources Department, PWD	B.E degree in Civil Engineering or Civil and Structural Engineering OR A pass in Sections A and B of the Institution Examinations under Civil Engineering branch, subject to the following further conditions namely:- I. Should furnish evidence of having undergone practical training in surveying for a period of not less than one year. or II. Should have put in service for a period of not less than one year in Public Works Department as Overseer or Junior Engineer. or III. Should hold the Upper Subordinate or L.C.E Diploma of the College of Engineering, Guindy or L.C.E. Diploma awarded by the State Board of Technical Education and Training, Chennai.
2	**Assistant Engineer (Civil) in Buildings**, PWD	
3	**Assistant Engineer (Electrical)** in PWD	A degree in Electrical Engineering or Electronics and Communication Engineering OR A pass in Sections A and B of the Institution Examination with Electrical Engineering as a subject.
4	**Assistant Director of Industrial Safety and Health** (Formerly named as Assistant Inspector of Factories)	A Degree in Mechanical or Production or Industrial or Electrical or Chemical Engineering or Textile Technology

Provided that other things being equal, preference shall be given to those who have undergone one year Apprenticeship Training under the Government of India Scheme or the State Government Apprenticeship Scheme (Proviso to be read with the qualification relating to all the above posts except for the post of Assistant Director of Industrial Safety and Health).

Note:-

i. The qualification prescribed for these posts should have been obtained by passing the required qualification in the order of studies i.e. 10^{th} + HSC/Diploma + U.G. degree.

ii. Candidates having a pass in Sections A & B of the Institution Examinations under Civil Engineering, applying for the post of Assistant Engineer (Civil) PWD may be required to produce the evidence for having undergone Practical Training in surveying for a period of not less than one year or certificate for having put in service for a period of not less than one year in PWD as Overseer or Junior Engineer or to produce the evidence for having Upper Subordinate or LCE Diploma of the College of Engineering, Guindy or LCE Diploma awarded by the State Board of Technical Education and Training, Chennai when called for by Tamil Nadu Public Service Commission.

iii. Knowledge of Tamil:- Candidates should possess knowledge of Tamil on the date of this notification (for details refer para 10 of the Instructions to the candidates).

iv. Persons claiming equivalence of qualification should upload evidence when called for by Tamil Nadu Public Service Commission. (For further details refer para 9 of the "Instructions to the candidates").

4. GENERAL INFORMATION:

A. The Rule of reservation of appointments is applicable for all the posts and the distribution of vacancies will be as per rule in force to each departmental Unit separately.

B. In G.O. Ms. No. 145, Personnel and Administrative Reforms (S) Department, dated 30.09.2010, the Government have issued orders to fill up 20% of all vacancies in direct recruitment on **preferential basis** to persons studied the prescribed qualification in Tamil Medium. The 20% reservation of vacancies on preferential allotment to **Persons Studied in Tamil Medium (PSTM)** will apply for this recruitment. (Candidates claiming this reservation should have studied the prescribed qualification for the post in Tamil Medium and should have the certificate for the same. Having written the examinations in Tamil language alone will not qualify for claiming this reservation). If the candidates with PSTM are not available for selection for appointment against reserved turn such turn shall be filled up by Non-PSTM candidates but belonging to the particular communal category. Regarding the PSTM reservation certificate shall be produced / uploaded by the candidate as it has been in prescribed format / proforma available in the Commission's website at 'www.tnpsc.gov.in' which may be obtained from the Head of the Institution. (For further details please refer para 27 (19) of the 'Instructions to the candidates')

C. The number of vacancies advertised is only approximate and is liable for modification including reduction with reference to vacancy position at any time before finalisation of selection.

D. If no qualified and suitable woman candidates are available for selection against the vacancies reserved for them, those vacancies will be filled by male candidates belonging to the respective communal categories.

E. **CERTIFICATE OF PHYSICAL FITNESS**:-

Candidates selected for appointment to the post will be required to produce a certificate of physical fitness in the form prescribed below:

Name of the Post	Standard of Vision	Form of Certificate of Physical Fitness
1. Assistant Engineer (Civil & Electrical) PWD	Standard-III or better	Form prescribed for Executive post.
2. Assistant Director of Industrial Safety and Health	Standard-II or better	

For appointment to any of the above posts, colour blindness will be a disqualification. Night blindness will also be a disqualification for the post of Assistant Director of Industrial Safety and Health. Candidates with defective vision should produce eye fitness certificate from a qualified eye specialist.

F. As per G.O.Ms.No.53 Social Welfare & Nutritious Meal Programme Department dated 11.04.2005 Deaf and Orthopedically handicapped persons alone are eligible for 3% reservation of vacancies intended for Differently Abled persons for the post of Assistant Engineer (Civil) & Assistant Engineer (Electrical) in PWD. Further, as per G.O.Ms.No.25, Welfare of Differently Abled Persons (DAP2.1) Department, dated 14.03.2013 the post of Assistant Director of Industrial Safety and Health (Formerly named as Assistant Inspector of Factories) has been identified as suitable for OA/OL categories of Differently Abled persons **(OA-One Arm / OL-One Leg)** for 3% reservation of vacancies intended for Differently Abled persons.

G. The Differently Abled persons should upload a copy of certificate of physical fitness specifying the nature of physical handicap and the degree of disability based on the norms laid down, from the Medical Board to the effect that his/her handicap will not render him/her incapable of efficiently discharging the duties attached to the post to which he/she has been selected before appointment when called for by Tamil Nadu Public Service Commission.

H. Reservation of appointment to "Destitute Widows" and "Ex-servicemen" will not apply to this recruitment.

I. Even after filling up of the posts reserved for SC Arunthathiyars on preferential basis, if more number of qualified Arunthathiyars are available, they shall be entitled to compete with the Scheduled Castes other than Arunthathiyars in the inter-se merit among them and if any posts reserved for Arunthathiyars remain unfilled for want of adequate number of qualified candidates, it shall be filled up by Scheduled Castes other than Arunthathiyars.

J. Any claim relating to the selection (not related to candidature or/and claims made in the application) should be received on the date when called for original certificate verification prior to selection. Any claim received thereafter will receive no attention.

K. Information regarding arrest, convictions/debarment/disqualification by any recruiting agency, criminal or any disciplinary proceedings initiated or finalised, participation in agitation or any Political Organization, candidature in election for Parliament/State Legislature/Local Bodies etc., if any, should also be furnished to the Commission.

L. The selection for appointment to the above said post is purely provisional subject to final Orders on pending Writ Petitions, if any, filed in Madras High Court and Madurai Bench of Madras High court.

M. **Applications containing wrong claims relating to category of reservation / age / educational qualification will be liable for rejection.**

5. SCHEME OF WRITTEN EXAMINATION (OBJECTIVE TYPE) AND ORAL TEST

Subject	Duration	Maximum Marks	Minimum Qualifying Marks for selection	
			SCs, SC(A)s, STs, MBCs/ DCs, BCs and BCMs	Others
WRITTEN EXAMINATION in OMR Format: **i. Paper-I** Any one of the following subjects in which the candidate has acquired his/her educational qualification (**Degree Standard -**200 questions each) (**Objective Type)** (i) Civil Engineering (Code No.029) (ii) Mechanical and Production Engineering (Code No.074) (iii) Electrical and Instrumentation Engineering (Code No.042) (iv) Textile Engineering (Code No.114) (v) Electronics and Communication Engineering (Code No.044) (vi) Chemical Engineering (Code No.025)	3 Hours	300	171	228
ii. Paper -II General Studies (Objective Type) **(Degree Standard-**100 questions)	2 Hours	200		
iii. Interview and Records	--	70		
	Total	**570**		

Note :-

i. The existing syllabi for the above subjects in Sl. No. (i) to (vi) of Paper - I now (Previously Paper I and II) have been clubbed together and constituted as a single syllabus for each subject.

ii. The questions in **Paper-I** will be set in English only and the questions in **Paper-II** will be set both in Tamil and English based on the existing syllabi.

iii. For answering Paper – I, the candidates should specify the subject in which they wish to be examined. They should choose only the subject in which they have obtained the prescribed qualification.

iv. The candidates who possess a degree in Production Engineering and Industrial Engineering should choose Mechanical and Production Engineering, the candidates who possess a degree in Textile Technology should choose Textile Engineering as an optional subject.

v. The subject paper Civil Engineering will consist of question in Civil and Structural Engineering.

vi. The syllabus for Paper - I has been published in the Tamil Nadu Public Service Commission Bulletin dated **16.05.2001** at the pages mentioned below against each:

Sl. No.	Subject	Subject Code	Pages
1	Civil Engineering	029	789-790
2	Electrical and Instrumentation Engineering	042	816-817
3	Mechanical and Production Engineering	074	887-888
4	Textile Engineering	114	987
5	Electronics and Communication Engineering	044	819-820
6	Chemical Engineering	025	772

The syllabi for Paper I (Optional Subject) & Paper II (General Studies) are available in the Commission's Website 'www.tnpsc.gov.in' and also furnished at Annexure-I to this Notification.

6. CENTRES FOR EXAMINATION:-

Examination will be held at the following Centres:

Name of the Centre	Centre Code	Name of the Centre	Centre Code	Name of the Centre	Centre Code
Chennai	0100	Madurai	1000	Thanjavur	1900
Coimbatore	0200	Nagercoil	0800	Tiruchirappalli	2500
Chidambaram	0302	Pudukkottai	1500	Tirunelveli	2600
Kancheepuram	0700	Ramanathapuram	1600	Udhagamandalam	1300
Karaikudi	1804	Salem	1700	Vellore	2700

Note:

The Commission reserves the right to increase/decrease the number of examination centres and to re-allot the candidates.

7. EXERCISING OPTION AND ORDER OF PREFERENCE OF POSTS

Candidates, who wish to apply for the recruitment, should specify the name of the post/posts in the online application as per the preferential order. While finalising the selection, the option exercised by the candidates in regard to order of preference of posts in the application will be taken into account. If a candidate has not opted for any of the posts, he/she will be considered for the post in the order as specified in para - 1 of the Notification subject to his/her eligibility to the posts. A candidate once selected for a post will not be considered for the other posts.

8. PROCEDURE OF SELECTION:-

Selection will be made in two successive stages i.e.,
(i) Written Examination in OMR Format and
(ii) Oral Test.
(For further details refer paragraph 21 (b) of the 'Instructions to the candidates').

9. EXAMINATION FEE: -

- Rs.175/- (Rupees one hundred and Seventy five only) be paid. (i.e. Cost of Application Rs. 50/- + Examination fee Rs.125/-) Candidates claiming exemption from examination fee should pay Rs.50/- towards Application cost. (No exemption for cost of application)
- Candidates have also to pay the service charges applicable to the Bank or Post Office or Fee Processing Agency.
- The fee for Main Written Examination should be paid by those who are to be admitted to the Main Written Examination, based on the result of Preliminary Examination, on receipt of intimation from the Tamil Nadu Public Service Commission, unless exemption of fee is claimed.
- Candidates can avail of the facility of one time Registration on payment of Rs.50/- towards Registration fee. The registration shall be valid for a period of Five years from the date of one time registration.
- **Offline mode of payment in the form of DD/ Postal Order etc., will not be accepted and the applications forwarded with such modes of payment will be summarily rejected.**
- Those who have registered in the **one time registration** system and paid the registration fee of Rs.50/- and received the registration ID **need not pay** the application fee i.e., Rs. 50/- and it is enough to pay the examination fee alone.
- Candidates who have made one time registration must apply for the notified post. One time registration is only to avail exemption for application fee for a period of 5 years from the date of registration.

(For further details regarding the Examination fee concessions refer paragraph 12 of the Instructions to the candidates').

10. NO OBJECTION CERTIFICATE:-

Refer to paragraph 15(g) of the 'Instructions to the candidates'.

11. CONCESSIONS:-

Concessions in the matter of age and / or fees allowed to SCs, SC(A)s, STs, MBCs/DCs, BCs, BCMs, Destitute Widows, Ex-servicemen and Differently Abled persons, other categories of persons etc. are given in paragraphs 12 to 14 of the 'Instructions to the candidates'.

12. HOW TO APPLY:

- Candidates should apply only through online in the Commission's Website www.tnpsc.gov.in or in www.tnpscexams.net
- Before applying, the candidates should have scanned image of their photograph and signature in CD/DVD/Pen drive as per their convenience.
- A valid e-mail ID or Mobile Number is mandatory for registration and e-mail ID should be kept active till the declaration of results. Candidates are cautioned to keep your e-mail ID and password confidentially. TNPSC will send Hall Tickets (Memorandum of Admission) for Written Examination, Interview Call Letters, Other Memos etc. to the registered/given e-mail ID only.
- All the particulars mentioned in the online application including Name of the Candidate, Post Applied, Communal Category, Date of birth, Address, e-mail ID, Centre of Examination etc. will be considered as final and **no modifications will be allowed after the last date specified for applying online.** Since certain fields are firm and fixed and cannot be edited, candidates are requested to fill in the online application form with the utmost care and caution as no

correspondence regarding change of details will be entertained.

- The candidates who wish to receive SMS should register their mobile number in the application.

12(A) APPLYING ONLINE:

1) Candidates are first required to log on to the TNPSC's website www.tnpsc.gov.in or www.tnpscexams.net.
2) Click "Apply Online" to open up the On-Line Application Form.
3) Select the name of the post or service for which you wish to apply.
4) If you already have Unique ID, enter the Unique ID and password to view the already available information and update them, if necessary.
5) If you do not have valid ID, enter all the required particulars without skipping any field.
6) Candidates are required to upload their latest photograph and signature as per the specifications given in the Guidelines for Scanning and Upload of Photograph and Signature. **An online application uploaded without the photograph and signature will be rejected.**

Note:

Candidate who have One Time Registration ID (Unique ID) and pass word, have to apply separately for all notifications. One Time Registration will not be considered as an application for any post.

12(B) Mode of Fee Payment:-

Select the mode of payment (Online Payment/Offline Payment).

12(C) Online Payment (Net Banking, Credit card/Debit card) :-

1) In case candidates who wish to pay fees through the online payment gateway, i.e. Net banking, Credit card and Debit card payment, **an additional page of the application form will be displayed** wherein candidates may follow the instructions and fill in the requisite details to make payment.
2) After submitting your payment information in the online application form, wait for the intimation from the server, **DO NOT press Back or Refresh button in order to avoid double charge.**
3) If the online transaction has been successfully completed, a registration ID number and password will be generated. Candidates should note their registration ID number and password for future reference in respect of the post applied for.

12 (D) Offline Payments (Post Office or Indian Bank):-

1) For offline mode of payment, candidates have to select either Post Office or Indian Bank branch.
2) Click "SUBMIT" to submit the application form.
3) Candidates will be provided with application number and password. Please note down the application number and password.
4) On submission, system will generate the payment chalan which the candidate need to take print out and go to the nearest branch of Indian Bank or the designated Post Offices as the case may be, to make the payment.
5) Collect the candidate's copy of the fee payment chalan from the branch. Check that the chalan is properly signed and the details of transaction number, branch name and DP code number, deposit date have been noted in the chalan by the branch authorities.
6) On-line application registration will be taken as successful one, only if the payment is made either in the post office or in the Indian Bank **within two working days from the date of registration/submission of application.**

12(E) Print Option:-

1) After submitting the application, candidates can print / save their application in PDF format.

2) On entering registration number and password, candidates can download their application and print, if required.

3) Need not send the printout of the online application or any other supporting documents to the Commission. The certificates will be verified only when the candidates come up for next stage of selection.

Note:-

I. Candidates are advised in their own interest to apply on-line much before the closing date and not to wait till the last date for depositing the fee/ intimation charges to avoid the possibility of disconnection/inability/failure to log on the TNPSC's website on account of heavy load on internet/website jam.

II. TNPSC does not assume any responsibility for the candidates not being able to submit their applications within the last date on account of the aforesaid reasons or for any other reason beyond the control of the TNPSC.

III. Under no circumstances, a candidate should share/mention e-mail ID or mobile number to any other person. In case a candidate does not have a valid personal e-mail ID, they should create a new e-mail ID before applying on-line and must maintain that e-mail account.

IV. There is a provision to modify the submitted on-line application. Candidates are requested to make use of this facility to correct their details in the on-line application if any. This modification facility will be available up to the last date for applying online for the particular post. After this date, no modification will be permitted. Candidates should take utmost care and caution while filling in the on-line application. Please note that no modification in fee payment details will be permitted for candidates who pay fees/intimation charges through the online mode. Since certain fields are firm, fixed and cannot be edited, candidates are advised to fill in the online application form with the utmost care and caution as no correspondence regarding change of details will be entertained.

V. Candidates should carefully fill in the details in the on-line application at the appropriate places and click on the "SUBMIT" button at the end of the on-line application format. Before pressing the "SUBMIT" button, candidates are advised to verify each and every particular column in the application. The name of the candidate or his/her father/spouse etc. should be spelt correctly in the application as it appears in the certificates/mark sheets. Any change/alteration found may disqualify the candidature.

VI. Request for change/correction in any particulars in the application form shall not be entertained under any circumstances **after the last date for** editing/updating application details specified. TNPSC will not be responsible for any consequences arising out of furnishing of incorrect and incomplete details in the application or omission to provide the required details in the application form.

VII. Commission is not responsible for the online payment failure.

13. OTHER IMPORTANT INSTRUCTIONS:-

a. **Candidates should ensure their eligibility for examination:** The candidates applying for the examination should ensure that they fulfil all eligibility conditions for admission to examination. **Their admission to all stages of the examination will be purely provisional subject to satisfying of the eligibility conditions**. Mere issue of memo of admission to the candidate will not imply that his/her candidature has been fully cleared by the Commission.

b. **How to apply:** Candidates are required to apply on-line by using the website **www.tnpsc.gov.in** or www.tnpscexams.net Detailed instructions for filling up online application are given in para 12 of this Notification.

c. The Hall Tickets for eligible candidates will be made available in the Commission's website **www.tnpsc.gov.in** or www.tnpscexams.net for downloading by candidates. No Hall Tickets will be sent by post.

d. **Grievance Redressal Cell for guidance of candidates:** In case of any guidance/information/clarification of their applications, candidature, etc. candidates can contact Tamil Nadu Public Service Commission's Office in person or over Telephone No. 044-25300300 or the Commission's Office Toll-Free No.1800 425 1002 on all working days between 10.00 a.m. and 05.45 p.m.

e. **Mobile phones and other articles banned:-**

(i) Candidates are not allowed to bring Pager, Cellular phone, Calculator, memory notes and books etc. or any other Electronic device or Recording device either as separate piece or part of something used by the candidate such as Watch or Ring.

(ii) If they are found to be in possession of any such thing or instrument they will not be allowed to attend the examination further, besides invalidation of answer paper and/or debarment. If it is considered necessary they will be subjected to thorough physical search including frisking on the spot.

(iii) Do not bring into the Examination Hall any article such as books, notes, loose sheets, mathematical and drawing instruments, Log Tables, stencils of maps, slide rules, Text Books, rough sheets etc. except the permitted writing material i.e. pen. No colour pen or pencil must be used.

(iv) Candidates are advised in their own interest not to bring any of the banned items including Mobile phones/Pagers to the venue of the examination, as arrangements for safekeeping cannot be assured.

f. Candidates are not required to submit along with their application any certificates in support of their claims regarding age, educational qualifications, community certificates and certificates regarding their physical disability, etc.,. They should be submitted when called for by the Tamil Nadu Public Service Commission. The candidates applying for the examination should ensure that they fulfil all the eligibility conditions for admission to the examination. Their admission at all the stages of examination for which they are admitted by the Commission viz. Preliminary Examination, Main Written Examination and Oral Test will be purely provisional, subject to their satisfying the prescribed eligibility conditions. If on verification at any time before or after the Preliminary Examination, Main Written Examination and Oral Test, it is found that they do not fulfil any of the eligibility conditions, their candidature for the examination will be cancelled by the Commission.

g. If any of their claims is found to be incorrect, they may render themselves liable to disciplinary action by the Commission.

h. **Unfair means strictly prohibited:** No candidate shall copy from any other candidate nor permit to be copied nor give nor attempt to give nor obtain nor attempt to obtain irregular assistance of any description.

i. **Conduct in examination hall:** No candidate should misbehave in any manner or create a disorderly scene in the examination hall or harass the staff employed by the Commission for the conduct of the examination. Any such misconduct will be severely viewed & penalized.

The on-line application can be filled upto 23.04.2014 till 11.59 p.m., after which the link will be disabled.

(For any additional information the candidates may refer Commission's ''Instructions to the candidates'' at the Commission's website www.tnpsc.gov.in)

Secretary

ANNEXURE-I
PAPER-I

Syllabus

[The existing syllabi for the subjects under Paper-I now (previously Paper -I and Paper –II) have been clubbed together and constituted as a single syllabus]

CIVIL ENGINEERING

Degree Standard

PAPER-I **Code No: 029**

UNIT I

CONSTRUCTION MATERIALS Engineering Properties uses and tests for stones and bricks lime - sources, types and properties - cement - composition, tests, specifications, properties - types of cements and admixtures. Miscelklaneous materials - Glass, Rubber Plastics and materials for acoustics and insulation.

UNIT II

CONSTRUCTION PRACTICE Stone Masonry - Classification, construction details and supervision - Brick Masonny - bonds - Damp proof courses - construction details of wails and arches. Shoring, scaffolding, underpinning. Floor finishes and roof coverings. Stairs and stair cases - Layout - types - suitability, Doors, Windows and ventilators Types - Selection, Fire resistant structure.

UNIT III

ENGINEERING SURVEY Levelling - Types - LS and CS contouring calculation of areas and volume Theodoite survey - Traversing - Heights and Distances Techeemetry - Modern surveying instruments. Selting out of curves Permanent adjustments of levels and theodelites.

UNIT IV

ESTIMATING AND COSTING Types of estimates - Writing technical specifications and tender documents. Types of contracts - terms and conditions conflicts and arbitration - Rate Analysis - schedule of rates Valuation and Rent fixation.

UNIT V

STRENGTH OF MATERIALS Stresses and strains - Elastic constants, - shear and tension compound strees principal stresses and planes Theeries of failure. Theory of simple pending - shear stress - distribution in beams Deflection of beams Strain energy in elastic deformation, impact fatigue and creep.

UNIT VI

THEORY OF STRUCTURES Proposed cantilever and fixed beams Continueous beams - Theorem of three moments - portal frames - moment distribution method - Colomns - short & long columns, unsymmetrical sections. Euler`s theory - critical leads for different end conditions Analyusis of arches - Eddy`s theorem - suspension bridges /moving leads - influence lines. Domes and Retaining walls - stabilityh conditions - checking.

UNIT VII

SOIL MECHANICS Site Investigation and Soil sampling - classification of soil Engineering properties of soil - SPT and its interpretation soil - Water interaction - permeability, seepage shear strength of soils - Determination of C and V Stress distribution in soils - Boussinesq`s and Wester - gaard`s. Theory of consolidation - consolidation test. compaction of soils - Meisture density relationship - stability of slopes analysis.

UNIT VIII

FOUNDATION ENGINEERING Shallow Foundations Bearing capacity Theory - Settlement analysis Methods of improving - bearing capacity and minimising settlement - Types of footings - Design principles mat foundations. Deep foundations - Piles - Static and Dynamic formulac - Pile cap - group of piles - pile lead test. Retaining walls - Earth pressure theories.

UNIT IX

WATER SUPPLY & TREATMENT Estimation of water resources - Ground water hydraulics for ecasting demand hydraulics. Forecasting demand - Impurities of water - physical, chemical and

bacterielogical analysis - water bern diseases - pumping and gravity schemes - Water treatment plants chlorination.

UNIT X

SEWAGE TREATMENT & POLLUTION CONTROL Disposal of sanitary sewage - sewer systems - design flow for separate, sterm and combined systems - sewer design sewer Appurtenances - Seweage pumping - Types of pumps. Sewage Treatment primary , secondry and tertiary levels plants - Sludge treatment and disposal Industrial watches Rural sanitation - Air pollution - Solid waste management.

PAPER -II

UNIT I

CONCRETE TECHNOLONY RC Tests on cement and aggregates - High grade cements High strength concrete Testing of fresh and hardend concrete - Non destructive testing - Concrete mix design - IS method quality control - cetering and shuttering sheet piles - slips and moving forms. Coincrete hollow block masonry Construction joints.

UNIT II

DESIGN OF R.C. ELEMENTS Methods of design of concrete members. Limit state and working stress design Design of flexural members. Design of singly and doubly reinforced rectangular and flanged Design of slabs and columns R.C. footings

UNIT III

MISCELLANEOUS STRUCTURES Steel structures - welded connections - Design of tension and compression members - trusses Design of purlins - Design of steel columns & beams. Design and construction of prestressed concrete beams - Design of masonry Chimneys and stacks.

UNIT IV

WATER RESOURCES ENGINEERING Water Resources in Tamil Nadu Water Resource Planning . Master Plan for water. Water budget & Development Plan. Reservoir planning & Management. Flood control. Chennel improvement Land Management.

UNIT V

IRRIGATION ENGINEERING Soil Plant Water Relationship - Water requirement of crops - Irrigation methods. Irrigation efficiencies. Water logging & consequences - Salinity & alkalinity. Reclamation. Head works and distribution works. Cross drainage works.

UNIT VI

TRAFFIC ENGINEERING Traffic Engineering and Traffic surveys - Intersections, road signals and markings - grade separations - parking & traffic control - Traffic regulation & safety. Accident investigation - measures for accident reduction. Traffic Management

UNIT VII

HIGHWAY ENGINEERING Highway planning in India - Road classification - Geometric design of highways. Construction of Earth WBM, bituminous and concrete roads - Design of flexible and rigid pavements. Design of joints in cement concrete roads - Drainage of roads - Maintenance of Roads.

UNIT VIII

RAILWAYS AIRPORTS AND HARBOURS Details of components of permanent way - geometric design - points & croissing - signalling Interlocking and level crossings. Airport planning Components of Airport - Site selection - Airport zonin g - planning of terminal buildings. Harbours & Ports - types - com ponents & their functions - Layout of a harbour - Docks - Wet and dry - Break waters.

UNIT IX

PROJECT MANAGEMENT Construction Management - Inportance and scope. Construction planning scheduling and monitoring - Cost control Quality control and inspection Network analysis by CPM and PERT - Determination of Critical path & floats - Project Management using CPM/PERT

UNIT X

COMPUTER APPLICATIONS Types of computers - conponents of moder computer systems - Office Automation - Word processing, spread sheets and database management - Developing Flow charts for solving Engineering problems - Computer Aided Design and drafting - Advantages of Computer Aided drafting over traditional drafcting - Developing 2D, 3D drawings and solid modelling.

ELECTRICAL & INSTRUMENTATION ENGINEERING

Degree Standard

PAPER-I **Code No: 042**

1. FUNDAMENTALS OF ELECTRICAL ENGINEERING Dc And Ac Series And Parallel Circuits - Kirchhoffs Law - Network Graph - Matrix Representation - Solution Of Steady State, equations - transients in AC networks - Network theorems, super position, reciprocity, Thevenin and Norton's theorems, Maximum power transfer therorem, star delta transformation - frequency response of RL, RC, RIC series and parallel circuits - solutions of balanced and unbalanced 3 phase circuits.
2. ELECTRICAL MACHINES Constructional features of DC Machines, emf equation and characteristics of different types of DC generators - DC motor - torque equation - DC motor characteristics - starters of DC motors speed control of DC motors - testing of DC motors - alternators - different types - constructional features - emf equation - regulation of alternators by different methods - phaseor diagram - expression for power developed as a funtion of torque angle - synchronous motors - principle of operation - v and inverted v curves - starting methods - stepper motors - principle of operation - polyphase induction motors - principle of operation phasor diagram and equivalent circuit - starting and speed control - single phase ixluction motor - principle of opetation and applications - transformers - principle of operation and construction of types different of single phase and three phase transformers - regulation,efficiency and all day efficiency.
3. CONTROL SYSTEMS Open loop and closed loop systems - mathematical modelling of physical systems - electrical, mechanical, electro mechanical, hydraulic, pneumatic and thermal systems - transfer function and state space modelling of these systems - block diagram representation and signal flow graph - electrical analog - time response of simple system for implulse, step and ramp type of inputs - solution of state equations - STM - time domain specifications - frequency domain analysius - polar, inverse polar, bode - constant M and N circles and Nichols chart frequency domain specifications - Routh-Hurwitz stability criterion - Nyquist stability criterion - construction of root locus - determination of closed loop poles - transient response and stability from root locus
4. GENERATION TRANSMISSION AND DISTRIBUTION Sources of energy - power plants - hydroelectric - nuclear - thermal - layout - storage schemes - turbines - hydroelectric and steam - interconnected systems - cost evaluation - nuclear reactors - fuel materials - coolant - comparison and detection of different types of power plants - transmission lines - performance - short and medium - corona - insulators - transmission towers - underground cables - distrubution - feeders - distributors and service main - comparison of distribution system - radial and ring distributors - calculation of voltages and distributors with concentrated and distributed loads.
5. PROTECTION AND SWITCH GEARS Circuit breakers - Arc in oil - Arc interruption - theories - current chopping - oil circuit breakers - air blast circuit breakers - vacum circuit breakers - sulphur hexaflouride - circuit breakers - testing of circuit breakers - protective relays - functional charactoristics of protective relays - operating principles of relays - overcurrent relays - directional over current relays - the universal relay - torque equation - differntial relays - feeder protection - distance protection - generator protection - protection of transformers - carrier current protection - comparators - static relays - fuses and H.R.C.fuses for relays (the emphasis must be on solid state devices).
6. BASIC ELECTRONICS Semi conductor diodes - zener diodes - transistors - FET's power diodes - thyristors - photocell - photodiodes - power diodes - photo transistors,L.D.R.and applications - rectifiers and voltage regulators - amplifiers - classification of amplifiers - power amplifiers - wide b and amplifiers - oscillators - operational amplifiers - application of operational amplifiers - Indusstrial timers - voltage regulators - Instruementation amplifiers - A to D and D to A converteros - PLL - active filters.
7. DIGITAL TECHNIQUES Number systems used in Digital electronics -weighted binary codes - non weighted codes - crror detection and correction,alpha numeric codes,BCD- development of

Boolean algebra - truth fuctions - reading boolean expression - Boolean expansions and logic diagrams - Minterms - tables and maps - solving digital probleme - Map reduction techniques - sum of products from hybrid function - multiple out put minimizations - tabular minimisations - sequential logic - flip/flops - digtal counter - ripple counter - logi c gates - mutliplexers, demultiplexers and decoders , code converters - arithmetic funcrioons - shift registers - semi conductormemory elements - PLA.

8. NETWORK ANALYSIS One port and two port networks - driving point impedance and admittance of one port network - open circuit impedance and short circuit admittance of two port network - transfer impedance and admittance - A,B,C,D parameters - impedence matching - filters - character istic of ideal filters - low pase and High pass filters - attenuation and phase shift - bandpass filter - elements of network synthesis - realiability of one port, hurwitz polynomical positive real function - necessary and sufficient conditions for positive real function - testing a positive real function proporties - synthesis of RL RC and LC driving point impedances.
9. ELECTRICAL MEASUREMENTS Measurement of voltage and current - permanent magnet moving coil and moving ion meters - dynamometer type - thermocouple and rectifier typ;e instrument of power and energy - dynamometer type wattmeter and induction type energy meter - single phase and three phase - testing and calibration of energy meter - power factor meter - magnetic measurement - ballistic galvanometer and fluxmeter - BH curve - permeability measurement - current and voltage transformers - use of instrument transformers with wattmeters - KVA and KVAR metrts - maximum demand indicators - Megger.
10. ELECTRONIC MEASUREMENTS BJT, FET and MOSFET voltmerters - solid state multimeter - DMM - audio and Radio frequency signal generators - AM signal generator - function generator - wave anlyzer - spectrum analyser - frequency measurement - measurement of period and time - phase angle measurement - bridge type of measurements - recording instruments - display instruments - general purpose oscilloscope - multitrace display - digital storage - sampling oscilloscope - sychroscope.

PAPER -II

1. MEASUREMENT SCIENCE Static characteristics of measuring instruments - accuracy, precision snesitivity,non-linerarity, hysteresis - dynamic characteristics - I order and II order instruments - Standards andcalibration - errors and error analysis.
2. TRANSDUCERS Variable resistance transducers - potentiometer, strain gauge RTD, thermistor, hygrometer - Variable inductance transducers - LVDT - variablpe relectance accelerometer - variable capacitance tranaducers for differential pressure, sound and thickness measurement - piezoelectric transducer - smart tranaducors.
3. MECHANICAL MEASUREMENTS Characteristics of instruments for measurement of displacement, velocity, acceleration, force, torque and vibration.
4. INDUSTRIAL INSTRUMENTS Temperature measurement - thermocouples, cold-junction compensation for thermocouple, radiation and optical pyrometers - pressure measurements - bourdon gauge, bellows, diaphragme, differential pressure transmitter, vacum gauges, melead gauge, prani gauge - flow measurement - office meter, venturimeter, electro magnetic flow meter, ultrasonic flow meter, rotameter positive displacement meters, mass flow meters.
5. ANALYTICAL INSTRUMENTS Measurement of PH,viscosity and density - Gas chromatography - UV and IR spectrophotometers, single beam and dual beam spectrophotometers.
6. PROCESS CONTROL Basic control actions - on - off, P, I , D, P + I , P + D and p + I + D control actions - electronic and pneumatic controllers - feed forward control, ratio control and cascade control - control valves - computer control of process - z transforms.
7. BIO MEDICAL INSTRUMENTS Measurement of biological signals - ECG,EEG, EMG - blood pressure and blood flow measurements - defibrillators - pace maker.
8. TELEMETRY Wired telemetry - Radio telemetry - analog modulation - time division multiplexing and frequency division multiplexing - PAM and FM transmitters - digital modalation - PCM transmitters - Demultiplexing - receivers - fibre optic transmitters and receivers.
9. MICRO PROCESSORS AND MICRO CONTROLLERS 8 bit microprocessors - 8085 and z80 - Architecture, programming and interface devices - 16 bit microprocessor 8088 - Micro controllers, 8031 and 8051 Microprocessor based instruments.

10. LOGIC AND DISTRIBUTED CONTROL Direct digital control - supervisory control - SCADA - programmable logic control - I/o module, PLC programming, ladder diagram - distributed control system - configuration, operator station, displays, communication in DCS ,protocols, field bus.

MECHANICAL AND PRODUCTION ENGINEERING

(Mechanical Engineering)

Degree Standard

PAPER-I **Code No: 074**

1. APPLIED MECHANICS: Statics of particles - Resolution of forces - supports and reactions - Determination of forces in member of statically determinate plane trusses by method of joints and method of section. Controls - moment of inertia, position, velocity and acceleration of penticles. Newton's Second law, Equations of motion, principle of work and energy, impulse and momentum, impact of elastic bodies, friction - laws, simple machines.
2. ENGINEERING THERMODYNAMICS:- Energy - Work - heat properties - states - processes. Energy equations. Work and PV diagrams. Laws of thermodynamics Carnot cycle, reversed carnet cycle, efficiency - COP. Specific heats - gas laws - perfect gas relationships. mole concept, molar volume, internal energy, enthalpy, molecular weight of gas mixtures. Methods of cycle analysis - tables of thermodynamic properties of air - thermal efficiency To cycle - diesel cycle - dual combustion cycle - comparison of cycles - problems on use of steam tables.
3. INTERNAL COMBUSTION ENGINES:- Basic engine nomenclature - engine classification - working of SI engine, CI engine, two stroke engine and four stroke engine - carburation - air fuel mixture ratio. Combustion in SI engine - ignition systems - timing - spark plugs - combustion chamber. Combustion in CI engine - ignition delay - valve timing diagram - fuel supply injection systems. Performance of SI and CI engines - factors affecting the performance characteristics. Cooling - lubrication systems, fuels used in SI and CI engines. Measurements of engine power - indicated mean effective pressure - indicated horse power - brake horse power - specific fuel consumption - thermal efficiency.
4. GAS DYNAMICS AND JET PROPULSION:- Energy equation for flow process - velocity of sound - mach number - effect of Mach number on compressibility. Isentropic flow with variable area - Area ratio as a function of Mach Number - mass flow rate - flow through nozzles - flow through diffusers. Solution of Fanne flow equation - isothermal flow with friction. Flow with normal shockwaves - governing equations. Prandtl - Meyer equation. Aircraft propulsion - jet engines - energy flow - thrust power and propulsive efficiency - performance of jet engine. Rocket engines - performance - solid and liquid propellant rockets. Comparison of various propulsion systems.
5. REFRIGERATION AND AIR CONDITIONING:- Principles of refrigeration - mechanism of producing cold - types of refrigerations - refrigerating effect and unit of refrigeration - coefficient of performance of refrigerator. Air refrigeration systems - reversed Carnot cycle - Bell colemen cycle. Simple vapour compression system. Advanced vapour compression systems - T.S Diagram - pH chart - dry and wet compression - under cooling. Vapour absorption systems. Refrigerants. Refrigeration applications. Air conditioning - Factors in air conditioning - simple heating and cooling - dehumidification - humidification.
6. FLUID MECHANICS:- Classification of fluids - fluid properties - Ideal fluid flow - Rotational - irrational flow - Bernoulli's equation - Flow through pipes - pipes in series - pipes in parallel - DARCY'S equation - viscous fluid flow - Navier - stokes equation - Laminar and Turbulent flow - Reynold's number - Compressible flow of perfect gas - speed of sound wave - concept of Mach number – Hydraulic Jump.
7. TURBOMACHINERY:- Definition and classification of turbo machines, equation for energy transfer. Centrifugal fans, blowers and Compressors. Axial flow fans and compressors. Axial turbine stages. Free and forced vortex flow. Centrifugal pumps - workdone - head - specific energy - priming - performance of multistage pumps. Hydraulic turbines - different types - governing, performance - selection of turbines. Gravitation - method of preventing - hydraulic coupling - torque convertors.
8. HEAT AND MASS TRANSFER:- Modes of heat transfer, one dimentional heat conduction, resistance concept, unsteady state heat conduction. Fins, free and forced conviction. Thermal boundary layer concept. D.B. equations and other correlations, radiation, black and gray bodies,

shape factor design of heat enchangers. NTU method. Analogy of mass, Heat and Momentum transfers, mass transfer equipments.

9. POWER PLANT ENGINEERING:- Sources of energy - conventional and non - conventional Location of steam power plant, diesel power plant and nuclear power plants - layout. Disposal of waste, safety and hazards. Hydroelectric power plants, Gas power plants - environmental problems. Power plant economics, cost benefit analysis - future power plants wind, tidel, solar energy - problems and prospects. Geothermal energy, fuel cells, thermionic and thermo electric converters etc.
10. INSTRUMENTATION AND CONTROL:- Elements of measurement systems. Range, span, sensitivity, accuracy, precision and repeatability of instrument. Errors in measurement system. Transducers for measurement of pressure, manometers, temperature measuring instruments, measurement of speed, strain gauge basics, force measurement using load cells and electromechanical methods. Dynamometers for power measurement, flow meters, rotameters, using velocity process, hot wire anemometer, accelerometers. Open and closed loop control systems. Transfer function, Hydraulic and Pneumatic control systems, Different types of controls like, two way proportional, differential and integral control.

PAPER-II

1. STRENGTH OF MATERIALS:- Direct stress and strain – elasticity – Hook's law – Poisson's ratio – bulk modulus. Shear stress- modulus of rigidity. Analysis of stress and strain compound stress. Strain energy, resilience and strength theories. Bending moment and shearing forces.
   Bending stresses in beams, shearing stresses in beams, deflection of beam, fixed and continuous beams. Combined direct and bending stresses. Columns and struts, torsion of shafts, springs, thin and thick cylindrical and spherical shells. Riveted joints.
2. THEORY OF MACHINES-I:- Kinematics of machanisms – link pair – Inversions of mechanism four bar chain – slider crank mechanisms. Motion and inertia – velocity – acceleration – force – mass – centrifugal and centripetal force – mass moment of inertia – velocity in mechanism – velocity polygons – acceleration in mechanism – lower pair – cams – gyroscope.
3. THEORY OF MACHINES-II:- Friction-laws of solid friction-wedge-screws-threads collar-pivot-clutch-bearing. Belt, rope and chain drive-toothed gears-gear trains-inertia force analysis and fly wheel governors – stability – friction and insensitiveness. Balancing of several masses in different planes. Mechanical Vibrations – force vibrations – damping.
4. DESIGN OF MACHINE ELEMENTS:- Design of riveted and welded joins – Design of detachable joints – Bolted Joints cotter joint – Knuckle joint – Design of crank shaft and connecting rod – Flange coupling – Helical and leaf springs – Fly wheel – Design of journal and thrust bearings.
5. DESIGN OF TRANSMISSION ELEMENTS:- Selection of flat and vee belts – design of cone pulley belt drive – design of spur gears, helical gears and bevel gears – Design of worm and wheel pair for power transmission – Design of single and two stage speed reducers.
6. PRODUCTION PROCESSES:- Classification of machining processes, metal cutting tools, tool materials, tool geometry, Lathe; machanisms for feed and spindle drive, work holding device, types of operation, Drilling machines, shaper, slotter and milling machines; drives and types of work done, milling machines; drives for spindle speed and feed Work holding devices indexing, milling machine operations.
7. MACHINING PROCESSES:- Grinding machines: Abrasives, grain structure and designation of grinding wheels, various types of grinding, work holding devices. Fine finishing process; honing, buffing, metal spraying and electroplating.
   Gear and gear manufacturing; Gear milling, shaping, hobbing, gear finishing: gear shaving, grinding, lapping , and gear honing. Special Machining process; Electro discharge machining, Electro Chemical grinding, electron beam and laser beam machining abrasive jet machining. NC & GNC machine operations, Flexible manufacturing systems automated guided vehicles, FMS layout, material handling system.
8. METROLOGY AND QUALITY CONTROL:- Precision instruments: Vernier, micrometer, slip gauges, sine bars, comparators, Inter changeability, limit gauges. Profile projector, tool

maker's microscope, screw thread projector, measurement of surface finish, Testing geometric accuracy of machine tools, Errors in threadpitch measurement, gear tooth errors statistical quality control concept, use of control charts, Acceptance sampling, economic aspects of quality control.

9. INDUSTRIAL ENGINEERING:- Work study – techniques – Method study – objectives – basic procedure – work measurement – objectives – basic procedure – production planning and control – machine loading and scheduling – product sequencing – inventory control – E O Q – quantity discounts – ABC Analysis – Plant layout – Product and Process layout material handling systems – simplex method – Transportation model – Assignment model.
10. INDUSTRIAL MANAGEMENT:-The basic of management theory and practice – Planning – The nature and purpose of Planning – The nature and purpose of Planning – Decision making – Organising – Nature and purpose of organising – staffing – Nature and purpose of staffing – Leading – Motivation – Leadership – controlling – Control techniques – Ensuring effective managing.

TEXTILE ENGINEERING
Degree Standard

PAPER-I **Code No: 114**

UNIT I

FIBRE PRODUCTION :- Classification of textile fibres. Principles of polymerization, Manufacturing details of viscose rayon, Poly ethylene terephthalate, nylon 6 and 6,6, poly-acrylonitrile, poly propylene, polyaramides carbon and glass fibres. Texturization of fibres.

UNIT II

FIBRE COMPOSITES :- Resins, additives to resins. Types and characteristics of the re-inforcing fibres, Different textile structure used for re-inforcements.

UNIT III

SPINNING PREPARATORY PROCESSES :- Sequence of processes used to prepare the staple fibres (cotton, jute, wool and man-made fibres) for yarn spinning. Process optimization.

UNIT IV

CONVENTIONAL YARN SPINNING :- Yarn formation using ring spinning method. Spinning limitations. Doubling of yarns.

UNIT V

NEW METHODS OF YARN SPINNING:- Yarn production by open end, friction and air-jett spinning methods. Techno - economic comparison with convetional method.

UNIT VI

PREPARATORY PROCESSES FOR FABRIC FORMATION:- Sequence of processes used to prepare the yarn for fabric formation in looms and kaitting machines. Process optimization.

UNIT VII

WEAVING MACHINES:- Fabric formation in conventional and high speed looms. Process optimization. Economic viability of high speed looms.

UNIT VIII

KNITTING MACHINES:- Fabric production in weft knitting machines. Comparison of woven and knitted fabrics, Principles of warp knitting. Production of garments from woven and knitted fabrics.

UNIT IX

CHEMICAL PROCESSING:- Preparation of material for coluration and finishing, principles involved in dyeing and printing. Physical and chemical finishing operation.

UNIT X

QUALITY ASSESSMENT:- Sampling method, Determination of sample size. Testing of fibres yarns and fabrics for various qualities. Statistical Significance Test.

PAPER -II

UNIT I

STRUCTURAL MECHANICS OF YARN :- Yarn geometry, Fibre migration and its characterization, Prodiction of filament and spun yarn tensile behavious under different conditions.

UNIT II
STRUCTURAL MECHANICS OF FABRICS :- Fabric geometry, Prediction of deformation behaviour of woven, knitted and non - woven fabrics.
UNIT III
TEXTILE MACHINE DESIGN :- Design of Cams, gear trains, clutches and brakes for application in textile machines. Kinematics of comber and loom operations.
UNIT IV
MACHINING OPERATIONS :- Material Selection, Different machining operations. Surface treatments, Tolerance Limits.

UNIT V
PNEUMATICS:- Application of free air and compressed air in textile machinery. Air pressure measurements and its control.

UNIT VI
WORK STUDY:- Work and time measurement. Motion time analysis. Resources allocation and scheduling.
UNIT VII
PRODUCTION PLANNING:- Balancing of textile machines in different departments to produce required quantity of and products taking into account various process parameters.
UNIT VIII
MACHINERY MAINTENANCE:- Break-down and preventive maintenance for textile machines. Types and Selection of Lubricants, Lubrication devices, Depreciation and replacement studies.
UNIT IX
SELECTION OF MOTORS:- Selection of electric motors for various textile machines. Application of variators and invertors. Smooth starting of machines. Microprocessor applications. Power requirements.
UNIT X
ENVIRONMENTAL CONDITIONS IN TEXTILE MILLS:- Plant lay-out, Material handling. Lighting and humidification, Safety devices]

ELECTRONICS & COMMUNICATION ENGINEERING

Degree Standard

PAPER-I **Code No: 044**

ELECTRONIC DEVICES CIRCUITS AND SYSTEMS

UNIT I
DEVICES AND CIRCUITS: Diodes and Transistors - PN Point contact Zener, varactor, Tunnel, step recover - input and output characteristics of BJI, FET, UJT, Opto - electronic devices - Biasing and stabilisation of transistor circuts - analysis using h - parameters - calculation of gain, impedance and bandwidth .
UNIT II
AMPLIFIERS AND OSEILLATORS: Design and analysis of RC, Dc coupled, Large signal amplifiers, Differential amplifier and tuned amplifiers - Oscillators - Critoria for oscillation, resonance type oscilators RC Phase shift wein bridge oscillators
UNIT III
RECTIFIERS AND POWER SUPPLIES: Half wave, Full wave and Bridge rectifiers will all types of filters, regulated power supplies. SMPS.
UNIT IV
MULTIVIBRATORS AND A VESHAPING: Astable, Bistable Monostable and submit trigger saw tooth generation using BJT and UJT clipping and clamping circuits using diodes and transistors.
UNIT V
LINEAR AND DIGITAL INTEGRATED CIRCUITS: IC fabrication techniques OPAMPS and its applications A/D and D/A converters, PILL. Wave form generators Voltage regulators, IC Power amplifiers.

UNIT VI

DIGITAL CIRCUITS: Switching algebra, Number systems, Logic gates and circuits, Minimization techniques, Logic families, shift registers, Counters, Multiplexersi Dimultiplexers, semiconductor Memories, LSI, VLSI.

UNIT VII

MICROPROCESSORS: 8 and 16 bit microprocessors and their architecture, Instruction set, Peripherals and Interfacing Microcontrollers Microprocessor based system design.

UNIT VIII

COMPUTER SYSTEMS: Data representation, Elements of high level programming languages (Pascal and C) Data Structures, Computer architecture, processor design, control unit design, Memory organization , I/O system organisation.

UNIT IX

MEASUREMENTS AND INSTRUMENTATION: Electrical transducers and their characteristics, measurement techniques, and related Instrumentation.

UNIT X

MICROWAVE DEVICES AND CIRCUITS: Microwave devices sehotky, PIN diodes, Gunn diodes. Microwave aplifiers and oscillators. Microwaves components microwave measurements.

PAPER-II

COMMUNICATION ENGINEERING

UNIT I AM/FM TRANSMITTERS AND RECEIVERS: AMPLITUDE, FREQUENCY AND PHASE MODULATIONS: Definitions and equations, modulation, index -Frequency spectrum of AM/FM signals, modulators and demodulators - Diode detecter, slope detector, Balanced slope detector foster seely discriminator Ratio detector. Transmitters: Allocation of frequency for various services, High power transmitter, Aerial coupling. Receiver: Superbeter odyne, SSB and FM receivers noise considerations. Digital communication: PCM, TDM and FDM.

UNIT II

TRANSMISSIONLINES, ANTENNAS AND WAVE PROBAGATION: Transmission lines and Wave guides: Characteristic impedance of transmission lines, standing waves - matching using smith chart-rectangular and circular wave guides - resorators, isolatored circulators and direction couplors. Antennas: Isotropic radiator, dipole, vertical antenna, resonant and non-resonant antennas - arrays - VHF, UHF, Microwave antennas - radiations pattern for the above antennas. Wave propagation: Ground wave, surface wave, HF and LOS propagation.

UNIT III

ANALOG AND DIGITAL SIGNAL PROCESSING: Signals and systems: Introduction - Vector space - concepts - Representation of signals - Linear time invariant systems - discrete time signals and discrete time systems. Analog Signal Processing: Circuit and Network Theorems, Four Terminal Networks - I, II, Lattice, Bridge - T networks, Equalizers, wave filters, Attenuators. Digital: Linear shift invariant systems - DFT and FFT - FIR and IIR and digitel filters - Design methods, FFT - Wiener and matched filters applications.

UNIT IV

TELEVISION: Television systems and standards: CCIR standards, NTSC, PAL, SECAM system Black and White transmission - scanning, blanking and synchroaising pulses. Monochrome Reception: Common, Video and Sound Circuits, Synchronizing circuits vertical deflection circuits, horizontal deflection circuits. Colour Transmission and Reception: Colorimetry, Generation of RGB signals, compatibility with monochroms TV and with band width, PAL encoding techniques, PAL decoders, colour TV picture tubes, Remote Tuning of TV Receivers.

UNIT V

RADAR SYSTEMS: Radar equations - range, minimum detectable signal, rader cross section, PRF and range ambiguities, Propogation effects and system losses. Types: CW, doppler, FM-CW, MTI, and pulse doppler Radar. Tracking techniques, conical and monopoles, Tracking-in range and tracking in doppler. Radar Transmitter & Receiver: Radar Transmitter source and Modulators, Radar antennas Radar receivers, Duplexers and Displays.

UNIT VI

SATELLITE COMMUNICATION: Orbit and Launch: Equation of Motion, tracking and orbit determination, satellite launches, satellite performance, station keeping, system Co-ordination and control.

UNIT VII

COMMUNICATION SYSTEMS: Satellite sub-system, FSS, BSS, Multiple axes techniques. FDMA, TDMA and CDMA. Earth station configuration, Tracking and receiver sub-systems.

UNIT VIII

FIBRE OPTIC COMMUNICATION: Optical fibres, optical loss, Modes and configuration, Fibre materials, attenuation, signal distortion. Optical sources - LED, LASERS, Modulation and reliability considerations, Fibre to Fibre joint, splicing techniques. Optical receivers, Photo diodes, Photo detectors.

UNIT IX

INFORMATION THEORY AND CODING: Information measure, properties of various entropies, Noiseless coding, Kraft-Mcmillan inequality, Huffman's method of coding, coding Theorem. Noisy coding, classification of channels and their calculation, Decoding schemes. Correlation receiver, matched filter, Wiener filter, linear estimation. Testing of hypothesis, Parameter estimation.

UNIT X

TELEPHONY, COMMUNICATION SWITCHING AND ACOUSTICS: Telephony: Telephone hand sets, transmitters and receivers, telephone traffic variation, busy hours, lost calls, dialing methods, various signalling systems. Communication Switching: Simplex, duplex and quadruplex working receivers, dialing methods, Digital Switching - circuit switching, packet switching, message switching, numbering plans Routing methods, signalling types, traffic measurements, EPABX modem.Acoustics: Microphone, different types - Loud speakers, different types - parameters - speech - hearing sound level meter - studio acoustics - sabine Formula - Reverbration time, stereo - effect.

CHEMICAL ENGINEERING

Degree Standard

PAPER-I **Code No: 025**

UNIT I

CHEMICAL PROCESS CALCULATION AND CHEMICAL ENGINEERING THERMODYNAMICS:- Properties of gases liquids and solids - Gas laws - Thermodynamics functions - Chemical and Phase Equilibrium - Laws of Thermodynamics - Ideal and non-ideal gases and solutions - partial molal properties - Material and Energy balance involving recycle, by pass and purge, Thermochemistry.

UNIT II

MOMENTUM, HEAT AND MASS TRANSFER OPERRATIONS:- Newtonian and non-Newtonian fluids, compressible and non - compressible fluids, flow in closed ducts, packed beds and fluidised bed. Continuity and conservation equations. Heat transfer by conduction, convection and Radiation - Heat exchanger equipment. Laws of Diffusion, Theories of mass transfer, Interphase mass transfer. Analogy of the above three operations.

UNIT III

MECHANICAL OPERATIONS AND RENEWABLE ENERGY SOURCES:- Size reduction, particle size analysis, mixing and agitation, sedimentation, filtration, flotation: Potential for energy sources, energy conservation, Solar energy, Thermal, Photoelectic, Ocean, Geothermal, Wind energy, Bio-energy sources.

UNIT IV

ENGINEERING MATERIALS AND SAFETY IN CHEMICAL INDUSTRIES:- Materials of construction for chemical industries, metallic, non-metallic, ceramic and polymeric materials, corrosion. Industrial safety principles. Site selection and plant layout. Chemical hazards classification. Dangerous occupational health diseases. Engineering control of plants, safety in operations and processes.

UNIT V

CHEMICAL TECHNOLOGY:- Inorganic chemical Industries - an overview, Acids, Fertilisers, industrial gases, marine chemicals, cement, glass and ceramics, Refractories, Organic chemical

Industries - an overview; natural products. Soap, Sugar, Paper, Rubber, Petrolem products, fermentation products, Intermediates and Dyes.

PAPER -II

UNIT I

Instrumentation and Process Control :- Principles, on - off, proportional, integral, Serivative and combined modes of control. Feed back control systems and its elements. Analysis of control systems, Measurement and control of Temperature, pressure, flow of fluids, PH and Humidity. Micro processer - based control.

UNIT II

Design & Optimisation and Environmental Engineering :- Process selection, flow diagrams, plant location and layout, optimisation techniques. Cost estimation, plant utilities, safety analysis of process plants. Environmental Engineering sources of impurities. Air and water quality standards, monitoring of pollutants, waste disposal, Noise pollution. Meterology and air pollution.

UNIT III

Multi - Phase Mass Transfer Operations:- Absorption, distillation, liquid - liquid extraction, adsorption, membrane separation process, continuous contact operation and theory. Batch process. Chemical Engineering

UNIT IV

Chemical Reaction Engineering:- Chemical Kinetics, interpretation of rate data in variable volume and constant volume systems ideal reactors. Concept of ideality. Development of design expression for batch, tubular, and stired tank reactors, combined reactors, comparison advantages and limitations in applications, thermal characteristics of reactors. Isothermal, adiabatic, non adiabatic condition - principles of reactor stability.

UNIT V

Numerical Methods and Computational Techniques:- Emprical laws and curvefitting - Equations with real Co-efficients and imaginary roots - equations with rational coefficients and irrational roots - symmetric functions of the roots - Transformation of equations. Numerical solutions of linear - algebric equations. Numerical solutions of non - linear - algebric equations - solution of initial value ordinary differential equations. Boundary value of non - linear ODE - solution of partical differential equation.

PAPER-II
GENERAL STUDIES

Degree Standard

Unit-I General science :

Physics Universe-General Scientific laws-Scientific instruments-Inventions and discoveries-National scientific laboratories-Science glossary-Mechanics and properties of matter-Physical quantities, standards and units-Force, motion and energy-Electricity and Magnetism, Electronics and Communication -Heat, light and sound-Atomic and nuclear physics-Solid State Physics – Spectroscopy- Geophysics - Astronomy and space science

Chemistry Elements and Compounds-Acids, bases and salts-Oxidation and reduction-Chemistry of ores and metals-Carbon, nitrogen and their compounds-Fertilizers, pesticides, insecticides-Biochemistry and biotechnology-Electrochemistry-Polymers and plastics

Botany-Main Concepts of life science-The cell-basic unit of life-Classification of living organism-Nutrition and dietetics-Respiration-Excretion of metabolic waste-Bio-communication.

Zoology-Blood and blood circulation-Endocrine system-Reproductive system-Genetics the science of heredity-Environment, ecology, health and hygiene, Bio- diversity and its conservation-Human diseases-Communicable diseases and non- communicable diseases- prevention and remedies-Alcoholism and drug abuse-Animals, plants and human life

Unit- II. Current Events

History--Latest diary of events – National--National symbols-Profile of States-Defence, national security and terrorism-World organizations-pacts and summits-Eminent persons & places in news-Sports & games-Books & authors -Awards & honours-Cultural panorama-Latest historical events--India and its neighbours-- Latest terminology- Appointments-who is who?

Political Science-1. India's foreign policy-2. Latest court verdicts – public opinion-3. Problems in conduct of public elections-4. Political parties and political system in India-5. Public awareness & General administration-6. Role of Voluntary organizations & Govt.,-7. Welfare oriented govt. schemes, their utility

Geography Geographical landmarks-Policy on environment and ecology—

Economics--Current socio-economic problems-New economic policy & govt. sector

Science-Latest inventions on science & technology-Latest discoveries in Health Science-Mass media & communication.

Unit-III. Geography

Earth and Universe-Solar system-Atmosphere hydrosphere, lithosphere-Monsoon, rainfall, weather and climate-Water resources --- rivers in India-Soil, minerals & natural resources-Natural vegetation-Forest & wildlife-Agricultural pattern, livestock & fisheries-Transport including Surface transport & communication-Social geography – population-density and distribution-Natural calamities – disaster management-Climate change - impact and consequences - mitigation measures-Pollution Control.

Unit-IV. History and culture of India

Pre-historic events--Indus valley civilization-Vedic, Aryan and Sangam age-Maurya dynasty-Buddhism and Jainism-Guptas, Delhi Sultans, Mughals and Marathas-Age of Vijayanagaram and the bahmanis-South Indian history-Culture and Heritage of Tamil people-Advent of European invasion-Expansion and consolidation of British rule-Effect of British rule on socio-economic factors-Social reforms and religious movements-India since independence-Characteristics of Indian culture-Unity in diversity –race, colour, language, custom-India-as secular state-Organizations for fine arts, dance, drama, music-Growth of rationalist, Dravidian movement in TN-Political parties and populist schemes- Prominent personalities in the various spheres – Arts, Science, literature and Philosophy – Mother Teresa, Swami Vivekananda, Pandit Ravishankar , M.S.Subbulakshmi, Rukmani Arundel and J.Krishnamoorthy etc.

Unit-V Indian Polity

Constitution of India-. Preamble to the constitution- Salient features of constitution- Union, State and territory- Citizenship-rights amend duties- Fundamental rights- Fundamental duties- Human rights charter- Union legislature – Parliament- State executive- State Legislature – assembly- Status of Jammu & Kashmir- Local government – panchayat raj – Tamil Nadu- Judiciary in India – Rule of law/Due process of law- Indian federalism – center – state relations-. Emergency provisions- Civil services in India- Administrative challenges in a welfare state- Complexities of district administration-Elections - Election Commission Union and State. Official language and Schedule-VIII-Amendments to constitution- Schedules to constitution-. Administrative reforms & tribunals-Corruption in public life- Anti-corruption measures – Central Vigilance Commission, lok-adalats, Ombudsman, - Comptroller and Auditor General of India- Right to information - Central and State Commission- Empowerment of women- Voluntary organizations and public grievances Redressal-Consumer protection forms

Unit- VI. Indian economy

Nature of Indian economy-Need for economic planning-Five-year plan models-an assessment-Land reforms & agriculture-Application of science in agriculture Industrial growth-Capital formation and investment-Role of public sector & disinvestment-Development of infrastructure- National income-Public finance & fiscal policy- Price policy & public distribution- Banking, money & monetary policy-Role of Foreign Direct Investment (FDI)- WTO-globalization & privatization- Rural welfare oriented

programmes- Social sector problems – population, education, health, employment, poverty-HRD – sustainable economic growth- Economic trends in Tamil Nadu -Energy Different sources and development- Finance Commission -Planning Commission- National Development Council

Unit-VI. Indian national movement

National renaissance-Early uprising against British rule-1857 Revolt- Indian National Congress-Emergence of national leaders-Gandhi, Nehru, Tagore, Nethaji -Growth of militant movements -Different modes of agitations-Era of different Acts & Pacts-World war & final phase struggle-Communalism led to partition-Role of Tamil Nadu in freedom struggle - Rajaji, VOC, Periyar, Bharathiar & Others-Birth of political parties /political system in India since independence-

Unit-VII. APTITUDE AND MENTAL ABILITY TESTS

Conversion of information to data-Collection, compilation and presentation of data - Tables, graphs, diagrams-Parametric representation of data-Analytical interpretation of data -Simplification-Percentage-Highest Common Factor (HCF)-Lowest Common Multiple (LCM)-Ratio and Proportion-Simple interest-Compound interest-Area-Volume-Time and Work-Behavioral ability -Basic terms, Communications in information technology-Application of Information and Communication Technology (ICT)- Decision making and problem solving-Logical Reasoning-Puzzles-Dice-Visual Reasoning-Alpha numeric Reasoning-Number Series-Logical Number/Alphabetical/Diagrammatic Sequences-

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