Y.B.Sc (IT) Fundamental of Digital Computing January 2

Sem P

43 2nd half.13-Avi(bf)

Con. 289-13.

TD-1430

(3 Hours) **[Total Marks : 100**

N.B. : (1) All questions are **compulsory**.
(2) Question Nos. **2** to **7** has **internal choice**.
(3) **Figures** to the **right** indicate **full** marks.
(4) Use of **scientific non-programmable calculator** is **allowed**.

Q. 1. Attempt the following questions: **(10)**

1. **Explain UNICODE?**
2. **Prove the following using laws of Boolean Algebra;**

   $(AB + ABC)\, A\bar{B}C = 0$

3. **Explain Half Adder circuit with logic diagram and truth table.**
4. **What is sequential logic?**
5. **Write a short note on magnetic Tape?**

Q. 2. Attempt any THREE of the following:– **(15)**

1. **Explain 1's and 2's complement with at-least 2 examples each.**
2. **What is ASCII code? explain**
3. **Explain error detecting codes and how are they used with examples.**
4. **Solve the following ;**
   a. **00101010 ÷ 00000110**
   b. **Perform the following subtraction using 1's and/or 2's complement;**
      i. **128 - 65**
      ii. **100 - 56**

Q. 3. Attempt any THREE of the following :– **(15)**

1. **Construct the following Gates from Universal NAND Gate a) AND b) XOR c) XNOR d) OR e) NOT. Also write the truth table for each.**
2. **Simplify the following using K map and realize it using 2 input gates.**

   $f(A, B, C, D) = \sum m(0,1,5,9,13,14,15) + d(3,4,7,1,0,11)$

3. **What is K map? Explain how will you simplify Boolean expressions using K map? Give examples.**
4. **(a) What do you mean by Boolean Algebra?**
   (b) Prove the following ;

   $$\overline{XYZ} + \bar{X}Y\bar{Z} + X\overline{YZ} + XY\bar{Z} = X\bar{Y} + \bar{Z}$$

[TURN OVER

Q. 4. Attempt any THREE of the following : **(15)**

1. **Design the two bit comparator circuit.**
2. **What is priority encoder? Explain 8 to 3 priority encoder with suitable diagram.**
3. **Design a 4-bit binary to 4-bit gray code converter.**
4. **Implement the function**

   F(A,B,C,D) = $\sum$ (1,2,6,7) with 4 to 1 line MUX

Q. 5 .Attempt any THREE of the following : **(15)**

1. **What is FF? Where is it used? Explain J-K FF with suitable diagram.**
2. **Explain with circuit diagram and waveforms Binary ripple counters with a modulus of less than 2^N .**
3. **Explain the working of R-S FF with active low inputs with suitable diagram**
4. **What are shift registers? Explain the working of serial in to parallel out 4-bit shift register.**

Q.6 . Attempt any THREE of the following : **(15)**

1. **Explain in detail Memory system in a computer.**
2. **Explainin brief about o/p devices of computers.**
3. **Define computer? Explain basic structure and working of computer.**
4. **What is secondary storage in computer? Explain types of secondary storage in computer.**

Q. 7 . Attempt any THREE of the following : **(15)**

1. **Write a note on Linux O.S.**
2. **Compare Windows with Linux.**
3. **Explain the use and execution of following Linux commands;**
   a) mkdir , b) cd , c) chmod d) cp , e) cat
4. **What is O.S? State and explain the types of O.S ?**

****

F.Y.B.Sc. (IT) Sem-I Introduction to C++ Programing Junary 2014

47 : 2nd half.13-Avi(bf)

Con. 291-13. **TD-1058**

(3 Hours) **[Total Marks : 100**

(**N.B. :** Question No. **1** is **compulsory**.)

Q1. Answer the Following:– 10

1) Define and explain Algorithm Concepts with suitable Example.
2) Write a program In C++ to Swap Two Numbers Without using third Number.
3) What are Backslash constants in C++?
4) Draw flow chart for generation of n factorial series numbers 0, 1, 2, 3, 5, 8, 13.....
5) Write Short note on Scope resolution operator.

Q2.(A) Answer any two :– 10

1) What are the various symbols used while drawing flowcharts? Explain.
2) Write an algorithm to find sum of ten numbers.
3) What is C++? What are its Applications?

Q2.(B) Answer any one :– 05

1) Explain the advantages of Flowcharts.
2) Define Algorithm and its Characteristics

Q3.(A) Answer any two :– 10

1) Explain Insertion and extraction Operators in C++.
2) Enlist the basic data types used in c++ with size of data in terms of bytes of each.
3) What are types of constants in C++? Explain

Q3.(**B**) Answer any one :– 05

1) What are references Variable? Explain.
2) Explain the Arithmetic and relational operators in C++ with Example.

Q4.(A) Answer any two :– 10

1) What are the Different Selection Statements in C++? Give Syntax for each.
2) What are the Different Looping Structures in C++? Give Syntax for each.
3) Explain Following Loop Control Statements.
   I) Break Statements II) Continue Statements

Q4.(**B**) Answer any one :– 05

1) What are Manipulators? Explain with Examples.
2) Write a program in C++ that finds a larger number among three numbers

Q5.(A) Answer any two :– 10

1) What is Call by Value and Call By reference .Explain with Example.
2) Explain the following built –In –Functions.
   I) getchar() II)strcat() III) strcpy() IV) strlen( ) V) strcmp()
3) Explain the Concept of function overloading with suitable example.

[TURN OVER

Q5.(B) Answer any one :– 05

1) Explain functions with arguments and a return value
2) Write a program in C++ by using functions to find the sum of three numbers.

Q6.(A) Answer any two :– 10

1) What is an array? What are the different types of array
2) Explain how to pass array elements to a function
3) Explain how to access a variable through its pointer

Q6.(B) Answer any one :– 05

1) What are pointers? Give the advantages of using pointers.
2) Explain how array is declared and accessing the elements of an array.

Q7.(A) Answer any two :– 10

1) Explain how to declare and initializing string variable with suitable example.
2) Explain different string handling functions with suitable examples
3) What is a structure? Explain How to declare and create a structure with example.

Q7.(B) Answer any two :– 05

1) Write a program in C++ to count the number of Characters in a String
2) Explain the Functions of Vectors.
   I) assign (): II) empty (): III) erase ():

F.Y.B.Sc. (IT) Professional Communication Skills - January 14
sem-I

37 - 2nd half.13-Avi(bf)
Con. 287-13.

TD-1228

(3 Hours) **[Total Marks : 100**

N.B. : (1) **All** questions are **compulsory**.
(2) **Figures** to the **right** indicate **marks** allotted to the question.

Q. 1. a) Say whether the following statements are true or false: (05)

i. A poster is a combination of words and pictures.

ii. Date is not an important part of a letter.

iii. E mail is the shortened form of electronic mail.

iv. The format of a report depends on the purpose and type of report.

v. Slides, flip charts are options available for technical oral presentation.

Q. 1 b) Fill in the blanks - (05)

i. The Roman numeral for the Arabic number 100 is .....

ii. Issuing a .....is the first step in conveying a meeting.

iii. Communication is a .....way process.

iv. Putting your thoughts in a code that is understood by the receiver is called .....

v. Body language includes facial expressions and.....

Q 2 a) Define courtesy and discuss how a letter can be made courteous. (15)

b) Discuss and illustrate the various ways in which a letter should be correct.

OR

Q.2 Write notes on any three Cs of Communication: (15)

a) Completeness

b) Conciseness

c) Concreteness

d) Consideration

e) Clarity

[TURN OVER

Q. 3. a) Explain what is meant by 'Visual Communication'. Write a note on different types of visual communication giving examples of each type. (15)

OR

Q. 3.b) Write notes on any three of the following –

i. Allness and closed mind as barriers to communication

ii. Barriers to effective listening

iii. Effects of emotions on communication

iv. The Halo and Horn effect

v. Space and time as barriers to communication.

Q. 4. a) Explain the tips to be kept in mind while 'conducting a Meeting'. (15)

OR

Q. 4. b) 'Wanted a Junior Programmer for XYZ College, Vashi. Candidate Should be first a class graduate (IT) well versed in different types of programs. Preference will be given if the candidate has 1-2 years experience.' Send your application with bio-data to: The Registrar, XYZ College, Vashi, Mumbai. (15)

Q. 5 a) Your office has caught fire a week before and the fire has badly damaged your office. As the Manager, draft a report to be sent to your Board of Directors giving details of the accident, the loss in your office and other preliminary details. (15)

OR

Q. 5 b) Write notes on any three of the following –

i. Guidelines for writing instructions

ii. Tips to writing a Summary

iii. The reference list in a report

iv. Different types of reports

v. Definitions and their importance

Q. 6.a) List out the factors to be considered before making a presentation. (15)

OR

Q.6 b) Write notes on any three of the following -

i. Importance of visual aids in presentation

ii. Advantages of oral communication

iii. Telephone manners

iv. Techniques for effective listening

v. Importance of oral communication.

Q. 7 a) Write notes on any three of the following- (15)

i. Transition words

ii. Proof reading and its importance

iii. Importance of revising of your work

iv. Abbreviations

v Spellings and their importance

OR

Q. 7 b)I. Proofread and correct the following paragraph (08)

Dear New customer

We would like to thank you for taking the time to allowing us to possible be your next home repair company. We are new to the area but service many other states like MaharaSHtra and karnatka. We want to assure you that we wil do every we can to help restore and save your values possession afters a bad fire or flodd. We aare franchise the world largest clearning company 'Service master Clean'. We are all service professionals wit over 50 year of experience in the cleaning and restoration business. Our goal is to make a crisis time as carefree and relaxing as we possibly can for you you and your loves ones. Please take the time to read hour brochure and call our offices if we can be of any assistanc to your damage home needs.

AND

Q. 7b)II. Do as directed - (07)

i. Give singular form of : (02 marks)

elbows, toes, churches, stories

ii. Give plural form of: (02marks)

ash, knife, wolf, holiday.

iii Give the full form of: (03 marks)

asap; e.g.; PTO; ISP; VAT

F.Y.B.Sc. (IT) Applied Mathematics-I January 14
Sem-I 4T: 2nd half.13-Avi(bf)

Con. 288-13. **TD-1082**

(3 Hours) **[Total Marks : 100**

N.B. : (1) **All** questions are **compulsory**.
(2) **Figures** to the **right** indicate **full** marks.

Q.1] Attempt any one: 10

a) Find inverse of given matrices, using adjoint method.

$$\begin{bmatrix} 2 & 1 & 3 \\ 3 & 1 & 2 \\ 1 & 2 & 3 \end{bmatrix}$$

b) Solve: $(1-x^2)\frac{dy}{dx}+2xy = x\sqrt{1-x^2}$

Q.2] Attempt any three:

a) Show that given matrix is Hermitian and iA is Skew Hermitian matrix. 5

$$\begin{bmatrix} 2 & 3+2i & -4 \\ 3-2i & 5 & 6i \\ -4 & -6i & 3 \end{bmatrix}$$

b) Show that given matrix is unitary and hence find A^{-1}. 5

$$\frac{1}{2}\begin{bmatrix} \sqrt{2} & -i\sqrt{2} & 0 \\ i\sqrt{2} & -\sqrt{2} & 0 \\ 0 & 0 & 2 \end{bmatrix}$$

c) Given that $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ show that $A^2-4A+5I=0.5$

d) Reduce the given matrices in normal form and hence find rank. 5

$$\begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$$

Q.3] Attempt any three:

a) Check whether given vectors are linearly dependent or independent set. 5

$X_1 = (1, 2, 3)^T$, $X_2 = (3, -2, 1)^T$, $X_3 = (1, -6, -5)T$

b) Find inner product of the given vectors. 5

$a = (1+i, 2-3i, 5+2i)^T$, $b=(2-i, 3+i, i)^T$

c) Verify Cayley-Hemilton theorem. 5

$$\begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}$$

d) Diagonalize the given matrix. Find the model matrix P. 5

$$\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$$

Q.4] Attempt any three:

a) Find the volume of the parallelopiped whose edges are represented by the vector A=2i-3j+4k, B=i+2j-k, C=3i-j+2k. 5

b) If R = a costi + a sinti + at tanαk Find value of $\left|\frac{dR}{dt} \quad \frac{d^2R}{dt^2}\right|$ 5

c) What is the directional derivative of $\phi = xy^2+yz^3$ at the point (2, -1, 1) in the direction of the normal to the surface $x\log z-y^2 = -4$ at(-1, 2, 1) 5

d) Find the angle between the tangent planes to the surface $x \log z = y^2-1$, $x^2y = 2-z$ at the point(1, 1, 1). 5

[TURN OVER

Q.5] Attempt any three:

a) Solve: $\frac{dy}{dx} = \frac{2y^4+x^4}{xy^3}$ 5

b) Solve: $(3xy^2-y^3)dx+(xy^2-2x^2y)dy$ 5

c) Solve: $(x^2+1)\frac{dy}{dx} = x^3-2xy+x$ 5

d) Solve: $xy\frac{dy}{dx} = y^3e^{-x^2}s$ 5

Q.6] Attempt any three:

a) Solve: $\frac{d^2y}{dx^2} + 5\frac{dy}{dx} - 12y = 0$ 5

b) Solve: $\frac{d^3y}{dx^3} + 8y = 0$ 5

c) Solve: $(D^2+3D+2)y=\sin(e^x)$ 5

d) Solve: $(D^2+2D+3)y=(x-x^2)$ 5

Q.7] Attempt any three:

a) Find Y_n if $Y = \frac{1}{x^2-5x+6}$

b) If $f(x) = e^{-x}(\sin x - \cos x)$ then verify Rolle's theorem in $\left(\frac{\pi}{4}, \frac{5\pi}{4}\right)$.

c) Verify Cauchy Mean value theorem for $f(x) = x^2 - 2x + 3$ and $g(x) = x^3 - 7x^2 + 20x - 5$ in $(1, 4)$.

d) If $u = \tan^{-1}\left(\frac{y}{x}\right)$ prove that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$.

F.Y.B.Sc. (IT) Electronic and Communication Technology January 1

Sem-I : 2nd half.13-Avi(bf)

Con. 290-13.

TD-1366

(3 Hours) **[Total Marks : 100**

N.B. : (1) **All** questions are **compulsory**.
(2) **Figures** to the **right** indicate **full** marks.

Q.1 ANSWER THE FOLLOWING. **(10)**

1. Explain the formation of P-type semiconductor with necessary diagram.
2. Draw a neat labeled block diagram of an oscillator.
3. Explain working of transistor as a switch.
4. Define AM and draw the waveforms.
5. State the Sampling Theorem and explain it.

Q. 2 (A) ATTEMPT ANY TWO OF THE FOLLOWING. **(10)**

1. Explain the working of P-N junction diode with necessary diagrams.
2. With the help of circuit diagram explain the working of half wave rectifier with necessary wave-forms.
3. Explain the output caracteristics of N-P-N transistor in CE configuration.

(B) ATTEMPT ANY ONE OF THE FOLLOWING. **(5)**

1. The turns ratio of a transformer uses in a bridge rectifier is 100:1. the primary is connected to a 230 V_{RMS} mains supply. Assuming diode voltage drop to be 0.5 V, find the dc voltage across the load resistance & the PIV of each diode. Also find the load current if a load resistance of 100 Ω is used.
2. When the emitter current of a transistor is changed by 1.1 mA its collector current changes by 0.97 mA. Calculate its common base current gain(β) and common emitter current gain(α).

Q. 3 (A) ATTEMPT ANY TWO OF THE FOLLOWING. **(10)**

1. Explain the working of single stage CE amplifier. Also discuss its frequency response curve.
2. With the help of circuit diagram explain the working of multistage amplifier. Derive an expression for its gain decibel.
3. Explain working of RC coupled amplifier with circuit diagram discuss its frequency response curve.

(B) ATTEMPT ANY ONE OF THE FOLLOWING. **(5)**

1. Explain the need of biasing a transistor. Explain the fixed biased method of biasing.
2. Explain how to plot the load line of CE amplifier. What is Q-point.

Q. 4 (A) ATTEMPT ANY TWO OF THE FOLLOWING. **(10)**

1. Explain the need of tank circuit in an oscillator Explain the RC tank circuit..
2. Explain the working of RC phase shift Oscillator with its circuit diagram.
3. Explain the block diagram of IC555.

(B) ATTEMPT ANY ONE OF THE FOLLOWING. **(5)**

1. An astable multivibrator using IC555 has R_A=470kΩ, R_B=2kΩ and C=0.0076μF.Calculate charging and discharging time constant duty cycle and output frequency.
2. A Colpitt's Oscillator uses following components in its tuned C_1=1500pF , C_2=800pF,L=200μH. Calculate the frequency of the oscillator.

[TURN OVER

Q. 5 (A) ATTEMPT ANY TWO OF THE FOLLOWING. (10)

1. With the help of circuit diagram explain the working of Balanced Modulator.
2. Explain the block diagram of the basic communication system.
3. Explain filter method for side band suppression with block diagram.

(B) ATTEMPT ANY ONE OF THE FOLLOWING. (5)

1. An audio signal is given by $E_m = 100 \sin (3140)t$. It amplitude modulates a carrier given by $E_c = 125 \sin 4\times10^6 t$. Find modulation index, percentage modulation, frequency of carrier, frequency of modulating signal, amplitude of side band components & their frequency.
2. Explain the low level modulator.

Q. 6 (A) ATTEMPT ANY TWO OF THE FOLLOWING. (10)

1. With help of block diagram explain the television transmitter.
2. Explain TRF receiver with the block diagram.
3. Compare FM and AM systems.

(B) ATTEMPT ANY ONE OF THE FOLLOWING. (5)

1. Explain typical pre-emphasis & de-emphasis circuit with their characteristics.
2. Explain PPM generator with waveforms.

Q. 7 (A) ATTEMPT ANY TWO OF THE FOLLOWING. (10)

1. Explain amplitude shift keying.
2. Explain types of optical fiber.
3. Explain the optical links in detail.

(B) ATTEMPT ANY ONE OF THE FOLLOWING. (5)

1. Explain the construction and working of LED.
2. Write a note on Ray model.

----------*----------

F.Y. B.Sc (I.T.) Introduction to Information Theory & Application (old) April 20
& sem-I Professional Communication Skills. (New)

Con. 216-14. **(OLD COURSE)** KN-6063

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** from the **remaining** questions.
(3) **All** questions carry **equal** marks.

1. (a) Encode binary word 1000 and 1100 into 7 bit even parity hamming code. 10
(b) Convert binary number (1000100) to decimal. 1
(c) Perform binary addition of (1001)and (1100). 2
(d) Convert octal number $(128)_8$ to decimal conversion. 2
(e) Explain encoding and decoding of data in detail. 5

2. Write short notes on :—
Attenuation 8
Dispersion 6
Worm and virus 6

3. Explain Dynamic RAM and Static RAM. 8
Define the term networks and types of networks. 6
Explain optical fiber cables. 6

4. What is the concept behind in assembler, compiler and interpreter ? Explain. 12
Explain instruction cycle with diagram. 8

5. Write short notes on :— 12
Cache memory virtual memory
Differentiate between RAM and EPROM. 8

6. What do you mean by the term modulation ? What is the need of modulation ? 12
Explain different modulation techniques.
Explain Shannon's theorem. 8

7. Write short notes on :—
A/D and D/A conversion.
Primary memory and secondary memory.
Flotation point representative and arithmetic.

———S———

[TURN OVER

Con. 216-14. (REVISED COURSE) KN-6063

(3 Hours) [Total Marks : 100

Note: 1. All questions are compulsory.
2. Figures to the right indicate marks allotted to the question.

Q. 1 A. Fill in the blanks: (05)

i. Maps, charts and graphs are methods of .....non verbal communication.
ii. Space, distance and time are .....barriers to communication.
iii. Terms of reference, collecting information are stages involved while writing a .....
iv. The Roman numerical for the Arabic number 50 is .....
v. The full form of asap is .....

Q. 1 B Say whether the following statements are true or false – (05)

i. A Brochure is a type of leaflet.
ii. One should avoid the use of jargon while writing letters.
iii. A job application letter is written to apply for a specific position.
iv. Signature is not an important part of a letter.
v. Seven Cs of communication are called so because the name of each of these qualities begins with the letter 'C'.

Q. 2 a. Discuss and illustrate the various ways in which a letter should be correct. (15)
b. Define courtesy and discus how a letter can be made courteous.

OR

Q.2 Write notes on any three Cs of Communication: (15)

i. Completeness
ii. Conciseness
iii. Concreteness
iv. Consideration
v. Clarity

Q. 3 a. Define a 'barrier to communication'. Discuss 'socio-psychological barriers' to communication. Also give suggestions to overcome these barriers. (15)

OR

Q.3 b. Write notes on any three of the following - (15)

i. Posture and gesture as methods of non verbal communication
ii. Listening barriers
iii. Encoding and decoding as elements in the cycle of communication
iv Feedback and its importance
v. Silence as an important method of communication.

Q. 4 a. Discuss the various tips required to be considered while drafting a Brochure. (15)

OR

Q.4 b. " Wanted an experienced assistant sales manager for an Electronics Showroom. Candidate must be a first class IT graduate with knowledge of computer hardware and preferably 2-3 years experience. Apply with bio data to Box K, The Times of India, Mumbai 400 001. (15)

Q. 5a. The students of your College have complained about the condition of your canteen. A Committee of four students has been formed to look into the complaints of the students and also give suggestions to improve. On behalf of the Committee, draft this report. (15)

OR

Q. 5 b. Write notes on any three of the following - (15)

i. Different types of reports
ii. Elements of formal instructions
iii. Writing a summary
iv. Definitions and their importance
v. Importance of an abstract in a report

Q. 6 a. Explain in detail 'Types of Reading'. (15)

OR

Q. 6 b. Write notes on any three of the following - (15)

i. Importance of Note making
ii. Disadvantages of oral communication
iii. Importance of body language in Oral presentation
iv. Barriers to effective listening
v. Telephone manners

Q. 7 a. Write notes on any three of the following - (15)

i. Hyphenation
ii. Importance of checking spellings during proof reading
iii. Revision and its importance
iv. Importance of tone in your writing
v. Editing

OR

Q. 7 b (i) Proof read and correct the following paragraph: (08)

Every well written Paragraph must have a main sentence. This sentence is the main idea of that paragraph which specifies the focus of the Paragraph. The remaining sentences in that paragraph are organised around it. They contain supporting details. The main sentence can be located at the beginning of the paragraph or at the end. The other sentences in the paragraph must be organised so as to develop the idea in a logical and convincing manner. There are many ways of organising ideas - One way could be that the writer makes a statement and gives examples In the next sentence to make clear his ideas to the reader. He can describe events which happen in a sequence. This method is useful or writing reports. However, one sentence should lead to the next – information should not be out of place otherwise the piece of writing will lose its unity.

AND

Q. 7b. (ii) Do as directed - (07)

i. Give singular forms of : (02 marks)
heroes, radios, knives, stories

ii. Give plural forms of: (02 marks)
notebook, box, wolf, body.

iii. Give the full form of: (03 marks)
encl., c.o.d., c.c., USA, Dr., ext.

F.Y.B.Sc. (IT) Mathematics P-I (Old) April 13
Sem-I Applied Mathematics (Rev)

(OLD COURSE) **QP Code : KN-6127**

(3 Hours) [Total Marks : 100

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Question Nos. **2** to **6**.

1. (a) Find non singular matrices P and Q such that PAQ is in normal form and hence find rank of A where $A = \begin{bmatrix} 1 & 2 & 3 & -2 \\ 2 & -2 & 1 & 3 \\ 3 & 0 & 4 & 1 \end{bmatrix}$ **10**

(b) Solve $\frac{dy}{dx} + \frac{y\cos x + \sin y + y}{\sin x + x\cos y + x} = 0$. **10**

2. (a) Solve the system of equations : **10**

$$x + 3y - 2z = 0$$
$$2x - y + 4z = 0$$
$$x - 11y + 14z = 0$$

(b) If $u = f(e^{y-z}, e^{z-x}, e^{x-y})$ then show that— **10**

$$\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0.$$

3. (a) Find the inverse of a matrix— **10**

$$\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{bmatrix}$$

(b) Solve $(y^4 + 2y)dx + (xy^3 + 2y^4 - 4x)dy = 0$. **10**

4. (a) If $u = \frac{xy}{2x+z}$ Prove that $\frac{\partial^3 u}{\partial y\, dz^2} = \frac{\partial^3 u}{\partial z^2\, dy}$. **10**

(b) If $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$ show that $A^3 = A^{-1}$. **10**

5. (a) Examine the vectors [1, –1, 1], [2, 1, 1] and [3, 0, 2] are L.I. or L.D. **10**
(b) Solve $(1 + x + xy^2)dy + (y + y^3)dx = 0$. **10**

6. (a) Solve $x\frac{dy}{dx} + \frac{y^2}{x} = y$. **10**

(b) Find the Eigen values and Eigen vectors of $\begin{bmatrix} 1 & 1 & -1 \\ 1 & 2 & 1 \\ -1 & 1 & 3 \end{bmatrix}$. **10**

(REVISED COURSE) **QP Code : KN-6127**

(3 Hours) [Total Marks : 100

Q1 .Solve 5*2=10M

a) Given that $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$. Find $A^2 - 4A + 5I$

b) Solve : $(2x^3 + 3y)\,dx + (3x+y-1)dy = 0$

Q2.Solve

a) Define Unitary Matrix .Show that A is unitary where $A = \begin{bmatrix} \frac{1(1+i)}{2} & -\frac{1(1-i)}{2} \\ \frac{1(1+i)}{2} & \frac{1(1-i)}{2} \end{bmatrix}$ 10M

b) Determine the rank of the Matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ -3 & -6 & -9 \end{bmatrix}$ 5M

OR

c) Find the inverse of the matrix using adjoint method $B = \begin{bmatrix} 2 & 1 & 3 \\ 3 & 1 & 2 \\ 1 & 2 & 3 \end{bmatrix}$ 10M

d) Show that the matrix is Skew-Hermitian $B = \begin{bmatrix} 3i & 2+i \\ -2+i & -i \end{bmatrix}$ 5M

Q3.Solve

a) Is the vector Linearly dependent.If so,find the relation between them (3,2,7) (2,4,1) (1,-2,6) 10M

b) Find eigen value and eigen vector of the matrix $A = \begin{bmatrix} 1 & -2 \\ -5 & 4 \end{bmatrix}$ 5M

OR

c) Verify Cayley Hamilton theorem for $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ 10M

d) Find eigen value and eigen vector of the matrix $A = \begin{bmatrix} 1 & -6 & -4 \\ 0 & 4 & 2 \\ 0 & -6 & -3 \end{bmatrix}$ 5M

Q4. Attempt any three 5*3=15M

a) If F = (x+y+1)I + J –(x+y) K, than Show that F.curl F =0

b) If A is a constant vector and R = xI =yJ + zK.Prove that, than i) grad(A.R) = A ii) div(A X R) = 0

c) Show that the vector is solenoidal (x + 3y)I + (y-3z)J + (x-2z)K

d) Prove the curl [(A.R)R] = A*R where A is constant vector.

[TURN OVER

Q5 Attempt any three **5*3=15M**

a) Solve : $(2x-y+1)\,dx + (2y-x-1)\,dy = 0$

b) Solve : $y^2 + x^2 \frac{dy}{dx} = xy \frac{dy}{dx}$

c) Solve : $(x^2 + y^2)\,dx - 2xydy = 0$

d) If the population of town doubles in 20years,in how many years will it triple under the assumption that the rate of increase is proportional to the number of inhabitants.

Q6 Attempt any three **5*3=15M**

a) Verify Rolle's Theorem for $f(x) = (x^2-1)(x+28)$ in [4,7] if possible.

b) Find n^{th} derivatives of the $y = \cosh x$.

c) Verify Lagranges Mean Value Theorem for $f(x) = 2x-x^2$ in [0,1]

d) Verify Cauchy MVT for $f(x) = x^3-4x$ and $g(x) = x^2+1$ in [0,1]

Q7 Attempt any three **5*3=15M**

a) Find the maximum and minimum values of $z= f(x,y) = x^3+y^3-3axy$

b) Divide 640 into three parts such that the sum of their products taken two at a time is maximum

c) Find the percentage error in the area of an ellipse when an error of 1.5% and 2% is made in measuring its major axis and minor axis respectively.

d) If $u = \log(x^2 + xy+y^2)$ show that $x\frac{du}{dx} + y\frac{du}{dy} = 2$

F.Y.B.Sc. (I.T) Sem-I Introduction to Digital Electronics (Old) Fundamentals of Digital Computing (New) April 14

(OLD COURSE) **QP Code : KN-6511**

(3 Hours) [Total Marks : 100

Note: - 1. Question No. 1 is compulsory.
2. Answer any four from the remaining question.
3. All questions carry equal marks.

Q.1. a) Do the following Conversion: (10)

(i) $(11111.10001)_2 = (?)_8$

(ii) $(FBA.BC)_{16} = (?)_{10}$

(iii) $(486..524)_{10} = (?)_2$

(iv) $(465.32)_8 = (?)_{10}$

(v) $(1101.1011)_2 = (?)_{10}$

b) Explain Basic Logic Gates with their symbols and truth tables. (10)

Q.2. a) i) Write the BCD code for 9248. (06)

ii) Write the Excess-3 code for $(35)_{10}$.

iii) Convert binary 1111 to gray code.

b) Subtract using Two's Complement (06)

(1) (6-8) (2) (7-4)

c) Explain the clocked S-R flip flop in detail. (08)

Q.3. a) Explain the formation of AND, OR and NOT Gate using Universal Gates. (10)

b) Minimize the following expression using K-map and realize using Basic gates. (10)

$f(A,B,C,D) = \sum m(1,3,5,7,8,9,10,11,13,15)$

Q.4. a) Explain Full adder and Half adder in detail with circuit diagram and truth table. (10)

b) State & Prove Demorgan's both laws. (10)

Q.5. a) Write a short note on decoder. (05)

b) Explain Master Slave Flip-flop with suitable diagram. (07)

c) Explain the term Shift Register with their types in detail. (08)

Q.6 a) What is Multiplexer? Design 8:1 multiplexer circuit with its logic equation and truth table. (10)

b) What is semiconductor? Write down the characteristics of semiconductor. (10)

Q.7. a) Explain the term transistor and transistor as an amplifier with the circuit diagram. (10)

b) Write a short note on Demultiplexer with the working of 4:1 demultiplexer. (10)

[TURN OVER

(REVISED COURSE) **QP Code : KN-6511**

(3 Hours) **[Total Marks : 100**

Note: All Questions are compulsory

Q. 1

1 Convert $(25.56)_{10}$ into its equivalent binary, octal and hexadecimal format 5M

2 Write a short note on AND, OR and NOT gate 5M

Q. 2 **Attempt any three**

1 Write a short note on Excess-3 code 5M

2 Multiply $(10101101)_2$ and $(1110)_2$ 5M

3 Explain the floating point representation of numbers 5M

4 Divide $(10101101)_2$ by $(110)_2$ and find the quotient and remainder. 5M

Q. 3 **Attempt any three**

1 Define minterm. Describe the method of representing the minterm of two, three and four variables using K-map. 5M

2 For XOR gate prove that, $A \oplus B = A B' + A' B$. Hence prove that $(A \oplus B)' = A' B' + A B$ 5M

3 "NOR gate is known as universal gate" – state and explain. 5M

4 Simply the following function $F(a,b,c,d) = \Sigma(1, 3, 5, 9, 11, 13)$ and draw the logic circuit diagram using basic logic gates 5M

Q. 4 **Attempt any three**

1 Write a short note on Half adder 5M

2 Define Decoder. Describe the Decoder circuit with an example 5M

3 Implement the following function $F(a, b, c, d) = \Sigma(0,1,3,8,9,15)$ using multiplexer 5M

4 Define Encoder. Explain the circuit with an example 5M

Q. 5 **Attempt any three**

1 Write a short note on registers 5M

2 Define Flip Flop. Write a short note on RS Flip Flop 5M

3 Define counter. Design the circuit diagram for 3-bit binary counter 5M

4 Define synchronous counter with an example circuit diagram. 5M

Q. 6 **Attempt any three**

1 Draw the basic functional diagram of a digital computer and explain each component 5M

2 Write a short note on Mouse 5M

3 Write a short note on RAM and ROM 5M

4 Define Printer. List the different types of Printer devices 5M

Q. 7 **Attempt any three**

1 Define Distributed Operating System. List the characteristics of distributed OS 5M

2 Write a short note on real time operating system 5M

3 Differentiate between Multi-user and Single-user operating system. 5M

4 Write a short note on Linux operating system. 5M

F.Y.B.Sc. (I.T) Sem-I Digital computer Fundamental (Old) Electronic and communication Technology (Reg) Apr 14

AGJ 1st half (b) 6

QP Code - KN–6711

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from **remaining**.

1. (a) Explain flag register in 8085. **6**
   (b) Explain PCI arbitration. **6**
   (c) Explain RAID with its various level. **8**

2. (a) Explain data bus, address bus and control bus in case of 8085 microprocessor. **6**
   (b) Write an assembly language program to add two 8bit numbers stored at memory location 2000 H and 2001 H. **6**
   (c) Write a short note on (i) Stack Memory (ii) Subroutine. **8**

3. (a) What do you mean by externally initiated operations with respect to a microprocessor ? **6**
   (b) Explain different addressing modes in 8085 microprocessor. Give two examples of each addressing mode. **6**
   (c) Explain structure and function of modern day computer system. **8**

4. (a) Write a short note on interrupt. **6**
   (b) Explain the structure of cache memory. **6**
   (c) What is instruction pipelining ? **8**

5. (a) Explain major functions of an I/O module. **6**
   (b) Explain the programmed I/O module and interrupt driven I/o module. **6**
   (c) With the help of a block diagram explain DMA. **8**

6. (a) What is an operating system ? **6**
   (b) Explain following terms in operating system – **6**
      (i) Multiprogramming
      (ii) Time sharing.
   (c) Write a short note on real time operating systems. **8**

7. (a) Write an assembly language program to find smallest number in given block stored from memory location 2000 H to 2004 H. **6**
   (b) Explain following instructions in 8085 – **6**
      (i) Lxl H, 2050
      (ii) PUSH B
      (iii) INR M.
   (c) Explain programming model of 8085 microprocessor. **8**

(REVISED COURSE)
(3 Hours) **[Total Marks : 100**

1. (a) Explain how can a transistor be used as a switch. 5
   (b) What is digital communication ? With suitable diagram explain ASK in detail. 5

2. Attempt any **three** question from the following :–
   (a) With the help of neat circuit diagram and proper input output waveforms, explain the working of bridge rectifier using pn junction diode. 5
   (b) What is Zener diode ? Discuss its application in voltage regulation. 5
   (c) Draw the output characteristics of a transistor connected in CE configuration and explain the various regions of operation. 5
   (d) With the help of energy band diagrams, explain the concept of conductors, insulators and semiconductors. 5

3. Attempt any **three** question from the following :–
   (a) What do you mean by Darlington pair ? 5
   (b) Write a short note on DC amplifiers. 5
   (c) Derive the expression for voltage gain of a multistage amplifier having 'n' amplifiers cascaded. 5
   (d) Draw the frequency response of a single stage amplifier and explain. 5

4. Attempt any **three** question from the following :–
   (a) What do you mean by feedback ? Explain negative and positive feedback in brief. 5
   (b) With the help of circuit diagram explain astable multivibrator using 555 timer. 5
   (c) With the help of circuit diagram explain RC phase shift oscillator. 5
   (d) Calculate the time period of astablemultivibrator, if R_A=4·7kΩ, R_B=2·2kΩ, and C=0·33μF. 5

5. Attempt any **three** question from the following :–
   (a) Explain a typical radio transmitter system using block diagram. 5
   (b) Define amplitude modulation and modulation index for amplitude modulation. 5
   (c) What is the need for modulation in communication system ? 5
   (d) Derive the equation for total power used in transmitting amplitude modulated wave. 5

6. Attempt any **three** question from the following :–
   (a) Differentiate between AM and FM systems. 5
   (b) What do you mean by sampling ? State and explain sampling theorem. 5
   (c) Write a note on pulse amplitude modulation (PAM). 5
   (d) Write a note on pulse width modulation (PWM). 5

7. Attempt any **three** question from the following :–
   (a) Describe the construction of an optical fibres. 5
   (b) With the help of diagram explain total internal reflection. 5
   (c) Write a short note on LASER. 5
   (d) Explain the following terms :– (i) attenuation (ii) dispersion (iii) optical detectors. 5

F.Y.B.Sc (IT) Sem I Introduction to Programming - C - (Old) Introduction to C++ programming (New) Apr 14

(OLD COURSE) **QP Code : KN-7007**

(3 Hours) **[Total Marks : 100**

Note: 1) Question no 1 is compulsory.
2) Answer any 4 from the remaining questions.
3) All questions carry equal marks.

Q1. A. what is an unsigned integer constant? What is the significance of declaring a constant unsigned?

b. What are the qualifiers that an int can have at a time?

Q2.a. Find errors, if any in the following arithmetic expression:

- X= y=z =0.5, 2.0,-5. *5;
- S= /5;
- A= b++ -C*2.

b. Which of the following arithmetic expressions are valid? If valid, give the value of the expressions; otherwise give reason.

- 21 %(int)4.5
- -14 %3
- +9/4 +5

Q3. A. In what ways does a switch statement differ from an if statement?

b. Write a program to read the age of 100 persons and count the number of persons in the age group of 50 to 60.Use for and continue statement.

Q4. A. Explain? : Operator with suitable example.

b. What is the difference between while loops and do-while loop. Give suitable example.

Q5. A. Distinguish between the following with suitable example:

- getc and getchar
- printf anf fprintf
- feof and ferror

b. What is the significance of EOF?

Q6. A. Write a program using pointers to compute the sum of all elements stored in an array.

b. How does a structure differ from an array?

Q7. Distinguish between the following with suitable example:

Actual and formal arguments.

Global and local variable.

[TURN OVER

(REVISED COURSE) **QP Code : KN-7007**

(3 Hours) [Total Marks : 100

NOTE: All questions are compulsory.

Q.1 (All questions are compulsory)

a) What is a flow chart in C++ programming? Draw a flow chart to find average of five numbers. (05)

b)What are the manipulators used in C++ programming. (05)

Q.2(Attempt any three)

a)Write a note on Program Design. (05)

b)Explain the importance of Compiler and linker. (05)

c)If the marks obtained by a student in five different subjects are input through the keyboard, find out the aggregate marks and percentage obtained by a student. Assume that the maximum marks that can be obtained by a student in each subject is 100. (05)

d)Write a note on Debugging & testing. (05)

Q.3(Attempt any three)

a)What are Identifiers? What are the rules for writing identifiers? (05)

b)What are escape sequences? Need of using escape sequences. (05)

c)How to use comma operator and conditional operator in c++ programming. (05)

d)What are variables and keywords used in C++ programming? (05)

Q.4(Attempt any three)

a)Write a program to display all even numbers between the range of 1 to 100. (05)

b)Explain the working of Switch-break with the help of program. (05)

c)Explain the use of scope resolution operator. (05)

d)Write the syntax of for loop. Also give an example to explain the working of for loop. (05)

[TURN OVER

Q.5(Attempt any three)

a)What are Inline functions and recursive functions? (05)
b)What are functions? Why we use functions? (05)
c)Write a program to demonstrate the working of Call by value. (05)
d)Explain sqrt( ) & pow( ) functions. (05)

Q.6(Attempt any three)

a)What are arrays? What are types of arrays? (05)
b)How to define and initialize an array. (05)
c)Write a program to add two 3X3 matrices. (05)
d)What are pointers? How to use pointers in C++ programming? (05)

Q.7(Attempt any three)

a)Write a program to demonstrate the working of structures. (05)
b)What are vectors in C++ programming? (05)
c)Write a note on: strcpy( ), strlen( ) (05)
d)Explain different I/O functions used in C++ Programming. (05)

F.Y.B.Sc. C.S. Computer science P-II June-14
Algorithms and Programming in C

Con. 242-14 **CC-6655**

(2 Hours) **[Total Marks : 60**

Note : All questions are compulsory.
Figures to the right indicate full marks.

SECTION - I

1. Attempt any two:
a) Explain Best, Worst and Average case complexity with respect to algorithms. 5
b) List and explain three approaches in programming. Explain any one in detail. 5
c) Write an algorithm to find the G.C.D and L.C.M. of two positive integers. 5

2. Attempt any two:
a) Explain while and do...while loops with an example. 5
b) Write a short note on Logical Operators in C with example. 5
c) Write a program in C to generate Fibonacci series. 5

3. Attempt any two:
a) State any explain any two storage classes of C. 5
b) Explain the use of ONE and TWO dimensional array in C. 5
c) Explain Bubble sort algorithm. 5

SECTION - II

4. Attempt any two:
a) What is a function? How functions are declared? 5
b) Write a note on Algorithmic efficiency. 5
c) Write a recursion function algorithm to find a Factorial of a number. 5

5. Attempt any two:
a) Explain the concept of Pointers. How dynamic memory allocation is done with pointers. 5
b) Define and explain the working of Union. 5
c) Differentiate between Macros and Functions. 5

6. Attempt any two:
a) Write a short note on Queue data structure. 5
b) Define Stack and its features. Write a program in C to implement Stack. 5
c) Write an algorithm to search a node in a Linked List. 5

F.Y.B.Sc. C.S. Computer science PI June-2014

Computer Organization & Introduction

Con. 259-14 microprocess and Comp. Archite CC-6501

(2 Hours) [Total Marks: 60]

N.B: (1) All questions are compulsory.
(2) Figures to the right indicate marks.
(3) Mixing of sub-questions is not allowed.

Q1. **Attempt the following (any TWO):**

(i) Explain Neumann Machine with the help of a diagram. (05)

(ii) Convert the following numbers in Decimal Number System. (05)

i. $(2A)_{16}$

ii. $(37)_8$

(iii) Perform the following binary subtractions using the 2's complement method: (05)

i. 1011110 – 1001010

ii. 1000100 – 0100101

Q2. **Attempt the following (any TWO):**

(i) Explain Multiplexer with the circuit diagram and truth table. (05)

(ii) Explain any two basic logic gates with the circuit diagram and truth tables? (05)

(iii) Write a short note on SR Flip Flop. (05)

Q3. **Attempt the following (any TWO):**

(i) Write a short note on Primary Memory. (05)

(ii) Explain Asynchronous Data Transfer. (05)

(iii) What is Cache Memory? Explain its usage. (05)

Q4. **Attempt the following (any TWO):**

(i) Explain how data transfer is done using DMA. (05)

(ii) Explain I/O module in detail. (05)

(iii) Write the difference between Random Access Memory and Serially Access Memory. (05)

Q5. **Attempt the following (any TWO):**

(i) What are the services provided by an Operating System? (05)

(ii) What are various types of scheduling? (05)

(iii) State the Characteristics of Multiprocessors. (05)

Q6. **Attempt the following (any TWO):**

(i) Explain the flag register and function of each flag. (05)

(ii) Explain the features of 8085 micrporocessor. (05)

(iii) Explain the following instruction with respect to 8085 microprocessor. (05)

1. MOV A, D
2. LXI H, 2003
3. PUSH PSW

F.Y.B.Sc. C.S. Physics paper-II June 2014

RT–Exam.–Feb.–14–1–108

Con. 241–14. **CC–6035**

(2 Hours) **[Total Marks : 60**

N.B. : (1) **All** questions are **compulsory** and carry **equal** marks.
(2) **Figures** to the **right** indicate **full** marks.
(3) Use of **scientific** calculator is **allowed**.
(4) Constants :
$C = 3 \times 10^8$ m/sec, $h = 6{\cdot}63 \times 10^{-34}$ J–sec.
$m_e = 9{\cdot}1 \times 10^{-31}$ kg.

1. (a) Attempt any **one** :– **7**
   (i) A capacitor [C] fully charged to a value say qm by a d.c. source of e.m.f. E. connected across a resistance [R]. Derive the expression for capacitor discharge to define discharge time constant.
   (ii) Explain parallel L-C-R circuit and concept of resonance for the circuit.

   (b) Attempt any **one** :– **3**
   (i) A d.c. voltage of 80 V is applied across a series combination of 5Ω and 20H. Find the rate of growth of current at the instant when the current is 6A.
   (ii) A sine wave has a peak value of 170 V. What is its value at 30° ? What is its rms and average value ?

2. (a) Attempt any **one** :– **7**
   (i) With the help of a neat diagram, explain the origin of line spectra in hydrogen atom.
   (ii) Derive the Bragg's law of X-ray diffraction.

   (b) Attempt any **one** :– **3**
   (i) Calculate the de Broglie wave associated with electron moving with a velocity equal to 1/30th of the velocity of light.
   (ii) An X-ray tube emits X-rays with minimum wavelength 0.1 A.U. What is the operating voltage of the tube ?

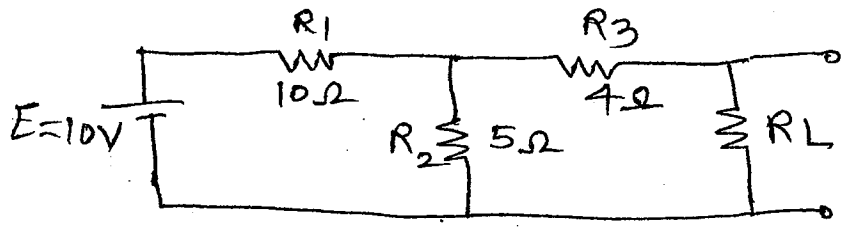
3. (a) Attempt any **one** :– **8**
   (i) Explain with the help of a neat logic diagram the construction and working of Full Adder. Write its truth-table.
   (ii) Explain output characteristics of a transistor in CE-mode. Draw a suitable circuit diagram.

   (b) Attempt any **one** :– **3**
   (i) Draw a neat diagram of transistor as an amplifier in CE-mode. Define voltage gain.
   (ii) Draw NAND and NOR-gates. Draw symbols and write their truth-tables.

[TURN OVER

4. (a) Attempt any **one** :– **8**
   (i) Explain with the necessary theory the construction of D'arsonval galvanometer.
   (ii) Describe De-Sauty's capacitance bridge. Obtain it's balancing condition.

   (b) Attempt any **one** :– **3**
   (i) In the circuit given below, find the value of R_L to give maximum power.



   (ii) In a Wien bridge $R_1 = R_2 = 1K$, $C_1 = C_2 = 0{\cdot}22\ \mu F$, $R_4 = 2{\cdot}2$ K. Find (1) Value of R_3 and (2) Frequency of applied voltage when the bridge is balanced.

5. (a) Attempt any **one** :– **7**
   (i) A parent radioactive element (A) decays into B to C [Stable element]. Find the number of atoms present in B at time t.
   (ii) Define Atomic Number and Mass Number. Explain the concept of Nuclear size and Nuclear spin in brief.

   (b) Attempt any **one** :– **3**
   (i) Write the following radioactive chemical equations –
   (1) Positive β-decay (2) Negative β-decay.
   (ii) Define average life time and 1 a.m.u.

6. (a) Attempt any **one** :– **7**
   (i) What is Compton Effect ? Derive an expression for the change in the wavelength for the same.
   (ii) Write a note on Pair production and annihilation.

   (b) Attempt any **one** :– **3**
   (i) Calculate the frequency of the X-ray photon of momentum 1.4×10^{-23} kgm/sec.
   (ii) Find the energy of neutron having de Broglie wavelength 10^{-14} m. Rest mass of neutron is 1.6×10^{-27} kg.

F.Y.Bsc. C.S.

Physics paper. I

June 2014

Con. 240-14.

CC-6784

(2 Hours) [Total Marks : 60

NOTE: 1. All questions are compulsory and carry equal marks.

2. Figures to the right indicate full marks.

3. use of scientific calculator is allowed.

Q. 1) A) Attempt any one of the following. [7]

1. What do you mean by Poisson's ratio? Show that (a) $\frac{9}{Y} = \frac{1}{K} + \frac{3}{\eta}$;

(b) $\sigma = \frac{3K - 2\eta}{6K + 2\eta}$

2. With necessary diagram obtain Bernoulli's equation.

B) Attempt any ONE of the following. [3]

1. A bullet of mass 10 gm is fired horizontally and remains imbedded in a mass 2 Kg suspended by a long string. The first swing after the impact raises the centre of gravity of combined mass through a height of 15 cm. Calculate the velocity of bullet.

2. A block slides down an incline plane of angle 30^0 with an acceleration of 0.3g. Find the coefficient of Kinetic friction, if sin $30^0 = 0.5$ and cos $30^0 = 0.866$.

Q. 2) A) Attempt any ONE of the following. [7]

1. Discuss the concept of internal energy. Obtain the first law of thermodynamics and discuss the path dependence of heat.

2. What do you mean by specific heats of perfect gas. Obtain the equation showing Mayer's relation.

B) Attempt any ONE of the following. [3]

1. 1 Kg water at 1 atm pressure has a volume of 10^{-3} m^3 and it becomes a 1671 x 10^{-3} m^3 of steam when boiled. If the latent heat of the vaporisation is 540 Kcal/Kg calculate the work done by its internal energy.

2. An ideal gas at 2 atm and 27^0 C is compressed adiabatically to 1 atm pressure. Calculate the resulting temperature. (Take ; $\gamma = 1.4$)

Q. 3) A) Attempt any ONE of the following. [7]

1. Show that the velocity propagation of a longitudinal wave through rod depends upon Young's modulus and density of rod.

[TURN OVER

2. Obtain an expression for Sabine's formula for reverberation of time.

B) Attempt any ONE of the following. [3]

1. Calculate the frequency of the fundamental note emitted by piezoelectric crystal. $L = 5$ mm , $Y = 10^{10}$ N /m^2 , $\rho = 3$ gm/ cc.

2. An auditorium has a volume of 5000 m^3. It is required to have reverberation time of 2.5 sec. What is the total absorption in a Hall?

Q. 4) A) Attempt any One of the following. [7]

1. Obtain the general equation of path followed by the particle in two mutually perpendicular SHMs having same period.

2. What is angular momentum of a system of particles. Obtain an equation for its conservation.

B) Attempt any ONE of the following. [3]

1. Two particles of masses 1 KG and 3 Kg have position vectors $5i - 2j + 10k$ and $-5i + 3j + 5k$. Find the instantaneous position of C.M. of the system.

2. A particle is subjected to two perpendicular SHMs $X = A \cos \omega t$ and $Y = A \cos (\omega t - \pi / 4)$. Find the trajectory of the particle.

Q. 5) A) Attempt any ONE of the following. [7]

1. With the help of the neat diagram obtain an expression for equivalent focal length and cardinal points for coaxial lens system

2. What is chromatic aberration? Show that Chromatic aberration = Dispersive power $\times$ mean focal length

B) Attempt any ONE of the following. [3]

1. Newton's rings are formed with a light of wave length 6700 A^0. Find the radius of 20th dark ring and the radius of curvature of lens if the radius of 10th dark ring is 1.1×10^{-2} m.

2. What should be the distance between lenses of focal lengths 12 cm and 4 cm (a) to minimise the spherical aberration and (b) to satisfy achromatism.

Q. 6) A) Attempt any ONE of the following. [7]

1. Describe the working of HE-NE LASER.

[TURN OVER

2. Obtain the equation for numerical aperture for the path of light in a fibre optics.

B) Attempt any ONE of the following. **[3]**

1. Write applications of LASER
2. Give a brief account of applications of Optical fibre.

****

F.Y.B.Sc.C.S. Mathematics paper-II June 2014

QP Code : CC-6118

(3 Hours) [Total Marks : 100

N.B. : (1) All Questions are compulsory
(2) Figures to the right indicate full marks to the subquestions
(3) From Question no. 2 to 7 , sub-question (a) is compulsory. Attempt any two from sub-question (b) , (c) and (d).

Q.1. Attempt any one :- (10)

a) State and prove fundamental theorem of Equivalence relation.

b) State and prove principle of Inclusion and Exclusion.

Q.2.

a) State and prove Euclid's Theorem, (7)

b) If (a,b) = 1 and $b|ac$ then show that $b|c$ (4)

c) Find g.c.d of a=1547 and b=560 and express it in the form of am+bn, where m and n are arbitrary integers. (4)

d) State Pascal's rule and write Pascal's triangle for n=5. (4)

Q.3.

a) Show that the inverse of bijective function is one to one & onto. (7)

b) Check whether the following operation $a * b = 5a - b$ is commutative and associative , for every $a,b \in Z$ (4)

c) Show that the number of subsets of a finite set having n elements is 2^n. (4)

d) Let $f: R \to R$ be defined by $f(x) = 5x+1$. Prove that f is bijective and also find f^{-1}. (4)

Q.4.

a) If $a \equiv b(mod\ n)$ *and* $c \equiv d(mod\ n)$ *then show that* $a - c \equiv b - d(mod\ n)$. (7)

b) Solve the system $x \equiv 2(mod\ 3)$, $x \equiv 3(mod\ 5)$, $x \equiv 2(mod\ 7)$. (4)

c) Verify Wilson's Theorem for p=5. (4)

d) Find the remainder when 5^{1002} is divided by 11. (4)

Q.5.

a) A committee of 4 members is to be formed from a set of 4 doctors, 3 professors and 5 engineers. Find the number of committees possible if : (7)

i) the committee contains atleast 3 doctors.
ii) the committee contains atmost 1 engineer.
iii) the committe contains exactly 2 professors

b) Write all permutations of A={1,2,3} (4)

c) Prove by induction $S(n,n-1) = {}^nC_2$, where S(n,k) is the Sterling's number of 2nd order. (4)

d) Define reflexive,symmetric,transitive relations & equivalence relation. (4)

Q.6.

a) Define odd and even permutations in S_n.Show that the number of even permutations in S_n is $\frac{n!}{2}$ (7)

b) Compute $\binom{11}{3\ 2\ 2\ 4}$ (4)

c) Find the number of integers from 1 to 300, which are not divisible by 3,5 and 7. (4)

d) If R be a relation on Z define $S(x,y) \in R$ if and only if 3x+5y is divisible by 8. Show that R is an equivalence relation. (4)

Q.7.

a) State and prove Rational Root Theorem. (7)

b) Find quotient and remainder when $f(x) = x^3 + 4x - 5$ *is divided by* $g(x) = x + 1$ (4)

c) If sum of the roots of the polynomial $x^3 - x^2 - 4x + 4$ is zero then find all its roots. (4)

d) Using De-Moivre's theorem find $\left(1 - i\sqrt{3}\right)^6$ (4)

F.Y.B.Sc. C.S. Mathematics paper-I June 2014

AGJ 1st half (b) 17

Con.-239-14.

CC-6709

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.

(2) Q.**2** to Q.**7** **(a)** part is **compulsory** and attempt any **two** question from **remaining** part.

1. (a) State Sandwich theorem and hence evaluate $\lim_{x\to 0} x\cos\frac{1}{x}$. **5**

(b) Verify $f_{yx} = f_{xy}$ for $f(x,y) = x\sin y + y\sin x + xy$. **5**

2. (a) State and prove fixed point theorem. **7**

(b) Show that $\lim_{x\to 2} f(x)$ does not exist, where **4**

$$f(x) = 3 - x \; ; \; x < 2$$

$$= \frac{x}{2} + 1 \; ; \; x > 2$$

(c) Draw the graph of function $y = |x+2|$. **4**

(d) Prove that a polynomial of degree n is continuous on $\mathbb{R}$. **4**

3. (a) Find the equation of tangent and normal to the curve $x^2+xy+2y^2=28$ at point (2,3). **7**

(b) Show that $f(x) = |x|$ is not differentiable at $x = 0$. **4**

(c) Find the derivative of $\sqrt{\cos^2 x + 2\cos x - 5}$. **4**

(d) If $y = e^x \sin x$ then prove that $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 2y = 0$. **4**

4. (a) If $f(x) = 2x^3-9x^2-24x+69$, find the intervals on which the function f(x) is **7**

(i) increasing; (ii) decreasing.

(b) Find absolute maximum and minimum values of the function $f(x)=\frac{x}{2}-\sin x$ on $(0,2\pi)$. **4**

(c) Determine the interval in which the graph of $f(x) = x^3-3x^2$ is concave up or concave down. Find point of inflections if any. **4**

(d) Verify Rolle's theorem for $f(x)=\frac{\sin x}{e^x}$ in $[0,\pi]$. **4**

[TURN OVER

5. (a) Show that the angle between any two diagonals of a cube is $\cos^{-1}(1/3)$. 7

   (b) Find the volume of the tetrahedron formed by the points (1,1,3), (4,3,2), (5,2,7) and (6,4,8). 4

   (c) Translate $x^2+y^2=5$ into cylindrical and spherical equation. 4

   (d) Find the equation of the plane which passes through point (6,2,3), (3,3,-2) and (2,-1,-2). 4

6. (a) Define level curves of a function of two variables. Further, describe and plot the level curve of f: $\mathbb{R}^2 \to \mathbb{R}$ is given by $f(x,y) = 100-x^2-y^2$ for c = 50, 75. 7

   (b) Evaluate the following limit – 4

   (i) $\lim\limits_{(x,y)\to(1,1)} \dfrac{(x+y)(x^2+y^2-4x)}{(x+2y)}$ (ii) $\lim\limits_{(x,y)\to(0,0)} \dfrac{x^2-xy}{\sqrt{x}-\sqrt{y}}$

   (c) Discuss the continuity of $f(x,y,z) = 3x-y^2+e^z$ at (1,1,0). 4

   (d) Using polar co-ordinates, show that $\lim\limits_{(x,y)\to(0,0)} \dfrac{x^3-xy^2}{x^2+y^2}$ does not exist. 4

7. (a) Using Lagrange's Multiplier, find extremum of $f(x) = 4x^2+10y^2$ on the disk $x^2+y^2=4$. 7

   (b) Show that if a function $f : D \to \mathbb{R}$ is differentiable at a point $(a,b) \in D \subseteq \mathbb{R}^2$ then f is continuous at (a,b). 4

   (c) If $u = \log(x^2+y^2)$ then show that $\dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2} = 0$. 4

   (d) Find the linearization of $f(x,y) = x^2+2x+y^2+xy$ at (–1,–1). 4

F.Y.B.Sc. C.S. Foundation Course-I June, 2014

Con. 238-14 **CC-6065**

(3 Hours) **[Total Marks : 100**

N.B. : (1) All questions are compulsory.

(2) Figures to the right indicate full marks.

1. Explain in detail the meaning and causes of Inter-group conflicts in India. 15

OR

Write a note on each of the following:-

(a) Contribution of races to Indian culture

(b) Violence against women

(c) Different types of mental retardation

2. Explain the basic features of Indian Constitution. 15

OR

Write a note on each of the following:-

(a) Features of party system in India

(b) Functions of Municipal Corporation

(c) Role of women in politics

3. Explain the causes and measures related to the problems of the elderly. 20

OR

Write a note on each of the following:-

(a) Major causes and effects of smoking

(b) Problem of child labour in India

4. Comment on the Human Rights Constituents to fundamental rights of Indian Constitution. 15

OR

Write a note on each of the following:-

(a) Concept of liberalization

(b) Impact of globalization on employment

(c) Growth of Corporate farming

5. Write a note on environmental degradation. 15

OR

Write a note on each of the following:-

(a) Concept of urbanization

[TURN OVER

(b) Impact of mass media on culture
(c) Causes of farmer's suicide in Maharashtra

6. Discuss in detail the meaning and causes of Stress and explain different stress management techniques. 20

OR

Write a note on each of the following:-
(a) Agents of socialization
(b) Maslow's theory of self actualization

BSc(IT) Sem-III

Computer Networks (old)
Computer Graphics (Rev)

April 2014

(OLD COURSE) **QP Code : VA-7123**

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. 1 is **Compulsary.**
(2) Attempt any **Four** questions from the remaining.
(3) Draw neat diagrams wherever **required.**

1. (a) Describe TCP/IP reference model with neat diagram. (10)

   (b) What is network topology? Explain all the topologies with advantages and disadvantages. (10)

2. (a) Explain the difference between Circuit and Packet switching. (10)

   (b) Describe error detection in detail. (10)

3. (a) What is ARQ? Explain all types of ARQ in detail. (10)

   (b) Describe High Level Data Link Control with all the frame formats. (10)

4. (a) What is OSI/ISO reference model. Explain all the layers in OSI model. (10)

   (b) What is IP? Explain IPV4 datagram header format in detail. (10)

5. (a) Explain X.25 protocol in detail. (10)

   (b) What is DNS and Resource encoding. Explain how DNS servers work? (10)

6. (a) What are different routing algorithms? Explain fixed routing in detail. (10)

   (b) Write short notes on (10)
      1. Hardware Concepts of distributed systems.
      2. ATM.

7. Write short notes on (20)
   1. Fiber optic cable.
   2. Bridges and Routers.
   3. Digital Signature.
   4. TCP Connection Management.

[TURN OVER

(REVISED COURSE) **QP Code : VA-7123**

(3 Hours) **[Total Marks : 100**

Note: All Questions are Compulsory

Q1 a) Write short note on Raster Scan Display and random scan display. 5
b) What is dithering and thresholding? 5

Q2 **Attempt any three questions**
a) Explain the working principle of CRT. 5
b) Explain DDA line drawing algorithm. 5
c) Explain midpoint Circle algorithm. 5
d) Write various applications of computer graphics. 5

Q3 **Attempt any three questions**
a) Discuss the scan conversions Line. 5
b) Explain two dimensional scaling and translation with an example. 5
c) Write short notes on shear transformation. 5
d) Write short notes on reflection. 5

Q4 **Attempt any three questions**
a) Explain three dimensional rotation transformations. 5
b) Explain the process of Window to viewport mapping. 5
c) Explain types of Perspective Projection. 5
d) Explain Parallel projection. 5

Q5 **Attempt any three questions**
a) Explain the physical device coordinates system (PDCS). 5
b) What is clipping? What are different types of clipping? 5
c) Explain Cohen Sutherland line clipping Algorithm. 5
d) Explain Seed filling Algorithm. 5

Q6 **Attempt any three questions**
a) Explain Spline curves representation. 5
b) Explain Bezier curves. 5
c) Write a short note on Conic Curve. 5
d) State the applications of fractal geometry. 5

Q7 **Attempt any three questions**
a) Write a short note on shadows.. 5
b) Write a short note on ray tracing. 5
c) Write a short note on Phong shading. 5
d) Explain the RGB Color model. 5

S.Y.B.Sc (I.T) Sem-III Computational Mathematics-I- (Old) April 201
Advanced SQL. (Rev)

(OLD COURSE) **QP Code : VA-7053**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any four questions from Q.Nos.2 to 6.
(3) All questions carry equal marks.

Q.1] (a) Solve the following equations by gauss-seidal procedure. The answer should be correct to three significant digits. [10]

$$x_1 - 10x_2 + 4x_3 = 6$$
$$2x_1 - 4x_2 + 10x_3 = -15$$
$$9x_1 + 2x_2 + 4x_3 = 20$$

(b) Use the Runge-Kutta Fourth order method to find the value of y when x=1 given that y=1 when x=0 and that: $\frac{dy}{dx} = \frac{y-x}{y+x}$. [10]

Q.2] (a) Compute the inverse of the matrix $\begin{pmatrix} 3 & 2 & 4 \\ 2 & 1 & 1 \\ 1 & 3 & 5 \end{pmatrix}$ and use the result of solve, [10]

$$3x + 2y + 4z = 7$$
$$2x + y + z = 7$$
$$x + 3y + 5z = 2$$

(b) Using bisection method to determine the root of $f(x) = e^x - x$. [10]

Q.3] (a) Find the number of term of the exponential series such that their sum gives the value of e^x correct to five decimal place for all value of x in the range $0 \le x \le 1$. [10]

(b) Approximated the integral given below using Trapezoidal rule using 8 equal subdivisions.

$$I = \int_{-1}^{1} \frac{1}{1+x^2} dx.$$ [10]

Con. 222-14. **[TURN OVER**

Q.4] (a) From the data find y at 4.5. by Newton's interpolation method. [10]

X	1	2	3	4	5
Y	2.38	3.65	5.85	9.95	14.85

(b) Find $y(0.2)$ using modified Euler's method $\frac{dy}{dx} = x + y$, $y(0) = 1$, step size=0.1. [10]

Q.5] (a)Evaluate the root for the equation $f(x) = \cos x - xe^x = 0$ using false position method. [10]

(b) Fit a straight line to the x and y values in the two columns. [10]

x_1	1	2	3	4	5	6	7
y_1	0.5	2.3	2.1	4.2	3.6	5.8	5.5

Q.6] (a) Evaluate the integral $\int_0^1 \frac{1}{1+x} dx$ by taking $h = \frac{1}{6}$ using Simpson's $\frac{3^{th}}{8}$. [10]

(b) Show that $\mu = \frac{2+\Delta}{\sqrt{(1+\Delta)}} = \frac{2-\nabla}{2\sqrt{(1-\nabla)}}$. [10]

****

[TURN OVER

(REVISED COURSE) **QP Code : VA-7053**

(3 Hours) **[Total Marks : 100**

Note: i) All questions are compulsory.
ii) Figures on right indicate maximum marks.

Q. 1 Attempt the following :-

a) Write differences between procedure and function. 5

b) Write a program using PL/SQL to calculate factorial of number entered by user. 5

Q. 2 Attempt ***any three*** from the following :-

a) What are joins? Explain left join and right join with example. 5

b) What are aggregate functions? How are they used? Explain with example. 5

c) Explain different types of constraints in SQL. 5

d) What is view? What are the advantages of view? 5

Q. 3 Attempt ***any three*** from the following :-

a) What is a privilege? Explain the different types of privileges. 5

b) What is correlated subquery? Explain with suitable example. 5

c) Explain set operators with example. 5

d) Explain roll up and cube operators with syntax and example. 5

Q. 4 Attempt ***any three*** from the following :-

a) What is transaction? Explain ROLLBACK, COMMIT and SAVEPOINT in transaction. 5

b) Explain PL/SQL Block structure. 5

c) Explain with example the %TYPE attribute. 5

d) How you can create and Display Bind variables? Explain. 5

Q. 5 Attempt ***any three*** from the following :-

a) Write a PL/SQL program to insert 3 new location_id for the country code 'IND' and city 'Mumbai' using For...loop in Locations table. (Locations: location_id, City, Country_code) 5

b) Explain %ROWTYPE attribute with example 5

c) Explain IF-THEN-ELSE statement in PL/SQL with an example. 5

d) What are cursors? Explain the classification of cursors. 5

Q. 6 Attempt ***any three*** from the following :-

a) What is stored procedure? How to create and call stored procedure? 5

b) What are advantages of using stored functions? 5

c) What is a package? How to create a package specification? 5

d) What are stored functions? Write its creation and calling example. 5

Q. 7 Attempt ***any three*** from the following :-

a) Write short note on Dynamic SQL. 5

b) Create a trigger to restrict insert into the Employee table to certain business hours, (8.00-18.00),Monday through Friday 5

c) Define triggers. Explain types of triggers. 5

d) Differentiate between BEFORE and AFTER triggers. 5

S.Y.B.Sc.(IT) Sem-III
AGJ 1st half (a) 47

System programming (old)
modern operating system (Rev)

April 2011

QP Code - VA–7143

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** from the questions **2** to **7**.
(3) **Each** question carries **equal** marks.
(4) Assume **suitable** data whenever **required**.

1. Explain the following commands with syntax and example of each :– **20**

who	cat	grep	rmdir	more
man	le	du	we	df

2. Perform the following operations :– **20**
   (a) Change the file permissions of the file new text to 666.
   (b) Display the last 20 files present in the current directory.
   (c) Display the last 20 lines from the file test1.
   (d) Create a directory mydir in the current directory.
   (e) Search all lines in a file which ends with A.

3. Answer the following :–
   (a) Explain the working of chmod command with an example. **7**
   (b) Explain in detail steps for formatting a disk. **5**
   (c) Write the syntax of if unconditional statement in Unix. Explain with an example. **8**

4. Perform the following operations :–
   (a) Create a directory called stud change to the stud directory. Verify whether you have actually changed to stud directory. Return to your original directory. **5**
   (b) Give the command to extract the logins of the people and their terminal type. **5**
   (c) Sort all the users who are logged in a file output io. **5**
   (d) Append the contents of file1 and file2 into the third file file3. **5**

5. Answer the following (Write the unix commands) :– **20**
   (a) How can you display list of all files including the hidden files ?
   (b) What do you use to forward errors to a file ?
   (c) How do you delete a file ?
   (d) What command do you have to use to go to the parent directory ?
   (e) With what command you can see your user name ?

6. (a) Explain the details about unix system architecture. **5**
   (b) What does the kernel in buffer read ahead ? **5**
   (c) List the building block primitives of unix with examples. **5**
   (d) What are the contents of a password file ? **5**

7. (a) Define sleep and wakeup with suitable example. 5
   (b) What are orphan and zombie process ? 5
   (c) State the need for umask functions. 5
   (d) How is process accounting done in unix ? 5

(REVISED COURSE)

(3 Hours) [Total Marks : 100

N.B. : (1) **All** questions are **compulsory**.
(2) Question **1**-solve any **two** questions.
(3) Draw diagrams wherever **necessary**.
(4) **Marks** are mentioned to the **right** of **each** question.

1. Answer any **two** from the following :–
   (a) Write a short note on critical-section problem. 5
   (b) Explain in brief NFS. 5
   (c) Define and explain the following terms :– 5
      (i) Assembler (ii) Linker.
   (d) Explain in brief Access Matrix. 5

2. Answer any **three** from the following :–
   (a) Give the difference between Simple Batch System and Multiprogrammed Batch System. 5
   (b) Write in short on Real Time System. 5
   (c) Explain in brief Time sharing System. 5
   (d) Define and explain following terms :– 5
      (i) Compilers (ii) Interpreters.

3. Answer any **three** from the following :–
   (a) Define and explain system calls. 5
   (b) Write a short note on operating system structure. 5
   (c) Give different types of services provided by the operating system. 5
   (d) Explain in brief virtual machine. 5

4. Answer the following :–
   (a) Explain in brief Multithreading Models. 10
   (b) Write a short note on Process Control Block. 5
   OR
   (b) Write a short note on semaphores. 5

5. Answer the following :–
   (a) Explain in brief FCFS and priority scheduling algorith with example. **10**
   (b) Write in short about semaphores. **5**

   OR

   (b) Write a short note on external fragmentation. **5**

6. Answer any **three** from the following :–
   (a) Write a short note on RAID. **5**
   (b) Explain Deadlock detection and Recovery **5**
   (c) Define file and gives its attributes **5**
   (d) Explain Disk structure. **5**

7. Answer any **three** from the following :–
   (a) Write in short on STREAMS. **5**
   (b) Explain System and Network Threats **5**
   (c) Write in brief on Access control **5**
   (d) What are the different principles of protection. **5**

S.Y.B.Sc. (I.T) Sem - III

Object Oriented Programming (old)
Object Oriented Programming with C++ (Rev)

April 2014

Con. 224-14.

(OLD COURSE)

VA-6631

(3 Hours)

[Total Marks : 100

N.B. : All questions are compulsory.

Q.1		Explain Data Abstraction and Data encapsulation in oops.	[10]
Q.2	(a)	Write a Note on Polymorphism.	7
	(b)	Swap two numbers with using and without using temporary variables in oop. Explain concept of objects and classes in oop.	8
Q.3	(a)	Differentiate between constructor and destructor.	7
	(b)	Explain the Array of objects with example.	8
Q.4	(a)	Write a program to overload arithmetic (+) operator.	7
	(b)	Explain Overloading of comparison operator with example.	8
Q.5	(a)	Write a note on destructors for derived classes.	7
	(b)	Explain multiple inheritances with example.	8
Q.6	(a)	Write a program to create a file for output and open a file for input.	7
	(b)	Explain stream operators and stream classes.	8
Q.7	(a)	Differentiate between function template and class template.	7
	(b)	Explain subclass templates with example.	8

[TURN OVER

Con. 224-14. (REVISED COURSE) VA-6631

(3 Hours) [Total Marks : 100

Note: - 1. Question No. 1 is compulsory.
2. Every question has an option.
3. All questions carry equal marks.

Q.1. Design the class Customer containing get_custInfo( ) and display_custInfo( ) as two of its methods which will be used for reading and displaying the customer information respectively. Where get_custInfo( ) will be private method. (10)

Q.2. Write any 3 from the following.
a) Differentiate between procedural & object oriented approach. (05)
b) What are the Characteristics of OOP technology. (05)
c) Define the terms Inheritance and polymorphism. (05)
d) What is object and class? Explain with example. (05)

Q.3. Write any 3 from the following.
a) What do you mean by access function? Explain. (05)
b) Explain what is a copy constructor with suitable program. (05)
C) What are the different types of constructor? Explain any two. (05)
d) Explain what is destructor with example. (05)

Q.4. Write any 3 from the following.
a) What is operator overloading? Write any 4 rules to overload operator. (05)
b) Explain what is friend class & friend function. (05)
c) Explain the different types of type conversions. (05)
d) Write a program to overload the increment and decrement operator. (05)

Q.5. Write any 3 from the following.
a) What is the difference between static and dynamic binding. (05)
b) Explain the term Virtual function and write the rules for it. (05)
c) Explain the different forms of inheritance. (05)
d) What is an abstract class? Explain. (05)

Q.6 Write any 3 from the following.
a) List the Assignment and Append operators of string. (05)
b) Write a short note on C++ exception handling mechanism. (05)
c) When do we use multiple catch blocks? Explain. (05)
d) Write the use of following functions: (05)
(i) c_str( ) (ii) substr( ) (iii) operator[ ] (iv) strcat( ) (v) strcmp( )

Q.7. Write any 3 from the following.
a) What is Function template? How it is define and call? (05)
b) Write a short note on Class Template. (05)
c) Write a short note on iterator classes. (05)
d) Explain the terms vector and stack. (05)

S.Y.B.Sc. (IT) Sem-III Logic, Discrete Mathematical Structures April 14
Logic, Discrete Mathematics (Rev) (Old)

RT–Exam.–Feb.–14–1–65

Con. 225–14. **(OLD COURSE)** **VA–6781**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from question Nos. **2** to **6**.

1. (a) State and prove DeMorgan's laws for sets. **10**
(b) Consider the Boolean polynomial $p(x,y,z) = (x \wedge y) \vee (x \vee (y' \wedge z))$. Construct truth table for function $f : B_3 \rightarrow B$ determined by this polynomial. Draw the logic diagram. **10**

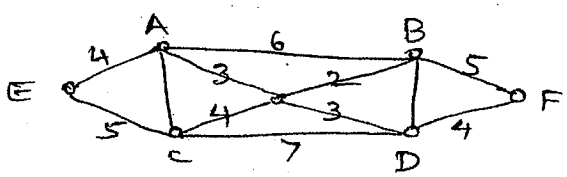
2. (a) Write a note on :– **10**
(i) Union of two sets (ii) Complement of a set.
Illustrate using Venn-diagram.
(b) What are properties of Mathematical structures ? **10**

3. (a) Show that any two equivalence classes are equal or disjoint. **10**
(b) Find R^{∞} using Warshall's algorithm **10**
$A = \{1, 2, 3, 4\}$ and $R = \{(1,1), (1,2), (2,3), (3,4)\}$

4. (a) Check if f(n) and g(n) have same order. **10**
(i) $f(n) = \log_b(n)$ and $g(n) = \log(n)$.
(ii) $f(n) = 5n^2 + 4n + 3$ and $g(n) = n^2 + 100n$.
(b) (i) Determine whether given pair of graph is isomorphic. **5**

(ii) Show that $(\mathbb{R}^+, *)$ is abelian group. $\mathbb{R}^+$ is set of all nonzero real numbers and $*$ is defined as $a * b = \frac{ab}{2}$. **5**

5. (a) Using Prim's algorithm find minimal spanning tree beginning at vertex E. **10**



(b) Let $A = \mathbb{N}$ and R be relation on A such that xRy iff $x \leq y$. Show that R is a partial order and $(\mathbb{N}, \leq)$ is a poset. **10**

6. (a) Write a note on languages and concatenation. **10**
(b) Design FSM which recognizes the language in which every sentence end with 100. **10**

Con. 225–14. **[TURN OVER**

(REVISED COURSE) **QP Code : VA-6781**

(3 Hours) **[Total Marks : 100**

N.B.: 1. **All** questions are **compulsory**.
2. **Figures** to the **right** indicate **full** marks.

Q.1 A) Answer the following in **one** line :- **5**

i) What is the value of f(392) if f is mod 7 function?
ii) What is Boolean Matrix?
iii) How to find out the relation is reflexive from M_R?
iv) What is the range for probability of any event?
v) When $p \leftrightarrow q$ is true, where p and q are any statements?

B) Let A={1, 2, 3, 4, 5, 6} and **5**

$$p = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 4 & 3 & 5 & 1 & 2 & 6 \end{pmatrix}$$

be a permutation of A.

i) Write p as a product of disjoint cycles.
ii) Compute p^2 and p^{-1}

Q.2 Attempt any THREE. **15**

A) Prove by mathematical induction that the sum of the cubes of three consecutive integers is divisible by 9.

B) In a survey of 260 college students, the following data were obtained:
64 had taken a mathematics course, 94 had taken a computer science course,58 had taken a business course, 28 had taken both a mathematics and business course, 26 had taken both a mathematics and a computer science course, 22 had taken both a computer science and a business course and 14 had taken all three types of courses. How many students were surveyed who had taken none of the three of courses?

C) Show that the following statements are logically equivalent. (use truth table)
$\sim (p \leftrightarrow q) \equiv (p \wedge \sim q) \vee (\sim p \wedge q)$

D) Using Venn Diagrams show that
i) $(A \cup B)' = A' \cap B'$ ii) $(A \cap B)' = A' \cup B'$

Q.3 Attempt any THREE. **15**

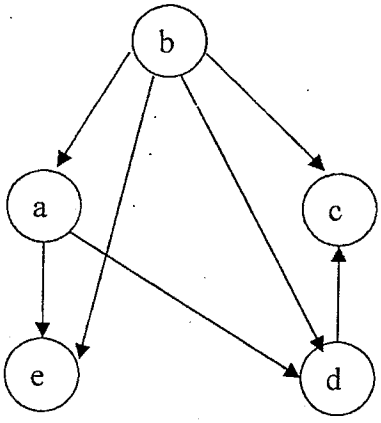
A) Let A = {1,2,3,4}. For the relation R whose matrix is given,, find the matrix of the transitive closure by using Warshall's algorithm.

$$M_R = \begin{pmatrix} 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{pmatrix}$$

B) If A = {a, b, c}, How many relations can be defined on A? How many of them are equivalence relations?

[TURN OVER

C) Find the relation determined by the diagraph and its matrix. Find indegree & outdegree of each vertex



D) Let a relation R defined on Z^+ as a R b iff a/b then prove that (Z^+, /) is a poset.

Q.4 Attempt any **Three** :- **15**

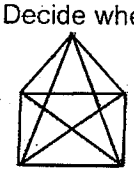
A) Six friends discover that they have a total of Rs. 2,61 with them on a trip for some outings show that one or more of them must have at least Rs. 361.

B) Find $\lfloor 2.3 \rfloor, \lceil -2.3 \rceil, \lfloor 34.67 \rfloor, \lceil -34.67 \rceil, \lfloor 2 \rfloor$

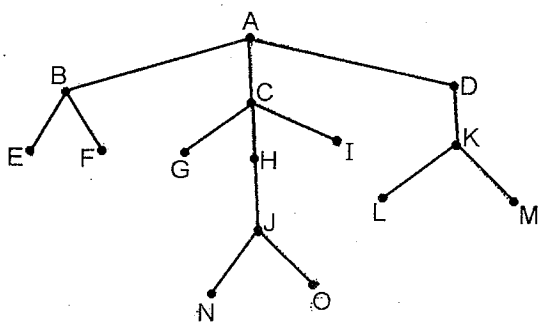
C) Let A=B=□ (set of real numbers), f and g are defined as f(a) = 2a+1, g(b) = b/3 then verify that $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$

D) Explain injective and surjective functions with examples.
Attempt any THREE.

Q.5 A) Decide whether the graph is Eulerian, Hamiltonian or both. **15**



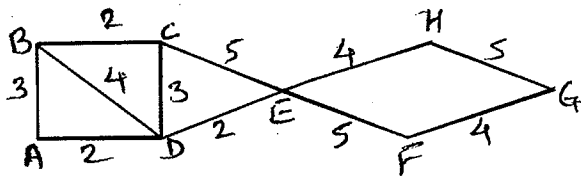
B) Consider the tree & answer the questions.



i)Root of the tree, ii) Siblings of G, iii) Height of the tree ,iv) List all leaves, v) Descendants of C

C) Evaluate the following expression in reverse polish form.
1 2 3 ^ + 1 2 3 + + -

D) Use Prim's algorithm to find a minimal spanning tree for the connected graph G given below. Use E as the initial vertex.

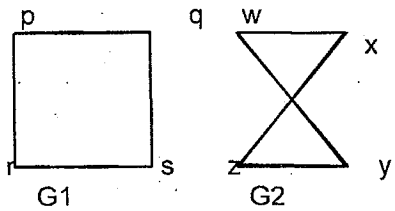


Q.6 Attempt any **three** :- **15**

A) Determine whether the set □ together with the binary operation is a group. If it is a group, determine if it is Abelian; specify the identity and the inverse of a generic element. Where a * b=a+b+2, a,b ∈ □

B) Let Q be the set of rational numbers and define a * b = a + b - ab
Is (Q, *) a monoid? Justify your answer.

C) Determine whether the following two graphs G1 & G2 are Isomorphic.



D) Prove that (F, +, .) is a field, where F = { a + b√2 | a, b are rational numbers}
Attempt any THREE.

Q.7 A) Use the technique of backtracking to find an explicit formula for the sequence defined by the recurrence relation and initial condition(s). **15**

$d_n = -1.1d_{n-1}$, $d_1 = 5$

B) Find the generating function for $a_k = 2 + 3k$

C) Solve the recurrence relation $b_n = 2b_{n-1} - 2b_{n-2}$, $b_1 = 1$, $b_2 = 4$

D) Solve the recurrence relation by method of generating function $a_{n+2} - 5a_{n+1} + 6a_n = 2$, $a_0 = 1$, $a_1 = 2$

B.Sc (IT) Sem-III Computer Networks (Old) Computer Graphics (Rev) January 201

36 : 2nd half.13-Avi(bf)

Con. 292-13.

BA-1134

(OLD COURSE)

(3 Hours)

[Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the **remaining**.
(3) Draw neat **diagrams** wherever **required**.

1. (a) Describe OSI reference model with neat diagram. (10)

(b) Explain in detail star and bus topologies. What are the advantages of star topology over bus topology? Which type of network Used star topology? (10)

2. (a) What is checksum? List the steps involved in creating a checksum. (10)

(b) What are two types of Line Configurations? (10)

3. (a) What is transmission media? Explain coaxial cable with diagram. (10)

(b) Explain the difference between stop and wait and sliding window flow control protocol. (10)

4. (a) What is TCP? Explain TCP system in detail. (10)

(b) Write the short note on interconnecting devices such as bridges, hubs, switches, routers and gateways. (10)

5. (a) Describe High level Data Link Control and its operation. (10)

(b) What is IP? Explain IPV4 datagram header in detail. (10)

6. (a) What is cryptography? Explain the importance of digital signature. (10)

(b) What is DNS and resource encoding? Explain how DNS servers work? (10)

7. Write short notes on : (20)

1. Frame Relay
2. Circuit and Packet switching.
3. Distributed system examples and goals.
4. X.25 protocol.

[TURN OVER

Con. 292-13. **(REVISED COURSE)** **BA-1134**

(3 Hours) **[Total Marks : 100**

(**N.B. : All** questions are **compulsory**.)

Q. 1		
1	Describe the DDA line drawing algorithm. Calculate the pixel positions along straight line between (5, 5) and (10, 8).	5M
2	What are different types of surface representation	5M
Q. 2	**Attempt any three :-**	
1	Write a short note on Raster Scan Display?	5M
2	Define Computer graphics and list down the applications of computer graphics	5M
3	Explain the working principle of CRT	5M
4	Explain the steps for midpoint circle generation algorithm.	5M
Q. 3	**Attempt any three :**	
1	What is mean by homogeneous co-ordinates?	5M
2	Write down the 2-D transformation matrix for Translation and Rotation	5M
3	Find the 2D-transformation matrix that transforms the given square ABCD to half its size with the center still remaining at the same position. The coordinates of the square are A (1, 1), B (3, 1), C (3, 3) and D (1, 3) and center at (2, 2). Also find the resultant coordinates of the square.	5M
4	Define the shear effect and give shear transformation	5M
Q. 4	**Attempt any three :**	
1	Does 3D Rotation commutative? Justify the answer	5M
2	Write a short note on 3D Scaling	5M
3	Write a short note on parallel projection. How does it differ from perspective projection?	5M
4	What is mean by device co-ordinates?	5M
Q. 5	**Attempt any three :**	
1	Write a short note on inside/outside test. And give a situation when inside/outside test fails.	5M
2	Develop a function/procedure which performs line clipping using Cohen Sutherland method, how line between (2, 2) and (12, 9) is clipped against window with (Wxmin, Wymin)=(4, 4) and (Wxmax, Wymax)=(9, 8)	5M
3	Write the procedure for seed fill algorithm	5M
4	What is windowing and clipping?	5M
Q. 6	**Attempt any three :**	
1	Define Bezier curve and state the property of it	5M
2	What are namable and unnamable curve	5M
3	What are fractals? State its properties	5M
4	Explain basic concepts of painter's algorithm	5M
Q. 7	**Attempt any three :**	
1	Write a short note on Polygon mesh shading	5M
2	Write a short note on morphing. List its advantages	5M
3	Write short note on ray casting	5M
4	What is shading and explain the concept of flat shading	5M

S.Y.B.Sc. (I.T) Sem-III Computational Mathematics (old) Advanced SQL (Rev) January 2014

Ash9-D:\Data-15

Con. 293-13.

BA-1296

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory.**
(2) Attempt any **four** questions from questions **2** to **6.**
(3) **All** questions carry **equal** marks.

1. (a) Fit a parabola of second degree $y = a + bx + cx^2$ for the data :– **10**

x	0	1	2	3	4
y	1	1·8	1·3	2·3	2·3

(b) Use Lagrange's interpolation formula to fit the polynomial for the data :– **10**

x	0	1	3	4
y	–12	0	6	12

* Estimate y at $x = 2$.

2. (a) By using Bisection Method find positive root of the equation $x^3 - 5x + 1 = 0$ upto 4 iterations. **10**

(b) Use Taylor's Method to obtain the solution of $\frac{dy}{dx} = x^2 - y^2$ given $y(0) = 1$ and also find $y(0\cdot1)$ and $y(0\cdot2)$. **10**

3. (a) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Trapezoidal rule. Take $h = 1$. **10**

(b) Find a real root of the equation $e^x = 4x$ by Newton Raphson Method correct upto 4 decimal places. (take $x_0 = 1$). **10**

4. (a) Solve the following LPP equation to maximize $z = 5x + 10y$ subject to constraints :– **10**

$$5x + 8y \le 40$$
$$3x + y \le 12$$
$$x, y \ge 0$$

by Graphical Method.

(b) Evaluate $\int_0^2 e^x\,dx$ by using Simpson's $\frac{1}{3}$rd and $\frac{3}{8}$th rule. Take $h = 0.5$ **10**

[TURN OVER

5. (a) Solve $\frac{dy}{dx} = 2x + y$, $y(0) = 1$ by Euler's modified method take $h = 0.2$ find $y(0 \cdot 2)$ and $y(0 \cdot 4)$. **10**

(b) Find a root of the equation $x^3 + 2x^2 - 3 = 0$ correct upto 3 decimal places by using Regula Falsi Method. **10**

6. (a) Solve $2x + y + z = 12$, $3x + 2y + 2z = 8$, $5x + 10y - 8z = 10$ by using Gauss Elimination Method. **10**

(b) Fit a straight line by using least square method for the following data :– **10**

x	0	5	10	15	20	25
y	12	15	17	22	24	30

Con. 293-13. **BA-1296**

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : **All** questions are **compulsory**.

1. Attempt the following :–

(a) Explain inner join and outer join with example. **5**

(b) Write SQL statement for the customer. **5**

(Emp_Id, Emp_Name, Contact_No, Salary).

(i) Display employee Id with salary

(ii) List all employee's name starts with 'P'

(iii) Display employee name in descending order

(iv) Display name of employee having maximum salary.

2. Attempt any **three** from the following :–

(a) Explain Primary key and Foreign key with example. **5**

(b) Explain group by clause with examples. **5**

(c) Explain Synonyms and Indexes in detail. **5**

(d) What are views ? What are its advantages ? **5**

3. Attempt any **three** from the following :–
   (a) State and explain date time functions in SQL. 5
   (b) Explain sub queries in FROM clause with example. 5
   (c) Explain set operators with example. 5
   (d) Explain Cube and Rollup with example. 5

4. Attempt any **three** from the following :–
   (a) Explain PL/SQL block syntax. 5
   (b) What is identifier ? Explain declarative section. 5
   (c) What is PL/SQL ? Give advantages of PL/SQL. 5
   (d) Explain sequences in PL/SQL expressions. 5

5. Attempt any **three** from the following :–
   (a) Explain exception handling with PL/SQL. 5
   (b) Explain % NOTFOUND and % ROWCOUNT attribute with example. 5
   (c) How to insert and update records with PL/SQL. 5
   (d) Explain Loop statements with example. 5

6. Attempt any **three** from the following :–
   (a) What is package ? Explain advantage of packages. 5
   (b) Write PL/SQL function to find out factorial of given number. 5
   (c) How to create, call and remove stored procedure ? 5
   (d) What are the advantages of stored procedure and function ? 5

7. Attempt any **three** from the following :–
   (a) Explain what are Business Application Scenarios for Implementing Triggers. 5
   (b) What is trigger ? Explain the various components of a trigger. 5
   (c) Explain what are row, statement and after / before trigger. 5
   (d) What are the system privileges required to manage triggers ? 5

S.Y.B.Sc (IT) System Programming (old) January 2014
Sem-III Modern Operating System (Rev)

Exam.–Con No.–Oct.–13–4

Con. 294–13. **(OLD COURSE)** **BA–1146**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Question Nos. **2** to **7**.

Q1	a) Explain in detail about the UNIX Operating system Architecture. b) Explain the file Structure in Unix System. c) What is inode? What does it contain?	8 7 5
Q2	a)Explain the following commands with syntax 1)cat 2) mv 3) diff 4) grep 5) ps 6)cmp 7)wc 8)sort b) Explain the redirection operator in UNIX with example. c) Write the "C" program display sum of all odd number from 1 to 100.	8 7 5
Q3	a) What is shell? Explain the various types of Shell. b) Explain the following with respect of shell programming with suitable example. 1) Looping Statement. 2) Conditional Statement. c) Write a shell script to display a Fibonacci series of any number entered through keyboard.	8 7 5
Q4	a) What are the file permissions available with respect to a file in UNIX? What is the command used to change the file permissions? b) Describe the various phase and component involved during the "C" compilation program. c) Write a short note on characteristics of good password.	8 7 5
Q5	a) Explain the telnet and ftp command. b) With an example explain some of the common environment variables. c) What is mean by command line argument? How to use the command line argument?	8 7 5
Q6	a) Explain the following commands with an example and different options 1)cal 2) calendar 3) date 4) echo5) banner 6) bc 7) passwd 8) who b) Explain the different modes of vi editor with a neat diagram c) Explain the syntax of awk command	8 7 5
Q7	a) Explain the different states of the process with help of diagram b) Explain parents and children with respect to a process c) What is meant by semaphores?	8 7 5

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

(N.B. : All questions are **compulsory)**

Q.1 Attempt the following : (10M)
1.Write a note on Compilers and Interpreters (5M)
2.Explain handheld system (5M)

Q.2 Attempt any 2 from the following : (15M)
1. Write a note on Distributed system (7M)
OR
2. Explain Clustered system. (7M)
3. Explain multiprocessor system and its advantages (8M)

Q.3 Attempt any 2 from the following : (15M)
1. Explain Operating system services (7M)
OR
2. Explain different type of system calls (7M)
3. Explain operating system generation (8M)

Q.4 Attempt any 2 from the following (15M)
1. Explain PCB (7M)
OR
2. What are different processes State (7M)
3. What are different benefits of threads? (8M)

Q.4 Attempt any 2 from the following : (15M)
1. Explain difference between logical and Physical Addressing (7M)
OR
2. Explain multithreading models (7M)
3. Explain Swapping (8M)

Q.5 Attempt any 2 from the following : (15M)
1. Explain Memory management without swapping (7M)
OR
2. Explain Thrashing (7M)
3. Explain paging (8M)

Q.6 Attempt any 2 from the following : (15M)
1. Explain type of file (7M)
OR
2. What are different file access methods (7M)
3. Explain different deadlock prevention method (7M)

Q.7 Attempt any 2 from the following : (15M)
1. What are different Principles of protection (7M)
OR
2. What are the different Security problems (7M)
3. How to implement security defenses. (8M)

S.Y.B.Sc. (I.T) sem-III object oriented programming (old) January 2014
object oriented programming with C++ (Rev)

RT–Exam.–Con No.–Oct.–13–1

Con. 295–13. **(OLD COURSE)** **BA–1032**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Question Nos. **2** to **7**.

Q.1. a) Differentiate between procedural and object oriented approach. (10)
b) Applications of object oriented programming. (10)

Q.2. a) What is object and class? Explain with example (10)
b) Write a program using friend function. (10)

Q.3. a) What are the different types of inheritance explain with diagram. (10)
b) What is pure virtual functions explain with example. (10)

Q.4. a) What is class templates? Write a program to demonstrate the need of Class templates. (10)
c) What is Exception handling. (10)

Q.5. a) Write a program using single inheritance. (10)
b) Write a program using static data member. (10)

Q.6. a) What is function Templates? (10)
b) Write a program using function templates. (10)

Q.7. a) Write a program to overload the operator unary. (10)
b) What is copy constructor? Write a program to demonstrate copy constructor. (10)

[TURN OVER

Con. 295–13. **2** **BA–1032**

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

(N.B. : All questions are **compulsory)**

Q1.	Attempt the following :–	
	A. Define the following terms with example: i) Object ii) Class	(5)
	B. Design an employee class for reading and displaying the employee information, the getInfo() and displayInfo() methods will be used respectively. Where getInfo() will be private method.	(5)
Q2.	Attempt any 3 from the following:-	
	A) What are the features of Object Oriented Programming? Give any two applications.	(5)
	B) Distinguish between Procedure Oriented Programming and Object Oriented Programming.	(5)
	C) Explain polymorphism with example.	(5)
	D) D) Explain the following characteristics of OOP a. i) Encapsulation ii) Reusability	(5)
Q3.	Attempt any 3 from the following:-	
	A) What is static function? How do we declare a member of a class static?	(5)
	B) Explain dynamic constructor with example.	(5)
	C) What is class destructor? Explain.	(5)
	D) What is constructor? State the characteristics of constructor in OOP.	(5)
Q4.	Attempt any 3 from the following:-	
	A) Explain the concept of operator overloading?	(5)
	B) Write a friend function for adding the two different subject marks and display its sum, using two classes.	(5)
	C) Overload the operator unary(++) for demonstrating operator overloading.	(5)
	D) Design a class shape containing the methods area() and volume() and also overload the area() function .	(5)
Q5.	Attempt any 3 from the following:-	
	A) What is inheritance? Explain multiple inheritance and multilevel inheritance with example.	(5)
	B) Explain protected versus private member access mode.	(5)
	C) Explain the following terms in brief i) Virtual class function.ii) Abstract class	(5)
	D) Explain the different types of File mode.	(5)

S.Y.B.Sc. (IT) Sem-III Logic, Discrete Mathematical Structures (Old) January 2014
Logic, Discrete Mathematics (Rev)

Con. 296-13. **BA-1482**

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Question Nos. **2** to **7**.
(3) **Figures** to the **right** indicate **full** marks.
(4) **Each** question carries **20** marks.

1 (a) Answer the following in **one** line :– **5**

(i) What is the value of $\lceil -9{\cdot}9 \rceil$?

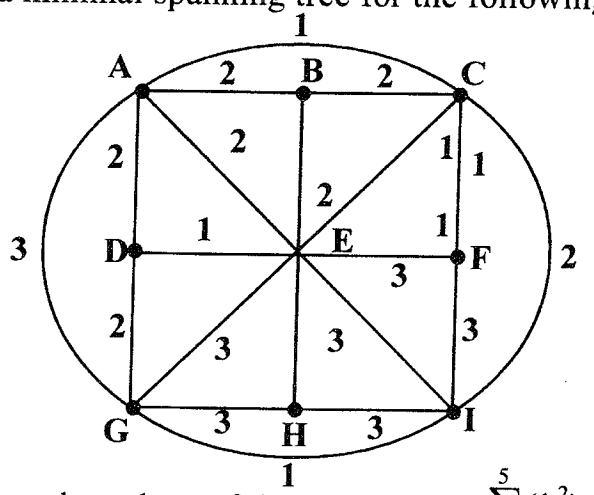
(ii) What is inverse of the statement $r \rightarrow s$?

(iii) Write the formula for extended Pigeonhole principle.

(iv) When $p \rightarrow q$ is true, where p and q are any statements ?

(v) If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$; $B = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix}$ compute A B

(b) Find a minimal spanning tree for the following weighted graph :– **5**



(c) What are the values of these sums ? i) $\sum_{k=1}^{5}(k^2)$ ii) $\sum_{j=0}^{4}(-2)^j$ **5**

(d) Draw the Hasse diagram of the following :– **5**

$D_{30} = \{1, 2, 3, 5, 6, 10, 15, 30\}$

2. (a) Prove the statement is true by using mathematical induction. **5**

$$1^2 + 3^2 + 5^2 + \ldots.. + (2n-1)^2 = \frac{n(2n+1)(2n-1)}{3}.$$

(b) Solve the recurrence relation $a_n = 4a_{n-1} + 5a_{n-2}$, $a_1 = 2$, $a_2 = 6$ **5**

(c) Let $S = \{1, 2, 3, 4, 5\}$ and $A = S \times S$. Define the following relation R on A: (a, b) R (a′,b′) if and only if a b′ = a′ b. **10**

(i) Show that R is the equivalence relation, (ii) Compute A/R.

[TURN OVER

3. (a) Use the structure $R = [M, +, *, T]$ where M is the set of matrices of the form $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$. Find for which operation R is closed. **5**

(b) Two cards are drawn at random from a deck of 52 cards. Find the probability that :– **5**

(i) one is red and other is black

(ii) one is spade and other is heart

(iii) both are face cards.

(c) Let f, g and h are functions form R to R defined as **10**

$f(x) = 2x^3 - 7$, $g(x) = 3x^2$ and $h(x) = 5x + 4$.

find :–

(i) $((g \circ f) \circ h)(l)$

(ii) $(f \circ g)(2)$

(iii) verify that $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$

4. (a) Let R be a relation on A= {1, 2, 3, 4}, R = {(1, 1), (1, 3), (2, 4), (3, 1), (3, 3), (4, 3)}. Find the transitive closure, by Warshall's Algorithm for this relation. **10**

(b) Construct the tree of the following algebraic expression and give the arrays LEFT, DATA and RIGHT describing the tree. ((2∗x)+(3–(4∗x)))+(x–(3∗11)) **10**

5. (a) Let M be the FSM with following state table :– **10**

	a	b
S_0	S_2,y	S_1,z
S_1	S_2,x	S_3,y
S_2	S_2,y	S_1,z
S_3	S_3,z	S_0,x

(i) Find the input Set I, the state S, the output set O and the initial state.

(ii) Draw the state diagram D = D(M) of M.

Suppose u = aababaabbab is an output word. Find the sequence v and the output word w.

(b) Let $(A, \leq)$ and $(B, \leq)$ are posets, prove that $(A \times B, \leq)$ is a poset with partial order $\leq$ defined by $(a, b) \leq (a', b')$ if $a \leq a'$ in A and $b \leq b'$ in B. **10**

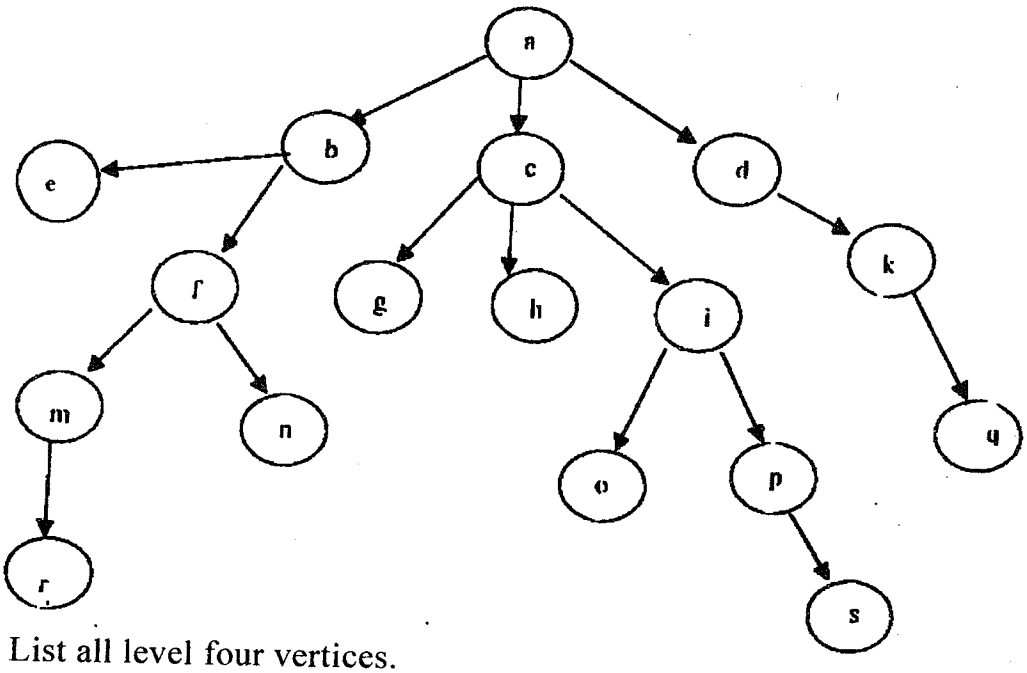
6. (a) If R be a relation on Z defined as $(x, y) \in R$ iff $3x + 5y$ is divisible by 8. Show that R is an equivalence relation. **10**

(b) Solve the following recurence relations :– **10**

(i) by the method of Characteristic roots, $b_n = 4b_{n-1} - 4b_{n-2}$, $b_1 = 1$, $b_2 = 7$.

(ii) by method of Generating functions $a_n = 3a_{n-1} + 4$, $a_0 = 5$.

7. (a) Consider the rooted tree (T, a) and answer the questions : **10**



(i) List all level four vertices.
(ii) List all leaves.
(iii) List siblings of c.
(iv) List offsprings of c.
(v) List descendants of c.
(vi) Compute T (f).
(vii) Compute (T, c).
(viii) What is height of (T, a) ?
(ix) What is height of T (f) ?
(x) What is the minimal number of vertices that would need to be added to make (T, a) a complete 3-tree ?

(b) Let A = {a, b, c, d, e, f, g, h} and let R be the relation defined by :– **10**

$$M_R = \begin{bmatrix} 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$$

(i) Show that (A, R) is a poset
(ii) Does the poset (A, R) have least element ? A Greatest element ? If so, identify them.
(iii) Show that the poset (A, R) is complimented and give all pairs of complements.
(iv) Prove or disprove that (A, R) is a Boolean Algebra.

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) **All** questions are **compulsory**.
(2) **In each** question from question No.**2** to question No.7, subquestion **(a)** is **compulsory** and attempt any **one** from subquestion **(b)** and **(c)**.
(3) **Figures** to **right** indicate **full** marks.

1. Answer any **one** of the following :– **10**

(a) Let R be an equivalence relation on 'A'. Show that $A = \bigcup_{a \in A} [a]$ where [a] denotes equivalence class of $a \in A$. Further, show that any two equivalence classes are equal or disjoint.

(b) Show that the number of vertices of odd degree in a graph is always even. **10**

2. (a) State and prove De Morgan's Laws for sets. **8**

(b) Compute the truth table of : $(p \Rightarrow q) \Leftrightarrow (\sim q \Rightarrow \sim p)$ **7**

(c) Prove that product of two consecutive integres is divisible by 2. **7**

3. (a) Suppose R and S are relations from A to B. Then show that :– **8**

(i) $(R \cap S)^{-1} = R^{-1} \cap S^{-1}$

(ii) $(R \cap S)^2 \subseteq R^2 \cap S^2$

(b) State and prove any four properties of lattices. **7**

(c) Determine the Hasse diagram of the relation on A = {1, 2, 3, 4} whose matrix is **7**

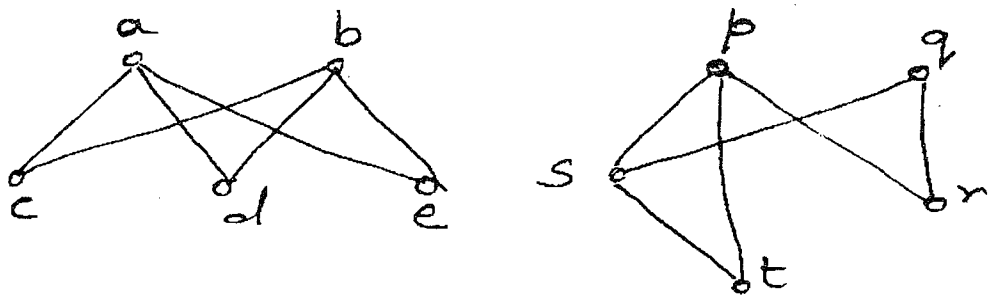
$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 \end{bmatrix}$$

4. (a) Show that $f : \mathbb{R} \rightarrow \mathbb{R}$ defined as $f(x) = 3x-1$ is bijective. Further, find g o f and f o g if $f : \mathbb{R} \rightarrow \mathbb{R}$ is defined by $f(x) = x+1 \ \forall x \in \mathbb{R}$ and $g : \mathbb{R} \rightarrow \mathbb{R}$ is defined by $g(x) = x^2 \ \forall x \in \mathbb{R}$. Check if f o g = g o f. **8**

(b) State Pigeon-hole principle. Show that if any five numbers from 1 to 8 are chosen, then two of them will add to 9. **7**

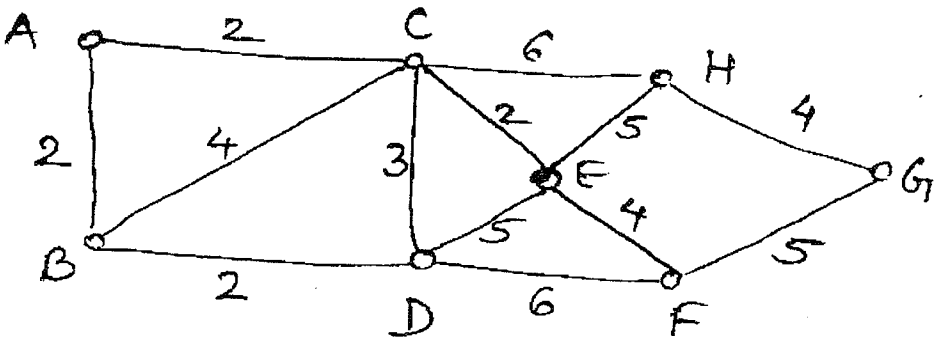
(c) Check whether the binary operation $*$ is commutative and associative if $*$ is defined as $a * b = 2a + 2b - 8$ for $a, b \in \mathbb{Z}$. **7**

5. (a) Check if following graphs are isomorphic :– **8**



Further, write incidence matrix for both the graphs.

(b) Find Hamiltonian cycle of minimal weight. **7**



(c) Write a note on Kruskal's algorithm to find minimal spanning tree in a graph. **7**

6. (a) R^+ is set of all non–zero real numbers and $*$ is defined as $a * b = \frac{ab}{2}$. Show that $(R^+, *)$ is an abelian group. **8**

(b) Show that every subgroup of an abelian group is normal subgroup. **7**

(c) Show that Z[i] is an integral domain but not a field. **7**

7. (a) Find sum of :– **8**

(i) First 20 natural numbers.

(ii) 3 + 5 + 7 + -------- +53.

(b) Solve the recurrance relation $a_n + a_{n-1} - 6a_{n-2} = 0$ where, $n \geq 2$, $a_0 = -1$, $a_1 = 8$. **7**

(c) Determine coefficient of x^7 of generating function $(1+3x)^{-9}$. **7**

F.Y B.Sc. (IT) Sem-II Electronics & Tele communication systems (old). Sept 2013

Microprocessor and Microcontrollers. (Rev)

VT-S.H. Exam. Aug.(I)-13-1

Con. 253–13. **OY–1225**

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** questions from Q. Nos. **2** to **7**.

1. (a) Define Multiplexing. Explain Frequency Division Multiplexing. **10**
   (b) Explain PAM and PPM system in detail. **10**

2. (a) Explain Monostable Multivibrator using IC 555 timer. **10**
   (b) Explain Emitter stabilized biased circuit with suitable diagram. **7**
   (c) Define conductor, insulator and semiconductor. **3**

3. (a) Explain SSB System. Write its advantages and disadvantages. **8**
   (b) Explain the Frequency Response of RC Coupled Amplifier. **6**
   (c) Explain the half wave Rectifier circuit. **6**

4. (a) State and explain Norton's Theorem. **6**
   (b) Derive the Relation for Power Content in AM Waves. **7**
   (c) Differentiate Between NPN and PNP Transistor. **6**

5. (a) Explain the Concept of Balanced modulator. **7**
   (b) Differentiate between Positive feedback and Negative feedback. Explain the RC phase shift oscillator. **10**
   (c) State and explain KVL. **3**

6. (a) Explain optical fiber and its properties. **6**
   (b) Explain pulse Code modulation system and Delta modulation in detail. **8**
   (c) Explain independent Side Band transmission system. **6**

7. (a) Explain Voltage Regulation Characteristics of a Zener diode. **7**
   (b) Explain Transistor as a switch. **7**
   (c) State and explain Thevenin's Theorem. **6**

[TURN OVER

(REVISED COURSE)

(3 Hours) [Total Marks : 100

(N.B. : All questions are compulsory.)

1. (a) Give classification of memory. 10
   (b) What is latch ? Describe its function.

2. Attempt any **three** of the following :– 15
   (a) Distinguish between SRAM and DRAM.
   (b) Explain encoder with suitable example.
   (c) Explain tri-state buffer in detail.
   (d) Explain related to memory :–
      (i) Expanding memory, (ii) Expanding ward size.

3. Attempt any **three** of the following :– 15
   (a) State functions of ALU of 8085.
   (b) What is flag ? List and Describe the flags of 8085.
   (c) Write short note on 8085 Address, Data and Control Bus.
   (d) State and decribe the interrupt signal available in 8085.

4. Attempt any **three** of the following :– 15
   (a) Cassify the instructions on the basis of byte length with example.
   (b) Write an assembly language program to find the smallest number from memory block starting from 2000 H to 2005 H and store largest number in 2020 H.
   (c) Explain following instructions in 8085 :–
      (i) ADI Data 8 (iv) J-condition address
      (ii) STAX rp (v) RAR.
      (iii) ANA r
   (d) Explain the programming model of 8085.

5. Attempt any **three** of the following :– 15
   (a) What is the benefits of Raid ?
   (b) What is cache memory ? Why it is needed ?
   (c) What is fetch, Execute and Instruction cycle ?
   (d) Explain the features of PCI Bus.

6. Attempt any **three** of the following :– 15
   (a) Explain the features of 8051 micro-controller.
   (b) Explain all 8051 flags of micro-controller.
   (c) Explain the operations of stack in 8051 micro-controller.
   (d) Explain how will you select internal memory bank with suitable example.

7. Attempt any **three** of the following :– 15
   (a) Explain the features of Input/output ports of 8051.
   (b) Explain various addressing modes of 8051.
   (c) Explain the following instructions of 8051 :–
      (i) MOVX A_1 Rp (iv) MUL AB
      (ii) INC A (v) RLA.
      (iii) Add R_1 Rr.
   (d) Write a program to perform in 8051 BCD addition of two-8bit numbers. Data is stored in data memory location 51H, 52H and store the result in data memory. Location 53H and carry in 54H.

****

Fy.Bsc.(IT) Design and Analysis of Algorithms (Old) Sept 13
Sem-II Web Technologies (Rev)

D : PH (April Exam) 396

Con. 252-13.

OY-1168

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions between Question Nos. **2** to **7**.
(3) **Figures** to the **right** indicate **full** marks.

Q.1. a) Explain the term Algorithm with its Characteristics? 07
b) Explain what is an Array with its types? 08
c) Write a program for Bubble Sort. 05

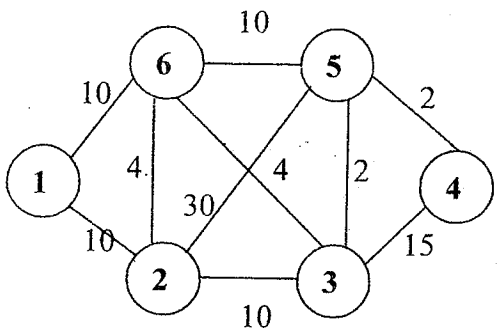
Q.2. a) Explain Binary Search with its algorithm & program. 10
b) Define Stack. Explain push and pop operations performed on stack. 10

Q.3. a) Draw & Explain Tree Terminology. 07
b) Explain Depth first search and Breadth first search method with example. 08
c) Write a program of Linear Search for Sorted List. 05

Q.4. a) Explain Divide and Conquer General Method. 10
b) Explain double-headed linked list with algorithm. How to insert and delete an element from linked list. 10

Q.5. a) Explain what is Merge sort & Solve this example using merge sort. 06
38, 27, 43, 3, 9, 82, 10
b) Write a short note on Graph coloring. 04
c) Explain Greedy method with suitable algorithm. 10

Q.6. a) Find the Minimum Cost Spanning tree for the graph given below: - 10



b) Give prefix and postfix notation for the following infix notation: - 10
(i) (A+B) * (C – D)
(ii) (A+ (B * C)) / (C – (D * B))

Q.7. a) Write Strassen's Matrix Multiplication algorithm. 10
b) Write short notes on: - 10
(i) Back Tracking.
(ii) Game Tree.

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. (1) **All** question are **compulsory.**
(2) Start **New** question on **New Page.**

Q. 1. Attempt both the questions: 10
A) What is Internet? And explain its applications.
B) What is a Cookie in PHP? Explain.

Q. 2. Attempt any three: (5 marks each) 15
A) Explain the following with respect to Internet:
i) E-Commerce
ii) Video Conferencing
B) Explain WWW and its evolution.
C) Write a short note on Web Servers.
D) Explain ISP and DNS.

Q.3. Attempt any three (5 marks each) 15
A) Explain the following tags with example:
i) <a>
ii) <font>
iii) <input>
iv) <frame>
B) What are ImageMaps? Explain with an example.
C) Explain Table tag in details. With an Example.
D) Create a Biodata form in HTML to take values for Name, Password, Mobile No., Address, Hobbies. The form should contain Submit and Reset button.

Q.4. Attempt any three (5 marks each) 15
A) Write a JavaScript program to find the Fibonacci series for given number.
B. Explain the following event handlers:
i) onClick
ii) onLoad
iii) onMouseOver
C) Write a JavaScript program to find the no, is prime or not.
D) Explain Switch and if....else loops with an example.

Q.5. Attempt any three: (5 marks each) 15
A) How to create XML document?
B) What is DTD? Explain with an example.
C) Create a DTD for the following XML document:

```
<?xml version= "1.0" encoding=" ISO–8859–1"?>
<note>
<to>Tove</to>
<from>Jani</from>
<heading>Reminder</heading>
<body>Don't forget me this weekend!</body>
</note>
```

D) Write a short note on XML Schemas.

Q.6. Attempt any three:(5 marks each) 15

A) Write a PHP program to display the Username and Print "Welcome <Username>!".

B) Explain different types of arrays in PHP.

C) Explain arrays function in PHP.

D) Write a PHP program to print "Happy Weekend" if it's a Weekend. Or print "Have a Nice Day" if it's not a weekend.

Q.7. Attempt any three:(5 marks each) 15

A) Write a PHP program to create a Table "tblEmployee" and insert the values for EmpId, EmpName,EmpAddress,EmpDept. (insert atleast 3 records).

B) Display the records which are inserted in the above table in the PHP page in tabular format.

C) What is a Session in PHP? Explain.

D) How to construct E-Mail in PHP? Explain.

F.Y. B.Sc (IT) Mathematics - II (Old) Sept. -13
Sem II Applied Mathematics - II (Rev)

D : PH (April Exam) 393

Con. 251-13. **OY-1155**

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Question Nos. **2** to **7**.
(3) **Figures** to the **right** indicate **full** marks.

1.a) Find Laplace Transform of the following. 10
(i) t^2-2t+3
(ii) cos5tsin3t

b) Prove that $\int_0^\infty \frac{e^{-ax}-e^{-bx}}{x}dx = \log(\frac{b}{a})$ 10

2.a) Express sin5Θ and cos5Θ interms of sinΘ and cosΘ 10

b) Using De Moivres Theorem prove that $\sin 7\theta = 7\sin\theta - 56\sin^3\theta + 112\sin^5\theta - 64\sin^2\theta$ 10

3.a) Evaluate $\int_0^3 \int_0^{\sqrt{4-x}} (x+y)dy\,dx$ 10

b) Evaluate $\int_0^1 \int_{x^2}^{x} \frac{1}{\sqrt{x^2+y^2}} dxdy$ 10

4.a) Evaluate $\frac{(1+i\sqrt{2})^{14}}{(\sqrt{2}-i)^{15}}$ 10

b) Obtain the fourier series for $f(x)= e^{-x}$ in the interval $0<x<2\Pi$ 10

5.a) Evaluate $\int_0^\infty e^{-4x^2}dx$ 10

b) Find the volume of solid S,where S is the interior of sphere $x^2+y^2+z^2=a^2$ 10

6.a) Evaluate $\int_C \frac{2z-1}{z(z+1)(z-3)}dz$ where C is the circle $|z|=2$. 10

b) Prove that $\int_0^\infty e^{-x^2}dx= \sqrt{\frac{\Pi}{2}}$ 10

7.a) $\int_0^1 \frac{x^\alpha - x^\beta}{\log x}dx$ by using D.U.I.S ($\alpha, \beta \geq 0$) 10

b) Evaluate $\int_0^{1+i} z^2 dz$ along the paths 10
(i) parabola $y=x^2$
(ii) line $y=x$

xxxxxxxxxxxxxxxxxxxxxx

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. (1) **All** questions are **compulsory**.
(2) **Figures** to the **right** indicate **full** marks.

Q.1] Attempt any one:

(a) If $|z+i| = |z|$ $\arg\left(\frac{z+i}{z}\right) = \frac{\pi}{4}$ and find z. [10]

(b) Verify the Leibnitz rule of D.U.I.S. for the integral

$I = \int_0^\infty e^{-at} \cos bt \, dt$ where 'a' is the parameter. [10]

Q.2] Attempt any three:

(a) Prove that $\log\left(\frac{x-iy}{x+iy}\right) = -i\cos^{-1}\left(\frac{x^2-y^2}{x^2+y^2}\right)$. [5]

(b) Using De' Moivre's theorem prove $\cos 4\theta = \cos^4\theta - 6\cos^2\theta\sin^2\theta + \sin^4\theta$. [5]

(c) Prove that : $\cosh^{-1}\left(\sqrt{1+x^2}\right) = \tanh^{-1}\left(\frac{x}{\sqrt{1+x^2}}\right)$. [5]

(d) If sum of two complex numbers is 8 and their product is 20 then find them. [5]

Q.3] Attempt any three:

(a) Evaluate $\int_{-\infty}^{\infty} \frac{x^2}{(x^2+1)(x^2+4)} dx$ [5]

(b) Estimate $\int_{1+i}^{4+2i} (x-2y+iy)dz$ along the parabola $y^2 = x$. [5]

(c) Find the bilinear transformation which maps 0, i and ∞ to 1, 0 and -1. [5]

(d) Determine where $f(z) = \log z$ is analytic and find $f'(z)$. [5]

Q.4] Attempt any three:

(a) Evaluate the area of the region R which is bounded by the parabolas $y^2 = 9-3x$ and $y^2 = 9-x$. [5]

(b) Find the volume of the solid S which is bounded below by the paraboloid $z = x^2 + y^2$ and above by the plane $z = 2y$. [5]

(c) Evaluate $I = \int_0^1 \int_{-\sqrt{x-x^2}}^{\sqrt{x-x^2}} (x^2+y^2)dydx$ [5]

(d) Evaluate $I = \int_0^{2\pi} \int_0^{\frac{\pi}{4}} \int_0^{a} r^2 \cos\theta \, dr \, d\theta \, d\phi$. [5]

Q.5] Attempt any three:

(a) Show that $\int_0^{\infty} 7^{-4x^2} dx = \frac{\sqrt{\pi}}{4\sqrt{\log 7}}$. [5]

(b) Show that erf(x) is an odd function. [5]

(c) Show that $\int_0^1 \frac{x^3 - 2x^4 + x^5}{(1+x)^7} dx = \frac{1}{960}$. [5]

(d) Evaluate $\int_0^1 \sqrt[4]{x} e^{-\sqrt{x}} dx$. [5]

Q.6] Attempt any three:

(a) Find the Laplace transform $te^{2t} \sin 2t \cos t$. [5]

(b) Evaluate $\int_0^{\infty} \frac{e^{-t} - e^{-3t}}{t} dt$ using Laplace transforms. [5]

(c) Find the inverse Laplace transform by convolution theorem $\frac{1}{(s-1)\sqrt{s}}$. [5]

(d) Find inverse Laplace transform of $\frac{s^2 + 10s + 13}{(s-1)(s^2 - 5s + 6)}$. [5]

Q.7] Attempt any three:

(a) Find $f_s\{f(t)\}$ if $F(t) = \begin{cases} \sin t, & 0 < t < a \\ 0, & t > a \end{cases}$. [5]

(b) Obtain the Fourier expansion of $f(x) = 2x - x^2$, $0 \le x \le 3$ whose period is 3. [5]

(c) Find Fourier cosine and sine transform of $F(t) = 2e^{-5t} + 5e^{-2t}$. [5]

(d) Obtain half range sine series for $f(x) = x, \quad 0 < x < \pi/2$
$= \pi - x, \quad \pi/2 < x < \pi$. [5]

****

F.Y.B.Sc. (IT) Computer Graphics (old) 8 Sept-13
Sem-II Database Management Systems (Rev)
mk.1-2nd hlf 13-(a)

Con. 255-13. **OY-1435**

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. All questions are **compulsory**.

1. Write down the applications of computer graphics. **10**

2. Attempt any **three** :—
   (a) What is Frame Buffer ? Explain. 5
   (b) Calculate the pixel positions along a straight line AB having end points A (5, 5) and B(13, 9) using Bresenhan's line drawing algorithm. 5
   (c) Explain Raster Scan Display System. 5
   (d) Explain various computer graphics input devices. 5

3. Attempt any **three** :—
   (a) Write a matrix representations for 2D transformation Translation . 5
   (b) What is 2D rotation transformation ? Explain. 5
   (c) Write short note on character generation. 5
   (d) What is 2D ? Explain. 5

4. Attempt any **three** :—
   (a) Write matrix representations for 3D transformation Scaling. 5
   (b) Explain perspective and parallel projection. 5
   (c) Explain 3D rotations transformations. 5
   (d) Translate an object ABC with A(1, 1), B(3, 1) and C(2, 3) by 3 units along x-axis and 4 units along y-axis. 5

5. Attempt any **three** :—
   (a) Explain the function — 5
      (i) initgraph ( )
      (ii) detectgraph ( )
      (iii) line ( )
   (b) Write boundary fill algorithm steps. 5
   (c) Explain Flood – Fill algorithms. 5
   (d) Write a polygon filling algorithms. 5

6. Attempt any **three** :—
   (a) Explain curve continuity. 5
   (b) Write Z-buffer algorithms. 5
   (c) What is visible and hidden surfaces ? 5
   (d) Explain Bezier surfaces. 5

7. Attempt any **three** :—
   (a) What is rendering ? Explain object rendering. 5
   (b) What is shading ? Explain flat shading. 5
   (c) What is morphing ? Explain. 5
   (d) Explain phong shading methods. 5

[TURN OVER

(REVISDED COURSE)

(3 Hours) [Total Marks : 100

N.B. (1) **All** questions are **compulsory**. (Question Nos. **1** to **7**)
(2) Attempt any **three** sub-questions out of **four** from Question Nos. **2** to **7**.
(3) Draw neat and labelled **diagram** wherever **necessary**.

1. (a) What is database system ? List any four database system applications. 5
(b) Explain ACID properties. 5

2. (a) Explain database architecture. 5
(b) Give drawbacks of file system over DBMS. 5
(c) Explain what is the purpose of database system. 5
(d) Write short note on transaction management. 5

3. (a) Give the syntax to create table with example. 5
(b) What is data model ? Explain the importance of data model. 5
(c) What are the business rules for data model ? 5
(d) What is data abstraction ? 5

4. (a) Write short note on weak entity and strong entity. 5
(b) Draw an ER diagram for library management. 5
(c) Explain lNF and 2NF normalization with example. 5
(d) State all and explain any four Codd's rules in detail. 5

5. (a) Write short note on :— 5
(i) select operation
(ii) project operation.
(b) State and explain set operations. 5
(c) Write the relational algebraic expressions for the given relations :— 5
Institute(institute_name, city)
Student(student_name, city, course, percentage)
Teacher(teacher _name, course, subject)
(i) Find out the list of students who are from the institute city.
(ii) Find out the list of students whose percentage is more than 60.
(iii) Find out the list of teacher who are teaching "Math" subject.
(d) Give the syntax with example of rename operation. 5

6. (a) Define constraint. Explain Primary key and Foreign key constraint. 5
(b) What is join ? Explain left and right outer join with example. 5
(c) Explain triggers with suitable examples. 5
(d) Explain view creating and dropping process with syntax and suitable. 5

7. (a) Explain different types of transaction state. 5
(b) Explain deadlock with example. 5
(c) Explain time stamping in detail. 5
(d) Explain serializability and concurrency control in detail. 5

S.Y.B.Sc. (I.T) Sem-III Computational Mathematics (old) Advanced SDL. (Rev) January 2015

Ash9-D-Data-15

Con. 293-13. **BA-1296**

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory.**
(2) Attempt any **four** questions from questions **2** to **6.**
(3) **All** questions carry **equal** marks.

1. (a) Fit a parabola of second degree $y = a + bx + cx^2$ for the data :– **10**

x	0	1	2	3	4
y	1	1·8	1·3	2·3	2·3

(b) Use Lagrange's interpolation formula to fit the polynomial for the data :– **10**

x	0	1	3	4
y	–12	0	6	12

* Estimate y at $x = 2$.

2. (a) By using Bisection Method find positive root of the equation $x^3 - 5x + 1 = 0$ upto 4 iterations. **10**

(b) Use Taylor's Method to obtain the solution of $\frac{dy}{dx} = x^2 - y^2$ given $y(0) = 1$ and also find $y(0\cdot1)$ and $y(0\cdot2)$. **10**

3. (a) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Trapezoidal rule. Take $h = 1$. **10**

(b) Find a real root of the equation $e^x = 4x$ by Newton Raphson Method correct upto 4 decimal places. (take $x_0 = 1$). **10**

4. (a) Solve the following LPP equation to maximize $z = 5x + 10y$ subject to constraints :– **10**

$$5x + 8y \le 40$$
$$3x + y \le 12$$
$$x, y \ge 0$$

by Graphical Method.

(b) Evaluate $\int_0^2 e^x\,dx$ by using Simpson's $\frac{1}{3}$rd and $\frac{3}{8}$th rule. Take $h = 0.5$ **10**

[TURN OVER

5. (a) Solve $\frac{dy}{dx} = 2x + y$, $y(0) = 1$ by Euler's modified method take $h = 0.2$ find $y(0 \cdot 2)$ and $y(0 \cdot 4)$. **10**

(b) Find a root of the equation $x^3 + 2x^2 - 3 = 0$ correct upto 3 decimal places by using Regula Falsi Method. **10**

6. (a) Solve $2x + y + z = 12$, $3x + 2y + 2z = 8$, $5x + 10y - 8z = 10$ by using Gauss Elimination Method. **10**

(b) Fit a straight line by using least square method for the following data :– **10**

x	0	5	10	15	20	25
y	12	15	17	22	24	30

Con. 293-13. **BA-1296**

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : **All** questions are **compulsory**.

1. Attempt the following :–

(a) Explain inner join and outer join with example. **5**

(b) Write SQL statement for the customer. **5**

(Emp_Id, Emp_Name, Contact_No, Salary).

(i) Display employee Id with salary

(ii) List all employee's name starts with 'P'

(iii) Display employee name in descending order

(iv) Display name of employee having maximum salary.

2. Attempt any **three** from the following :–

(a) Explain Primary key and Foreign key with example. **5**

(b) Explain group by clause with examples. **5**

(c) Explain Synonyms and Indexes in detail. **5**

(d) What are views ? What are its advantages ? **5**

3. Attempt any **three** from the following :–
   (a) State and explain date time functions in SQL. 5
   (b) Explain sub queries in FROM clause with example. 5
   (c) Explain set operators with example. 5
   (d) Explain Cube and Rollup with example. 5

4. Attempt any **three** from the following :–
   (a) Explain PL/SQL block syntax. 5
   (b) What is identifier ? Explain declarative section. 5
   (c) What is PL/SQL ? Give advantages of PL/SQL. 5
   (d) Explain sequences in PL/SQL expressions. 5

5. Attempt any **three** from the following :–
   (a) Explain exception handling with PL/SQL. 5
   (b) Explain % NOTFOUND and % ROWCOUNT attribute with example. 5
   (c) How to insert and update records with PL/SQL. 5
   (d) Explain Loop statements with example. 5

6. Attempt any **three** from the following :–
   (a) What is package ? Explain advantage of packages. 5
   (b) Write PL/SQL function to find out factorial of given number. 5
   (c) How to create, call and remove stored procedure ? 5
   (d) What are the advantages of stored procedure and function ? 5

7. Attempt any **three** from the following :–
   (a) Explain what are Business Application Scenarios for Implementing Triggers. 5
   (b) What is trigger ? Explain the various components of a trigger. 5
   (c) Explain what are row, statement and after / before trigger. 5
   (d) What are the system privileges required to manage triggers ? 5

S.Y.B.Sc. (I.T) Computer Networks (Old) January 2014
Sem-III Computer Graphics (Rev)

36 : 2nd half.13-Avi(bf)

Con. 292-13. **BA-1134**

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the **remaining**.
(3) Draw neat **diagrams** wherever **required**.

1. (a) Describe OSI reference model with neat diagram. (10)

(b) Explain in detail star and bus topologies. What are the advantages of star topology over bus topology? Which type of network Used star topology? (10)

2. (a) What is checksum? List the steps involved in creating a checksum. (10)

(b) What are two types of Line Configurations? (10)

3. (a) What is transmission media? Explain coaxial cable with diagram. (10)

(b) Explain the difference between stop and wait and sliding window flow control protocol. (10)

4. (a) What is TCP? Explain TCP system in detail. (10)

(b) Write the short note on interconnecting devices such as bridges, hubs, switches, routers and gateways. (10)

5. (a) Describe High level Data Link Control and its operation. (10)

(b) What is IP? Explain IPV4 datagram header in detail. (10)

6. (a) What is cryptography? Explain the importance of digital signature. (10)

(b) What is DNS and resource encoding? Explain how DNS servers work? (10)

7. Write short notes on : (20)

1. Frame Relay
2. Circuit and Packet switching.
3. Distributed system examples and goals.
4. X.25 protocol.

[TURN OVER

Con. 292-13. **(REVISED COURSE)** **BA-1134**

(3 Hours) **[Total Marks : 100**

(**N.B. : All** questions are **compulsory**.)

Q. 1		
1	Describe the DDA line drawing algorithm. Calculate the pixel positions along straight line between (5, 5) and (10, 8).	5M
2	What are different types of surface representation	5M
Q. 2	**Attempt any three :-**	
1	Write a short note on Raster Scan Display?	5M
2	Define Computer graphics and list down the applications of computer graphics	5M
3	Explain the working principle of CRT	5M
4	Explain the steps for midpoint circle generation algorithm.	5M
Q. 3	**Attempt any three :**	
1	What is mean by homogeneous co-ordinates?	5M
2	Write down the 2-D transformation matrix for Translation and Rotation	5M
3	Find the 2D-transformation matrix that transforms the given square ABCD to half its size with the center still remaining at the same position. The coordinates of the square are A (1, 1), B (3, 1), C (3, 3) and D (1, 3) and center at (2, 2). Also find the resultant coordinates of the square.	5M
4	Define the shear effect and give shear transformation	5M
Q. 4	**Attempt any three :**	
1	Does 3D Rotation commutative? Justify the answer	5M
2	Write a short note on 3D Scaling	5M
3	Write a short note on parallel projection. How does it differ from perspective projection?	5M
4	What is mean by device co-ordinates?	5M
Q. 5	**Attempt any three :**	
1	Write a short note on inside/outside test. And give a situation when inside/outside test fails.	5M
2	Develop a function/procedure which performs line clipping using Cohen Sutherland method, how line between (2, 2) and (12, 9) is clipped against window with (Wxmin, Wymin)=(4, 4) and (Wxmax, Wymax)=(9, 8)	5M
3	Write the procedure for seed fill algorithm	5M
4	What is windowing and clipping?	5M
Q. 6	**Attempt any three :**	
1	Define Bezier curve and state the property of it	5M
2	What are namable and unnamable curve	5M
3	What are fractals? State its properties	5M
4	Explain basic concepts of painter's algorithm	5M
Q. 7	**Attempt any three :**	
1	Write a short note on Polygon mesh shading	5M
2	Write a short note on morphing. List its advantages	5M
3	Write short note on ray casting	5M
4	What is shading and explain the concept of flat shading	5M

S.Y.B.Sc (IT) System Programming (Old) January 2x
sem-III Modern Operating System (Rev)

Con. 294–13. **(OLD COURSE)** **BA–1146**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Question Nos. **2** to **7**.

Q1	a) Explain in detail about the UNIX Operating system Architecture. b) Explain the file Structure in Unix System. c) What is inode? What does it contain?	8 7 5
Q2	a)Explain the following commands with syntax 1)cat 2) mv 3) diff 4) grep 5) ps 6)cmp 7)wc 8)sort b) Explain the redirection operator in UNIX with example. c) Write the "C" program display sum of all odd number from 1 to 100.	8 7 5
Q3	a) What is shell? Explain the various types of Shell. b) Explain the following with respect of shell programming with suitable example. 1) Looping Statement. 2) Conditional Statement. c) Write a shell script to display a Fibonacci series of any number entered through keyboard.	8 7 5
Q4	a) What are the file permissions available with respect to a file in UNIX? What is the command used to change the file permissions? b) Describe the various phase and component involved during the "C" compilation program. c) Write a short note on characteristics of good password.	8 7 5
Q5	a) Explain the telnet and ftp command. b) With an example explain some of the common environment variables. c) What is mean by command line argument? How to use the command line argument?	8 7 5
Q6	a) Explain the following commands with an example and different options 1)cal 2) calendar 3) date 4) echo5) banner 6) bc 7) passwd 8) who b) Explain the different modes of vi editor with a neat diagram c) Explain the syntax of awk command	8 7 5
Q7	a) Explain the different states of the process with help of diagram b) Explain parents and children with respect to a process c) What is meant by semaphores?	8 7 5

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

(N.B. : All questions are **compulsory)**

Q.1 Attempt the following : (10M)
1.Write a note on Compilers and Interpreters (5M)
2.Explain handheld system (5M)

Q.2 Attempt any 2 from the following : (15M)
1. Write a note on Distributed system (7M)
OR
2. Explain Clustered system. (7M)
3. Explain multiprocessor system and its advantages (8M)

Q.3 Attempt any 2 from the following : (15M)
1. Explain Operating system services (7M)
OR
2. Explain different type of system calls (7M)
3. Explain operating system generation (8M)

Q.4 Attempt any 2 from the following (15M)
1. Explain PCB (7M)
OR
2. What are different processes State (7M)
3. What are different benefits of threads? (8M)

Q.4 Attempt any 2 from the following : (15M)
1. Explain difference between logical and Physical Addressing (7M)
OR
2. Explain multithreading models (7M)
3. Explain Swapping (8M)

Q.5 Attempt any 2 from the following : (15M)
1. Explain Memory management without swapping (7M)
OR
2. Explain Thrashing (7M)
3. Explain paging (8M)

Q.6 Attempt any 2 from the following : (15M)
1. Explain type of file (7M)
OR
2. What are different file access methods (7M)
3. Explain different deadlock prevention method (7M)

Q.7 Attempt any 2 from the following : (15M)
1. What are different Principles of protection (7M)
OR
2. What are the different Security problems (7M)
3. How to implement security defenses. (8M)

S.Y.B.Sc. (IT) Sem-III Object Oriented Programming (OH) January 14
Object Oriented Progr with C++ (Rev)

RT–Exam.–Con No.–Oct.–13–1

Con. 295–13. **(OLD COURSE)** **BA–1032**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Question Nos. **2** to **7**.

Q.1. a) Differentiate between procedural and object oriented approach. (10)
b) Applications of object oriented programming. (10)

Q.2. a) What is object and class? Explain with example (10)
b) Write a program using friend function. (10)

Q.3. a) What are the different types of inheritance explain with diagram. (10)
b) What is pure virtual functions explain with example. (10)

Q.4. a) What is class templates? Write a program to demonstrate the need of Class templates. (10)
c) What is Exception handling. (10)

Q.5. a) Write a program using single inheritance. (10)
b) Write a program using static data member. (10)

Q.6. a) What is function Templates? (10)
b) Write a program using function templates. (10)

Q.7. a) Write a program to overload the operator unary. (10)
b) What is copy constructor? Write a program to demonstrate copy constructor. (10)

[TURN OVER

Con. 295–13. **2** **BA–1032**

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

(N.B. : All questions are **compulsory)**

Q1.	Attempt the following :-	
	A. Define the following terms with example: i) Object ii) Class	(5)
	B. Design an employee class for reading and displaying the employee information, the getInfo() and displayInfo() methods will be used respectively. Where getInfo() will be private method.	(5)
Q2.	Attempt any 3 from the following:-	
	A) What are the features of Object Oriented Programming? Give any two applications.	(5)
	B) Distinguish between Procedure Oriented Programming and Object Oriented Programming.	(5)
	C) Explain polymorphism with example.	(5)
	D) D) Explain the following characteristics of OOP a. i) Encapsulation ii) Reusability	(5)
Q3.	Attempt any 3 from the following:-	
	A) What is static function? How do we declare a member of a class static?	(5)
	B) Explain dynamic constructor with example.	(5)
	C) What is class destructor? Explain.	(5)
	D) What is constructor? State the characteristics of constructor in OOP.	(5)
Q4.	Attempt any 3 from the following:-	
	A) Explain the concept of operator overloading?	(5)
	B) Write a friend function for adding the two different subject marks and display its sum, using two classes.	(5)
	C) Overload the operator unary(++) for demonstrating operator overloading.	(5)
	D) Design a class shape containing the methods area() and volume() and also overload the area() function .	(5)
Q5.	Attempt any 3 from the following:-	
	A) What is inheritance? Explain multiple inheritance and multilevel inheritance with example.	(5)
	B) Explain protected versus private member access mode.	(5)
	C) Explain the following terms in brief i) Virtual class function.ii) Abstract class	(5)
	D) Explain the different types of File mode.	(5)

Q6.	Attempt any 3 from the following:-	
	A) Explain following functions put(), get(), getline(), write(), read()	(5)
	B) Define the following terms	(5)
	i) Stream	
	ii) Input stream	(5)
	iii) Output stream	
	C) Explain Stream Manipulator with example.	(5)
	D) What is exception handling? Explain.	
Q7.	Attempt any 3 from the following:-	
	A) What is Standard Template Library (STL)? How STL is different from C++ standard Library?	(5)
	B) What is function template? Explain it with example.	(5)
	C) What is class template? Explain it with example.	(5)
	D) What is container? State and explain types of containers.	(5)

S.Y.B.Sc. (D.T) Logic, Discrete Mathematical structure (Old) January 14
Sem-III
Con. 296-13. Logic, Discrete Mathematics (Rev) **BA-1482**

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Question Nos. **2** to **7**.
(3) **Figures** to the **right** indicate **full** marks.
(4) **Each** question carries **20** marks.

1 (a) Answer the following in **one** line :– **5**

(i) What is the value of $\lceil -9{\cdot}9 \rceil$?

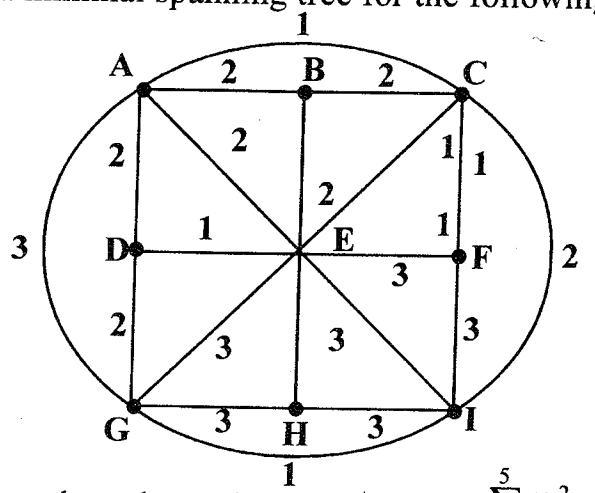
(ii) What is inverse of the statement $r \rightarrow s$?

(iii) Write the formula for extended Pigeonhole principle.

(iv) When $p \rightarrow q$ is true, where p and q are any statements ?

(v) If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$; $B = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix}$ compute A B

(b) Find a minimal spanning tree for the following weighted graph :– **5**



(c) What are the values of these sums ? i) $\sum_{k=1}^{5}(k^2)$ ii) $\sum_{j=0}^{4}(-2)^j$ **5**

(d) Draw the Hasse diagram of the following :– **5**

$D_{30} = \{1, 2, 3, 5, 6, 10, 15, 30\}$

2. (a) Prove the statement is true by using mathematical induction. **5**

$$1^2 + 3^2 + 5^2 + \ldots.. + (2n-1)^2 = \frac{n(2n+1)(2n-1)}{3}.$$

(b) Solve the recurrence relation $a_n = 4a_{n-1} + 5a_{n-2}$, $a_1 = 2$, $a_2 = 6$ **5**

(c) Let $S = \{1, 2, 3, 4, 5\}$ and $A = S \times S$. Define the following relation R on A: (a, b) R (a′,b′) if and only if a b′ = a′ b. **10**

(i) Show that R is the equivalence relation, (ii) Compute A/R.

[TURN OVER

3. (a) Use the structure $R = [M, +, *, T]$ where M is the set of matrices of the form $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$. Find for which operation R is closed. **5**

(b) Two cards are drawn at random from a deck of 52 cards. Find the probability that :– **5**

(i) one is red and other is black

(ii) one is spade and other is heart

(iii) both are face cards.

(c) Let f, g and h are functions form R to R defined as **10**

$f(x) = 2x^3 - 7$, $g(x) = 3x^2$ and $h(x) = 5x + 4$.

find :–

(i) $((g \circ f) \circ h)(l)$

(ii) $(f \circ g)(2)$

(iii) verify that $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$

4. (a) Let R be a relation on A= {1, 2, 3, 4}, R = {(1, 1), (1, 3), (2, 4), (3, 1), (3, 3), (4, 3)}. Find the transitive closure, by Warshall's Algorithm for this relation. **10**

(b) Construct the tree of the following algebraic expression and give the arrays LEFT, DATA and RIGHT describing the tree. ((2*x)+(3–(4*x)))+(x–(3*11)) **10**

5. (a) Let M be the FSM with following state table :– **10**

	a	b
S_0	S_2,y	S_1,z
S_1	S_2,x	S_3,y
S_2	S_2,y	S_1,z
S_3	S_3,z	S_0,x

(i) Find the input Set I, the state S, the output set O and the initial state.

(ii) Draw the state diagram D = D(M) of M.

Suppose u = aababaabbab is an output word. Find the sequence v and the output word w.

(b) Let $(A, \leq)$ and $(B, \leq)$ are posets, prove that $(A \times B, \leq)$ is a poset with partial order $\leq$ defined by $(a, b) \leq (a', b')$ if $a \leq a'$ in A and $b \leq b'$ in B. **10**

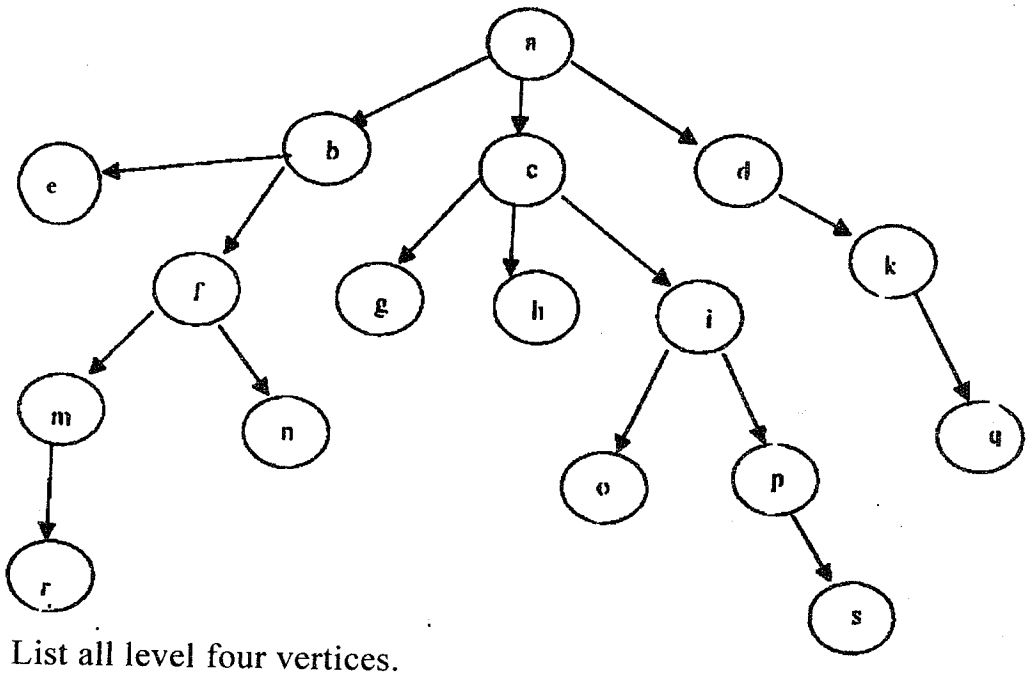
6. (a) If R be a relation on Z defined as $(x, y) \in R$ iff $3x + 5y$ is divisible by 8. Show that R is an equivalence relation. **10**

(b) Solve the following recurence relations :– **10**

(i) by the method of Characteristic roots, $b_n = 4b_{n-1} - 4b_{n-2}$, $b_1 = 1$, $b_2 = 7$.

(ii) by method of Generating functions $a_n = 3a_{n-1} + 4$, $a_0 = 5$.

7. (a) Consider the rooted tree (T, a) and answer the questions : **10**



(i) List all level four vertices.
(ii) List all leaves.
(iii) List siblings of c.
(iv) List offsprings of c.
(v) List descendants of c.
(vi) Compute T (f).
(vii) Compute (T, c).
(viii) What is height of (T, a) ?
(ix) What is height of T (f) ?
(x) What is the minimal number of vertices that would need to be added to make (T, a) a complete 3-tree ?

(b) Let A = {a, b, c, d, e, f, g, h} and let R be the relation defined by :– **10**

$$M_R = \begin{bmatrix} 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$$

(i) Show that (A, R) is a poset
(ii) Does the poset (A, R) have least element ? A Greatest element ? If so, identify them.
(iii) Show that the poset (A, R) is complimented and give all pairs of complements.
(iv) Prove or disprove that (A, R) is a Boolean Algebra.

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) **All** questions are **compulsory**.

(2) **In each** question from question No.**2** to question No.**7**, subquestion **(a)** is **compulsory** and attempt any **one** from subquestion **(b)** and **(c)**.

(3) **Figures** to **right** indicate **full** marks.

1. Answer any **one** of the following :– **10**

(a) Let R be an equivalence relation on 'A'. Show that $A = \bigcup_{a \in A} [a]$ where [a] denotes equivalence class of $a \in A$. Further, show that any two equivalence classes are equal or disjoint.

(b) Show that the number of vertices of odd degree in a graph is always even. **10**

2. (a) State and prove De Morgan's Laws for sets. **8**

(b) Compute the truth table of : $(p \Rightarrow q) \Leftrightarrow (\sim q \Rightarrow \sim p)$ **7**

(c) Prove that product of two consecutive integres is divisible by 2. **7**

3. (a) Suppose R and S are relations from A to B. Then show that :– **8**

(i) $(R \cap S)^{-1} = R^{-1} \cap S^{-1}$

(ii) $(R \cap S)^2 \subseteq R^2 \cap S^2$

(b) State and prove any four properties of lattices. **7**

(c) Determine the Hasse diagram of the relation on A = {1, 2, 3, 4} whose matrix is **7**

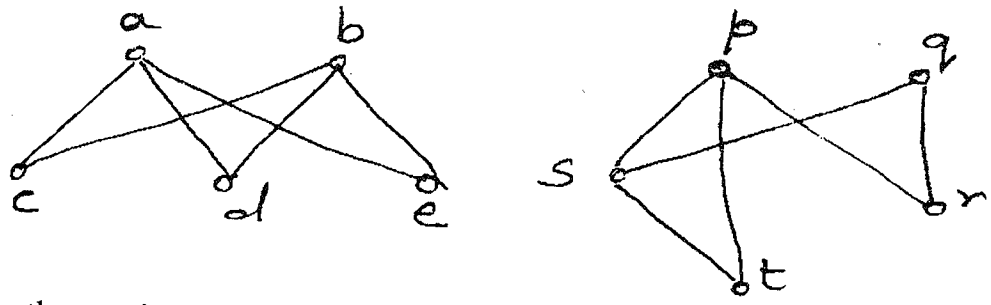
$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 \end{bmatrix}$$

4. (a) Show that $f : \mathbb{R} \rightarrow \mathbb{R}$ defined as $f(x) = 3x-1$ is bijective. Further, find g o f and f o g if $f : \mathbb{R} \rightarrow \mathbb{R}$ is defined by $f(x) = x+1 \ \forall x \in \mathbb{R}$ and $g : \mathbb{R} \rightarrow \mathbb{R}$ is defined by $g(x) = x^2 \ \forall x \in \mathbb{R}$. Check if f o g = g o f. **8**

(b) State Pigeon-hole principle. Show that if any five numbers from 1 to 8 are chosen, then two of them will add to 9. **7**

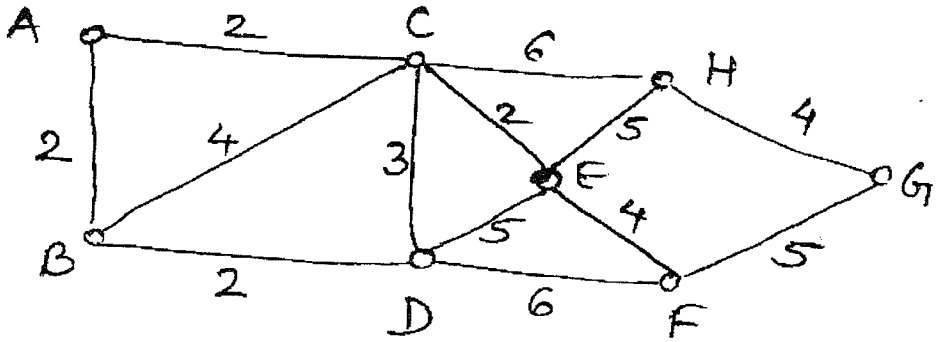
(c) Check whether the binary operation $*$ is commutative and associative if $*$ is defined as $a * b = 2a + 2b - 8$ for $a, b \in \mathbb{Z}$. **7**

5. (a) Check if following graphs are isomorphic :– 8



Further, write incidence matrix for both the graphs.

(b) Find Hamiltonian cycle of minimal weight. 7



(c) Write a note on Kruskal's algorithm to find minimal spanning tree in a graph. 7

6. (a) R^+ is set of all non–zero real numbers and $*$ is defined as $a * b = \frac{ab}{2}$. Show that $(R^+, *)$ is an abelian group. 8

(b) Show that every subgroup of an abelian group is normal subgroup. 7

(c) Show that Z[i] is an integral domain but not a field. 7

7. (a) Find sum of :–

(i) First 20 natural numbers. 8

(ii) 3 + 5 + 7 + -------- +53.

(b) Solve the recurrance relation $a_n + a_{n-1} - 6a_{n-2} = 0$ where, $n \geq 2$, $a_0 = -1$, $a_1 = 8$. 7

(c) Determine coefficient of x^7 of generating function $(1+3x)^{-9}$. 7

S.Y.B.Sc. C.S. Foundation Course - II (Old & Rev) June 2014

Con. 261–14. **(OLD COURSE)** **DY–6133**

(3 Hours) (Total Marks: 100)

[N.B.: All questions are Compulsory]

Section I

1. Write note on **Any Three** of the following 18
   a) Chipko Movement
   b) Right to Information
   c) Relationship between Science and Technology
   d) National Commission for Women

2. Attempt **Any Two** of the following
   a) Analyze and discuss the Fundamental Rights relating to Right to Equality. 8
   b) What are the main functions performed by NGO's ? 8
   c) What are the contributions of C.V. Raman towards the growth of Science? 8

3. Attempt **Any Two** of the following.
   a) Explain the main features of National Security Act. 8
   b) Briefly discuss the functions and powers of the State Human Rights Commission in the State. 8
   c) State in detail the landmarks in the development of Human Rights 8

Section II

4. Write note on **Any Three** of the following 18
   a) Biotic Components in the Eco System
   b) List the Water born diseases.
   c) Information Technology
   d) Acid rain and it effects
   e) Benefits of Space Technology

5. Attempt **Any Two** of the following.
   a) Explain in brief the causes, symptoms and treatment for the Air born diseases 8
   b) Define Environmental degradation. What are its main causes? 8
   c) What do you mean by Sonography and state the effects of Sex determination test? 8

6. Attempt **Any Two** of the following.
   a) Explain the different Types of Cyber Crime 8
   b) Define Nanotechnology. Describe any four applications of Nanotechnology. 8
   c) What is Disaster Management? State the main factors involved in it. 8

[TURN OVER

(REVISED COURSE)

(3 Hours) **(Total Marks: 100)**

[N.B.: All questions are Compulsory]

Section I

1. Write note on **Any Three** of the following 18
   a) The Prevention of Atrocities (SC/ST) Act, 1989
   b) Leadership Skills
   c) The National Commission for Women
   d) Effects of Natural Disaster
   e) Issac Newton

2. Attempt Any Two of the following
   a) Discuss the causes of environmental degradation. 8
   b) Explain the meaning and features of technology. 8
   c) What are the challenges faced by the education in India. 8

3. Attempt **Any Two** of the following.
   a) Write in detail Disaster- Natural and Manmade. 8
   b) Explain the importance of body language in effective communication. 8
   c) Write a letter to the editor of the Hindustan Times complaining about the problem of water logging in your area during monsoons due to lack of proper drainage facilities. 8

Section II

4. Write note on **Any Three** of the following 18
   a) Consumer and Sale of goods Act 1930
   b) Right to Information
   c) Forest Conservation
   d) Acid rain and it effects
   e) Polluter Pays Principal

5. Attempt **Any Two** of the following.
   a) Discuss the concept, structure and function of an ecosystem. 8
   b) What are the effects of Global Warming 8
   c) Describe the causes and effects of Air Pollution. 8

6. Attempt **Any Two** of the following.
   a) Write a detailed note on the application of laser technology. 8
   b) Discuss the various ways in which technology is misused. 8
   c) Discuss the problems related to water and housing in mega cities like Mumbai. 8

S.Y.B.Sc. C.S. Computer science P-III Database Management system-I and Software Engineering June 201

QP Code : DY-7104

(2 Hours) **[Total Marks : 60**

Note: (1) All Questions are compulsory.
(2) Figure to the right indicate the marks.
(3) Answers to both the sections to be written in same answer book.

Section – I

Q.1 **Attempt any two:**
A) What is normalization? Explain 1NF & 2NF with example. (05)
B) Define the following giving example: (05)
(i) Super Key (ii) Attributes (iii) Entities
C) What are the advantages of DBMS? (05)

Q.2 **Attempt any two:**
A) List & Describe the aggregate function in SQL. (05)
B) Consider the following schema- (05)
Suppliers (sid : integer, sname : string, address: string)
Parts (pid : integer, pname : string, color : string)
Catalog (sid : integer, pid : integer, cost : real)
Write the SQL Queries:-
(1) Find the names of the suppliers who supply some red part.
(2) Find the sid's of suppliers who supply some red or green part.
(3) Find the sid's of suppliers who supply some red part or are at '221 Bandra'.
(4) Find the Pid's of parts supplied by at least two different suppliers.
(5) Find the pid's of the most expensive part supplied by supplier name 'Ramesh'.
C) Define Relation? Differentiate between Selection & Projection. (05)

Q.3 **Attempt any two:**
A) What are Stored Procedures? What are their benefits? (05)
B) Explain with example nested triggers in SQL. (05)
C) difference between a primary index & secondary index. (05)

Section-II

Q.4 **Attempt any two:**
A) Define Software Engineering? State its objective. (05)
B) List the advantages of spiral model used for software development. (05)
C) Write a short on SDLC? (05)

Q.5 **Attempt any two:**
A) State the characteristics of SRS. (05)
B) Describe many to many relationship in Entity Relationship Diagram. (05)
C) Explain the following : (05)
(i) Decision table (ii) Decision Tree

Q.6 **Attempt any two:**
A) Differentiate between DBMS and RDBMS. (05)
B) Discuss the role of verification and validation in various phases of SDLC. (05)
C) Write note on alpha testing. (05)

****

Con. 257-14.

S.Y.B.Sc. C.S. Computer Science. P-II C++ & JAVA June 14

Con. 245-14 **DY-7024**

(2 Hours) **[Total Marks : 60**

Note: All questions are compulsory.
Figures to the right indicate full marks.

SECTION - I

1. Attempt any two:
a) Explain different types of logical operators in C++ with an example. 5
b) What are the benefits of Object Oriented Programming? 5
c) Write a C++ program to print the odd, even and prime number between 1 to 50. 5

2. Attempt any two:
a) Explain "If....else" and "switch case" with an example. 5
b) What are the different types of Constructors? Explain with an example. 5
c) Create a class CCircle to calculate area and circumference of a circle. The program should initialize the variables through constructor. Use the same constructor for reading radius of a circle. 5

3. Attempt any two:
a) Explain File pointers and their manipulations. 5
b) Explain the components of STL. 5
c) Write a C++ program to detect the END of File. 5

SECTION - II

4. Attempt any two:
a) Write a short note on JIT and JRE. 5
b) Differentiate between Java and C. 5
c) Write a Java program which contains three instance variables and two Methods. 5

5. Attempt any two:
a) Explain Exception Handling in Java with an example. 5
b) What is Constructor Overloading? Explain with example. 5
c) Write a Java program to find the factorial of a given number. 5

6 Attempt any two:
a) Explain FlowLayout and BorderLayout class with example. 5
b) Explain the Life Cycle of an Applet. 5
c) Create an Applet to display two Lines, one Circle and one Square. 5

S.Y.B.Sc CS Computer Science P-I June 12
Discrete Mathematics &
Computer Graphics

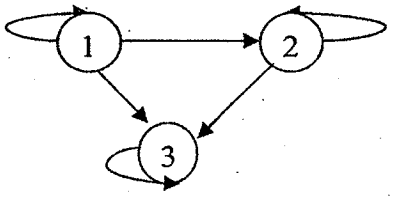
Con.260-14. **DY-6177**

(2 Hours) [Total Marks: 60]

N.B: (1) All questions are compulsory.
(2) Figures to the right indicate marks.
(3) Mixing of sub-questions is not allowed.

Q1. **Attempt the following (any TWO):**

(i) Determine whether the relation R whose digraph is given is an equivalence relation. (05)



(ii) Solve the recurrence relation: $a_{r+2} - 2a_{r+1} + a_r = 2r$ (05)

(iii) Consider the partial order of divisibility on set A. Draw the Hasse diagram of poset. (05)

a. A= {1, 2, 3, 5, 6, 10, 15, 30}
b. A = {1, 2, 3, 4, 5, 6, 10, 12, 15, 30, 60}

Q2. **Attempt the following (any TWO):**

(i) Let A= {1,2,3,4}. For the relation R whose matrix is given, find the matrix of the transitive closure by using Warshall's Algorithm: (05)

$$\begin{bmatrix} 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

(ii) State the Breadth First Algorithm. (05)

(iii) Let E denote the following algebraic expression: (05)
[a + (b – c)] * [(d – e) / (f + g – h)].
Represent E with a binary tree T. Also state the preorder traversal of E.

Q3. **Attempt the following (any TWO):**

(i) Draw the digraph of the machine whose state transition table is given below: (05)

	a	b
s_0	s_1	s_0
s_1	s_2	s_1
s_2	s_3	s_2
s_3	s_3	s_3

(ii) Suppose a department contains 13 professors. Show that at least 2 of them their birthday in the same month. (05)

(iii) Find the term independent of x in the expansion of (05)

$$\left(x^4 - \frac{1}{x^2}\right)^{60}$$

Q4. **Attempt the following (any TWO):**

(i) What is shearing? What are the different types of shearing? Explain with suitable diagrams and the corresponding transformation matrices. (05)

(ii) State the DDA Line Drawing Algorithm. (05)

(iii) Show that 2D reflection through X – axis followed by 2D reflection through the line y = -x is equivalent to clockwise rotation by 90^0 about the origin. (05)

Q5. **Attempt the following (any TWO):**

(i) State the properties of Bezier Curves. (05)

(ii) Explain the Sutherland Hodgeman Polygon Clipping Algorithm. (05)

(iii) Write a short note on Workstation Transformation. (05)

Q6. **Attempt the following (any TWO):**

(i) Write a short note on Raster Animation. (05)

(ii) Explain Frame by Frame Animation. (05)

(iii) Differentiate between Diffuse and Point Source Illumination. (05)

F.Y.B.Sc. C.S Mathematics Paper-I June 2014

RT–Exam.–Feb.–14–1–102

Con. 243–14. **DY–6010**

(3 Hours) **[Total Marks : 100**

N.B. : (1) **All** questions are **compulsory**.
(2) In **each** question, from Q.No. **2** to **7**, subquestion (**a**) is **compulsory**. Solve only **one** subquestion from (**b**) and (**c**).
(3) **Figures** to the **right** indicate **full** marks.

1. Attempt any **two** of the following :– **10**
   (a) Show that $\sqrt{5}$ is not rational number.
   (b) State Fubini's theorem for rectangular regions and non-rectangular regions.
   (c) Evaluate $\int_0^2 \int_0^{\sqrt{4-x^2}} e^{x^2+y^2}\, dydx$ using polar coordinates.

2. (a) Show that [a, b] is closed set. **8**
   (b) State any two disjoint neighbourhoods of π and e. **7**
   (c) Show that 0 is only limit point of set $\left\{\frac{1}{n} : n \in \mathbb{N}\right\}$. **7**

3. (a) Show that bounded sequence has a convergent subsequence. **8**
   (b) If $f : [a, b] \to \mathbb{R}$ is continuous on [a, b] then show that f is bounded on [a, b]. **7**
   (c) Show that $\left\langle \frac{4n+5}{5n+1} \right\rangle$ is Cauchy sequence, $\forall\, n \in \mathbb{N}$, in $\mathbb{R}$. **7**

4. (a) State and prove Cauchy's Root test for convergence of series. **8**
   (b) Test convergence of series :– **7**

   (i) $\sum_{n=0}^{\infty} (-1)^n$ (ii) $\sum_{n} \frac{1}{2^n + 3^n}$

   (c) Find Fourier series for periodic function – **7**

   $$f(x) = \sin x \quad ; \quad 0 < x < \pi$$
   $$= 0 \quad ; \quad \pi < x < 2\pi$$

[TURN OVER

5. (a) Solve $y'' - 6y' + 9y = \frac{e^{3x}}{x^2}$ using variation of parameters. **8**

(b) If $y_1 = x^2$ is one of the solution of given differential equation $x^2y'' + xy' - 4y = 0$ then find general solution. **7**

(c) Solve $\left(x^2 - 2x + 2y^2\right)dx + 2xy\,dy = 0$. **7**

6. (a) Find area of region S bounded by $y = x^2$ and line $y = 2x + 3$. **8**

(b) Find volume of solid bounded by $2 \le x \le 4$, $3 \le y \le 5$, $-1 \le z \le 1$. **7**

(c) Compute M_{xy} and M_{yz} if S is solid cylinder $x^2 + y^2 \le 4$ between the planes $z = 0$ and $z = 4$. Given density of $S = 20 - z^2$. **7**

7. (a) Verify Green's theorem for $\int_c (2x - y + 4)dx + (5y + 3x - 6)dy$ where C is the triangle with vertices (0, 0), (3, 0) and (3, 2) and positively oriented boundary. **8**

(b) Evaluate $\int_{(1,1,2)}^{(3,5,0)} (yzdx + xzdy + xydz)$ along the line joining (1,1,2) and (3,5,0). **7**

(c) Find work done by force $f(x, y) = (e^x - y^3)\bar{i} + (\cos y + x^3)\bar{j}$ on a particle that travels once around the unit circle $x^2 + y^2 = 1$ in the clockwise direction. **7**

S.y.B.Sc. C.S. Mathematics Paper-II June 14

RT–Exam.–Feb.–14–1–104

Con. 258–14. **DY–6767**

(3 Hours) **[Total Marks : 100**

N.B. : (1) **All** questions are **compulsory**.
(2) In **each** question, part **a** is **compulsory**. Attempt any **one** question from part **b** and part **c**.
(3) **Figures** to the **right** indicate **full** marks.

1. (a) Show that intersection of subspaces is again a subspace, of a vector space. Give example also. **10**

OR

(b) Explain Gram-Schmidt method to construct an orthogonal basis from given basis. **10**

2. (a) Discuss (2,3) system of homogeneous linear equations. Give geometrical interpretation. **8**

(b) Write a note on types of matrices. **7**

(c) Show that elementary matrices are invertible and invertible matrix is product of elementary matrices using one example. **7**

3. (a) Show that Euclidean space $\mathbb{R}^2$ is a real vector space. **8**

(b) Check which of the following set is linearly independent. **7**
(i) A = {(1, 2), (2, 4)} (ii) B = {(1, 0, 0), (0, 1, 0), (0, 0, 1)}

(c) Find rank of the matrix $\begin{bmatrix} 2 & 1 & -4 & 3 \\ 0 & 1 & 3 & 2 \\ 2 & 3 & 2 & -1 \end{bmatrix}$ **7**

4. (a) Give one example of inner product space with justification. **8**

(b) State and prove Pythagorus theorem. Further, give geometric application in $\mathbb{R}^2$. **7**

(c) Check which of following are orthogonal set. **7**
(i) P = {(1,0,0), (0,1,1)} (ii) Q = {(2,0), (0,2)}

5. (a) Let $T : U \to V$ be linear transformation then show that – **8**
(i) Ker T is a subspace of U.
(ii) Im T is a subspace of V.

(b) Show $T : \mathbb{R}^2 \to \mathbb{R}^2$ defined by $T(x, y) = (x + y, x - y)$ is linear transformation. **7**

(c) Prove that if $T : U \to V$ is a linear transformation and dim U = dim V then T is one-one if and only if T is onto. **7**

[TURN OVER

6. (a) If A^t denote the transpose of matrix A, then show that det A. det B = det (AB) and det A^t = det A, where A and B are n x n matrices. **8**

(b) Find minor and cofactors of matrix – **7**

$$A = \begin{bmatrix} 1 & -1 & 2 & -1 \\ 2 & -2 & 3 & 1 \\ 0 & 3 & 5 & 2 \\ 1 & 0 & 5 & 4 \end{bmatrix}$$

(c) Find (i) area of parallelogram whose sides are spanned by (1,3) and (–1,1). **3**
(ii) volume of parallelopiped spanned by (1,0,–1), (2,1,–2), (3, –1,–3). **4**

7. (a) If A and B are any two matrices in M(n, $\mathbb{R}$) then show that either [A] = [B] or [A] $\cap$ [B] = ϕ. **8**

(b) Find characteristic polynomial of $A = \begin{bmatrix} 1 & 0 & 3 \\ 1 & 2 & 3 \\ 0 & 1 & 4 \end{bmatrix}$. **7**

(c) Find eigen value and eigen vector of linear transformation $T(x, y) = (2x + 3y, x + 4y)$ if $T : \mathbb{R}^2 \to \mathbb{R}^2$ and $(x, y) \in \mathbb{R}^2$. **7**

S.Y.B.Sc. C.S. Mathematics Paper - III June 14

RT–Exam.–Feb.–14–1–106

Con. 244–14. **DY–6131**

(3 Hours) **[Total Marks : 90**

N.B. : (1) **All** questions are **compulsory**.
(2) **All** questions carry **equal** marks.
(3) **Figures** to the **right** indicate **full** marks.
(4) Use of non programmable **scientific** calculator is **allowed**.

1. (a) Check whether an input number is prime or not and display the message accordingly. **7**

(b) Attempt any **two** :–

(i) Design an algorithm to find the sum of first 'n' even natural numbers. Trace it for n = 8. **4**

(ii) Write an algorithm to find G.c.d. of two numbers. Trace it for a = 6 and b = 15. **4**

(iii) Write an algorithm for Breadth first search. **4**

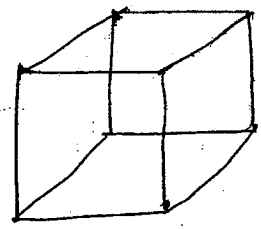
2. (a) Define complete graph on 'n' vertices and draw K_5 and K_6. **7**

(b) Attempt any **two** :–

(i) In a graph of 8 edges there are '4' vertex of degree '3'. Find the total number of vertices in a graph. **4**

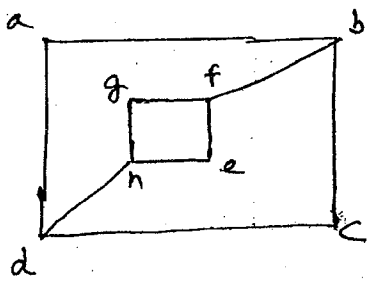
(ii) Check whether following graphs are planar or not – **4**

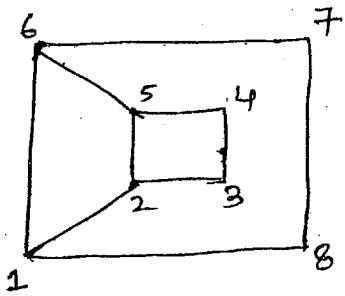
(1)



(2) $K_{3,3}$

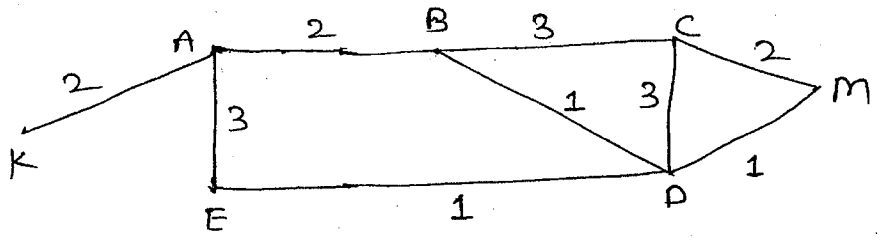
(iii) Check whether following graphs are Isomorphic – **4**





[TURN OVER

3. (a) Write steps in Prim's algorithm for weighted graph and find minimum spanning tree by using Prim's algorithm for following graph :– 7



(b) Attempt any **two** :–

(i) Show that if a graph is connected and has (n – 1) edges then a graph is a tree where 'n' is number of vertices. 4

(ii) Draw all possible subgraphs of K_3. 4

(iii) Show that an edge 'e' of 'G' is a bridge iff G – e is disconnected. 4

4. (a) Find the volume of the solid revolving around the X-axis and surface of revolution of astroid $x = 3\cos^3 t$ and $y = 3\sin^3 t$ where $0 \le t \le \pi$. 7

(b) Attempt any **two** :–

(i) Evaluate $\int_0^\infty 7^{-4x^2}\, dx$ 4

(ii) Find the length of the arc of the curve $y = x^2$ from '0' to '2'. 4

(iii) Evaluate $\int_0^\infty \frac{x}{1+x^2}\, dx$. 4

5. (a) Show that the Newton Raphson method converges to solution quadratically. 7

(b) Attempt any **two** :–

(i) Find the root of the equation $f(x) = e^{2x} - x + 1$ by using fixed point method correct upto three decimal places. 4

(ii) Solve the system by using Dolittle's LU - Decomposition :– 4
$x + y + z = 1,\ \ 4x + 3y - z = 6,\ \ 3x + 5y + 3z = 4.$

(iii) Find $\sqrt{3}$ by using Newton Raphson method. 4

6. (a) Derive the formula for Euler's modified method. 7

(b) Attempt any **two** :–

(i) Solve the equation $\frac{dy}{dx} = x^2 + y,\ \ y(0) = 1$ by using Taylor's method to find y(0·4). 4

(ii) Solve the equation $\frac{dy}{dx} = 2xy,\ \ y(0) = 1$ estimate y(1) when h = 0·5 by Milne – Simpson predictor – corrector method. 4

(iii) By Euler's method estimate y(1) for the equation $y' = 3x + y$ with $y(0) = 1$ by taking h = 0·25 4

S.Y.B.Sc. (IT) Sem - IV Database Concept and System (OLD) June 2014
Multimedia (Rev)

Con. 251-14 **(OLD COURSE)** **GP-6033**

(3 Hours) **[Total Marks : 100**

N.B.: 1. Q.No 1 is compulsory.

2. Answer any 4 from the remaining.

3. All questions carry equal marks.

1. A. Write a short note on Transaction Management. 10
   B.Explain the following commands with examples: 10
   i)Select ii) Update iii) Insert iv) Delete v) Drop

2. A. Write a short note on E-R model. 10

   B. Explain Mapping constraints in brief. 10

3. A. Give the structure of Relational Database. 10

   B. Consider the following schema . 10

   Suppliers (Sid : integer ,Sname : string, address : string)

   Parts (PID : integer, Pname: String , color: string)

   Catalog (Sid : integer , Pid : integer, cost : real)

   - Find the Pnames of parts of which there is some supplier
   - Find the Snames of supplier who supply every part.
   - Find the Sid of suppliers who supply only red parts

4. A. Describe the advantage of pipelining. 10

   B. Give different types of aggregate functions.. 10

5. A.Define Transaction . Explain ACID properties. 10

   B.Write a short note on Serializability and Recoverability. 10

6. A. Explain the concept of deadlock with deadlock prevention and recovery from deadlock. 10

   B. Explain different types of attributes. 10

7. A Write a short note on Timestamp based protocol. 10

   B Explain Decomposition in relational database design. 10

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

Note:-

1. All Questions are compulsory

Q 1.	**A]**	Describe the scope of multimedia?	10
Q 2.		Attempt any **Three** questions	
	A]	Describe the multimedia in public place?	5
	B]	List and describe approaches the advantage of multimedia database?	5
	C]	Give the list of file and give full form it?	5
	D]	Use different type of software used in multimedia system?	5
Q 3.		Attempt any **three** questions	
	A]	What are analog signals and their essential properties?	5
	B]	Explain digital signals?	5
	C]	How can analog signals be represented as waves?	5
	D]	Distinguish between periodic and periodic waves?	5
Q 4.		Attempt any **three** questions	
	A]	Describe bitmap type font?	5
	B]	Explain Real image?	5
	C]	What is image? List different type of images?	5
	D]	Explain the application of scanner?	5
Q 5.		Attempt any **three** questions	
	A]	How sound Flow from one place to another place?	5
	B]	What is Raster?	5
	C]	What is color? List different types if colors?	5
	D]	What the basic components of the audio system describe?	5
Q 6.		Attempt any **three** questions	
	A]	List and describe simple compression techniques?	5
	B]	State the necessity of compression techniques?	5

[TURN OVER

	C]	List the different encoding technique?	5
	D]	Describe the Huffman encoding technique with example?	5
Q 7.		Attempt any **three** questions	
	A]	List and describe type of multimedia users?	5
	B]	Write short note on multimedia presentations?	5
	C]	Describe Feature of Adobe Premier?	5
	D]	Describe features of Dream Weaver?	5

S.Y.B.Sc. (IT) Operating system (old) June 14
Con. 252-14 Quantitative Technology (Rev)
Sem - IV

(OLD COURSE)

(3 Hours)

GP-6755

[Total Marks : 100

NOTE: All question are compulsory

Q.1	Attempt the following A) Explain Scheduling B) Explain different types of files	(10)
Q2.	Attempt any 3 from the following:- A) Explain Real time OS B) Explain Multitasking with example C) Explain Distributed OS D) What is assembler	 (5) (5) (5) (5)
Q3.	Attempt any 3 from the following:- A) Explain various types of the system calls. B) Explain various services provided by OS C) Explain concept of virtual machine. D) Explain aging techniques	 (5) (5) (5) (5)
Q4.	Attempt any 3 from the following:- A) Explain FCFS with example B)Explain threading model in detail. C) Explain long-term and short-term Scheduling. D) Explain various process states with neat diagram.	 (5) (5) (5) (5)
Q5.	Attempt any 3 from the following:- A) What are Best-fit, First-fit and Next-fit algorithms B) Explain any one technique for memory management in detail. C) Explain memory management D) How paging is performed explain in detail	 (8) (7) (8) (7)
Q6.	Attempt any 3 from the following:- A) Explain various free space management methods B) Define deadlock? Explain characteristic of deadlock? C) How disk management D) Explain various file operations.	 (5) (5) (5) (5)
Q7.	Attempt any 3 from the following:- A) What are the benefits of principle of protection? B) Explain different types of file assess method C) Explain characteristics of good password. D) Explain security.	 (5) (5) (5) (5)

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

Note: 1) All questions are compulsory.

2) For Q.2 to Q.7, Part (a) is compulsory and attempts any one part from (b) and (c).

3) Figure to write indicates full marks.

4) Use of non-programmable scientific calculator is allowed.

Q.1]

a) From the following table find the number of students who obtained less then 45 marks. [5]

Marks	30-40	40-50	50-60	60-70	70-80
No. of students	31	42	51	35	31

b) Use Taylor's series method to salve the equation $\frac{dy}{dx} = x^2 y - 1$; y (0)=1. Find y (0.03). [5]

Q.2]

a) Find a real root of the equation $x^3 - 2x - 5 = 0$ by method of false position correct to three decimal places. [8]

b) Evaluate $\frac{\Delta 3}{E}(x^2 - 2x)$ taking the interval of difference h = 1. [7]

c) Given f(-2) =46, f(-1) = 4, f(1) = 4, f(3) = 156, f(4) = 484. Use the Langrange's interpolation formula to compute f(0). [7]

Q.3]

a) Solve 3x+2y=4.5, 2x+3y – z=5, -y+2z=-0.5 taking initial value $x_0 = 0.4, y_0 = 1.6, z_0 = 0.4$ by Gauss Seidel method. [8]

b) Evaluate $\int_0^{\pi} \frac{\sin^2 x}{5 + 4\cos x} dx$ by taking 5 ordinates by Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule. [7]

c) $\frac{dy}{dx} = x + y + xy$ With y (0) =2 estimate y (2) by Euler's method taking h=0.5. [7]

[TURN OVER

Q.4]

a) Calculate Spearman's correlation coefficient between advertisement cost and sales from the following data: [8]

Advertisment cost ('000Rs)	39	65	62	90	82	75	25	98	36	78
Sales	47	53	58	86	62	68	60	91	51	84

b) From the data given below find two regression equation and hence estimate the most likely marks in statistics when marks in economics is 13. [7]

Marks in economics	14	10	15	11	9	12	6
Marks in Statistics	8	6	4	3	7	5	9

Also estimate the most likely marks in economics when marks in statistics is 10.

c) Fit second degree curve fit equation and estimate value of y, when x = 8. [7]

X	1	2	3	4	5	6
Y	40	44	48	50	46	52

Q.5]

a) An old machine produced 10 defective bolts in a batch of 300. After the servicing was done the same machine was found to produce 6 defective bolts in a batch of 200. [8]

Help the manufacturer to conclude whether the machine has improved after the servicing? (At 1% level of significance).

b) A pay commission is appointed to study the wages of government employees. It was provided with the information that the average salaries of the employees are Rs.8,400 with standard deviation Rs.3,000. But the commission selected 100 employees at random and found that average salary is Rs.8,800. Test at 5% level of significance, whether the sample chosen is a representative of the population? [7]

c) The average income of 100 men in a city is Rs.15,000 with standard deviation Rs.8,500 and the average income of 100 women is Rs.12,000 and standard deviation Rs.9,000. Can it be said at 5% level of confidence that there is significant difference between the average income of men and women? [7]

Q.6]

a) State the properties of normal distribution.For the Normal distribution the limits of middle 50% of the observations are 250 and350. Find Median, Standard deviation, Mean deviation. [8]

b)If 8% of the mobiles are produced by a Nokia a defective, the production of the company are 50 mobiles per day. Find the probability that, i). None of the defective mobile. ii). 4 mobiles are defective, iii) at most 2 mobiles are defective. [7]

c) It is observed that the average number of phone calls per minute coming into switchboard of a company is 3. Find probability that during a particular minute there will be (i) no phone calls, (ii) exact 2 phone calls, (iii) At least 3 phone calls. [7]

Q.7]

a) Solve the L.P.P. by Simplex method: [8]

Maximize, $z = 50x_1 + 70x_2$

Subject to, $x_1 + x_2 \leq 70$

$x_1 + x_2 \leq 100$

$2x_1 + x_2 \leq 120$

$x_1 \geq 0,\ x_2 \geq 0.$

b) Solve graphically, [7]

Minimize $Z = 4x_1 - 2x_2$
Subject to $x_1 + x_2 \leq 14,\ \ 3x_1 + 2x_2 \geq 36,\ \ 2x_1 + x_2 \leq 24$
$x_1, x_2 \geq 0.$

[7]

c) Is eye color and shade of hair related in individuals? Can we conclude from the data shown below that there is a significant connection between eye color and hair shade? At $\alpha = 0.05$, using χ^2 – test.

Observed Frequencies:	**Light Hair**	**Dark Hair**	***Row Total***
Blue Eyes	23	7	30
Brown Eyes	4	16	20
column Total	27	23	50

S.Y.B.Sc (I.T) Software Engineering (old) June 14
Sem-IV Software Engineering (Rev)

Con. 255-14 **(OLD COURSE)** **GP-6047**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the **remaining** questions.

1. (a) What do you mean by the term "software engineering" ? Describe the evolving role of software. **10**
   (b) Explain waterfall model in detail with the help of a diagram. **10**

2. (a) What are DFDs ? State some of the advantages and disadvantages of DFDs. **10**
   (b) Write a short note on :– **10**
      (i) Software Quality
      (ii) Reliability Metrics.

3. (a) Explain Coupling and cohesion. **10**
   (b) What do you understand by the term system design ? Explain Top-down and Bottom-up design. **10**

4. (a) What do you mean by a flowchart ? Explain some of its symbols with a suitable example. **10**
   (b) Write short note on :– **10**
      (i) Product metrics
      (ii) Process metrics.

5. (a) Write a short note on :– **10**
      (i) Problem partitioning
      (ii) Abstraction.
   (b) Explain the following testings (any **two**) :– **10**
      (i) Stress Testing
      (ii) Regression Testing
      (iii) Sandwitch Testing
      (iv) Smoke Testing.

6. (a) What are the test plans and test case ? Illustrate with example. **10**
   (b) What is code walk through and code Inspection. **10**

7. (a) What do you understand by the term :– **10**
      (i) Error, faults and failure
      (ii) Verification and validation.
   (b) Define the term "Debugging" ? Explain various debugging techniques available. **10**

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

Note : All Question compulsory

Q.1 Attempt the following

a) What are the objective of software Engineering [5m]

b) Explain Documentation process [5m]

Q.2 Attempt any 3 from the following

a) Explain step involved in SDLC [5m]

b) Explain Prototyping [5m]

c) Explain SOCIO technical system [5m]

d) Explain characteristic of software [5m]

Q.3 Attempt any 3 from the following

a) Explain Spiral model [5m]

b) What are the benefits of waterfall model [5m]

c) Differentiate between software and hardware model [5m]

d) State and explain software requirement [5m]

Q.4 Attempt any 3 from the following

a) Explain role of management in software development [5m]

b) Explain context model [5m]

c) Explain requirement elicitation [5m]

d) Explain feasibility study [5m]

Q.5 Attempt any 3 from the following

a) Explain Language processing system [5m]

b) Define user interface and its issues [5m]

c) Explain Agile Methods [5m]

d) Explain prototyping [5m]

Q.6 Attempt any 3 from the following

a) Explain validation and verification techniques [5m]

b)Define software Testing and its component [5m]

c) Explain staffing [5m]

d) explain The CBSE Process [5 m]

Q.7 Attempt any 3 from the following

a) Define quality with quality control [5m]

b) Explain Process Analysis and Modeling [5 m]

c) Explain security concept [5 m]

d) Explain process and product quality [5 m]

S.Y.Bsc. (IT) E-commerce (OH). June 14
sem- IV Embedded system (Rev)

Con. 254-14 **(OLD COURSE)** **GP-6539**

(3 Hours) **[Total Marks : 100**

Note:

- **Question No. 1 is compulsory**
- **Attempt any four from Question No. 2 to 7**

1. (a) What is E-Commerce? Explain types of E-Commerce. Write its advantages and disadvantages. 10
   (b) What is Cryptography? Explain Symmetric and Asymmetric cryptography. 10

2. (a) Explain Trade Cycle and EDI. 10
   (b) Explain Digital Signature and Hashing Technique in detail. 10

3. (a) Explain Network Topologies in detail. 8
   (b) Write notes on VSAT. 6
   (c) Write notes on communication media. 6

4. (a)Explain SET and working of SET. 10
   (b) Write notes on VeriSign. 5
   (c) Explain Digicash with its features. 5

5. (a) Explain PGP in detail with its working. 8
   (b) Explain X.400 MHS system. 6
   (c)Write notes on IP Address. 6

6. (a)Explain E-Market and Internet market in detail. 8
   (b) Write notes on SSL. 6
   (c) Write notes on OSI Layer. 6

7. Write notes on: 20
   (a) TELNET
   (b) FTP
   (c) DNS
   (d) Legal issues of E-Commerce

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

Note: i) All questions are compulsory.
ii) Figures on right indicate maximum marks.

Q. 1 Attempt *any two* from the following :-

a) Write a difference between general purpose system and embedded system? 5

b) Write a short note on role of compiler in embedded system? 5

c) Write a short note complex instruction set computer (CISC).

Q. 2 Attempt *any three* from the following :-

a) Write a short note on small scale and medium scale embedded system? 5

b) Write a short note on COTS and embedded firmware? 5

c) Write a short note reduced instruction set computer (RISC)? 5

d) Write a short note on Little Endian and Big Endian processor? 5

Q. 3 Attempt *any three* from the following :-

a) Write a short note on Testability & debug-ability, Portability? 5

b) What do you mean by non-operational attribute of embedded system? Explain any five non-operational quality attribute? 5

c) Explain Washing Machine as Application Specific Embedded system? 5

d) Write a short note on Security and Safety in embedded system? 5

Q. 4 Attempt *any three* from the following :-

a) Write a short note on Linking and Locating in embedded system 5

b) Explain the role of assembly language and assembler in embedded system? 5

c) Define Infinite loop in embedded system? Illustrate with proper example? 5

d) Explain the concept of Harvard with proper diagram? 5

Q. 5 Attempt *any three* from the following :-

a) Explain the concept of ROM and along with their types? 5

b) Explain the concept of Interrupt map in embedded system? 5

c) Write a short note on Flash memory 5

d) Explain the concept of Memory mapped 5

Q. 6 Attempt *any three* from the following :-

a) State the functions of status register of the peripheral? 5

b) Explain the structure of device driver? 5

c) Explain Real time characteristics of embedded operating system 5

d) Explain role of Simplex, Semi simplex and Full Duplex communication related to peripherals 5

Q. 7 Attempt *any three* from the following :-

a) Write a short note on Microcontroller development Cycle 5

b) Explain the concept of simulator and emulator? 5

c) Explain the concept of emulator and Debugging in detail with proper diagram? 5

d) Write a short note on Debugging tools? 5

~ * ~ * ~ * ~ * ~ * ~

S.Y.B.Sc. (I.T.) C++ and JAVA (Old) June 14
Sem.-IV JAVA and Data Structure (Rev)

Con. 253-14 **(OLD COURSE)** **GP-6183**

(3 Hours) **[Total Marks : 100**

Note: (1) Question No. 1 is compulsory
(2) Attempt any **FOUR**questions from Question No. 2 to 7
(3) Figure to the right indicate the full marks

Q. 1

A) Define the concept class. With a suitable example explain the method of creating a class and accessing its members in C++ language. 8M

B) Write a short note on Polymorphism and Data Hiding 6M

C) Explain the input and output statements in C++ language. 6M

Q. 2

A) Write a C++ program to create a class with an integer data member to store a number and two member function to find the number is even/odd and prime or not
Accept a number and check whether it is even/odd and prime or not. 8M

B) Explain the concept of static functions in C++ 6M

C) write a short note on friend functions 6M

Q. 3

A) Write a C++ program to add and subtract two complex numbers using operator overloading of binary operators '+' and '-' 8M

B) Define inline function. Explain the method of creating and using inline function in C++ 6M

C) With a suitable example explain the method of using the destructor in C++ 6M

Q. 4

A) Write a C++ program to define a time class containing the members
- Two integer data members minutes and hours
- Two overloaded constructors, one take two integer parameter and the other take one integer parameter representing the total number of minutes and convert it into hours and minutes
- One method to display the class data members
- Include Increment() method that increment time by 1 minute and Decrement() method that decrements time by 1 minute 8M

B) Write a short note on abstract class 6M

C) Differentiate between early binding and late binding 6M

Q. 5

A) Write a C++ program to create a class named student with data members(rollno, name, five different subject marks, total and percentage) and member function named calculate() for finding the total marks and percentage of a student.
Using an array of object calculate the percentage of 10 students and arrange the students detail in ascending order of name. 8M

B) Define access specifiers in C++. List and explain the different types of access specifiers 6M

C) Write a short note on 'this' pointer. 6M

Q. 6

A) Write a java program to find the reverse of a number and hence find the number is palindrome or not. 8M

B) Describe the method of using for loop in java programs with an example 6M

C) Write a short note on packages. 6M

Q. 7

A) Write an applet with a text field for entering a number and a button named "find". On click of find button display the factorial of the text field number in a message box. 8M

B) Explain the life cycle of a thread in multithreaded program. 6M

C) Write a short note on interfaces in java. 6M

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

Note: (1) All Questions are Compulsory
(2) Figures to the right indicates full marks

1		
a.	List Various features of Java?	5M
b.	Explain the operation of queue with an example	5M
2	Attempt any three Question :-	
a.	Explain Data Types in java.	5M
b.	What are public static void main(String args[]) and System.out.println() ? Explain with an example	5M
c.	What are the OOP Principles in java?	5M
d.	Define this , finalize, and final(for variables, methods, classes) ?	5M
3.	Attempt any three Question :-	
a.	Explain how multiple inheritance can be achieved in Java	5M
b.	What is an Interface? How it is created? Explain its use with suitable example.	5M
c.	What is an exception? What are its types? Write a syntax for creating user defined exception class	5M
d.	Derive class square from class Rect. Create another class Circle. Create an interface with only one method call area. Implement this interface in all classes. Include appropriate data members and construction in all classes. Write a program in java to accept details of square and circle and display the area.	5M
4.	Attempt any three Question :-	
a.	What is meant by Stream and what are the types of Streams and classes of the Streams?	5M
b.	What is the main difference between Readers/Writers and Input/output streams? Give a few subclass of Reader and Writer Class	5M
c.	Explain File Writer.	5M
d.	Explain any 6 methods in string class	5M
5.	Attempt any three Question :-	
a.	Write an algorithm for stack operations.	5M
b.	What is linear search? Write algorithms for linear search and comment on the complexity.	5M
c.	What is recursion? Give the application of recursion with programs	5M
d.	Write a Program in java to accept five integers from user & and arrange in descending order.	5M
6.	Attempt any three Question :-	
a.	What are the various traversals in a tree	5M
b.	Describe various hashing techniques.	5M
c.	What is a doubly linked list?	5M
d.	Explain single rotation on AVL tree.	5 M
7.	Attempt any three Question :-	
a.	Explain with suitable examples the basic heap operations	5M
b.	Explain with example about the insertion sort.	5M
c.	Define path, degree, cycle, loop, directed graph, undirected graph, bigraph, weighted graph.	5M
d.	What is an adjacency matrix? What are the different ways for implementing it?	5M

F.Y.B.Sc. (I.T) Design and Analysis of Algorithms (Old) June 2016
Sem-II Web Technologies (Rev)

AGJ 1st half (b) 15

Con.-247-14. **(OLD COURSE)** **PB-6082**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Q. **2** to Q. **7**.

1. (a) Explain back tracking General Method of 8 Queen's problem. **10**
   (b) Explain the selction Sort Method with suitable diagram and algorithm. **10**

2. (a) Explain Greedy method with suitable algorithm. **10**
   (b) Write a short note on i) Game Trees **10**
   ii) AND/OR Graph

3. (a) Explain PUSH and POP operation on stack. **7**
   (b) Explain the Binary search method. **7**
   (c) Draw a Binary Tree for the following set of numbers **6**
   60 17 32 30 5 10 73 111 5 26

4. (a) Explain Heap and Heapsort method with suitable algorithm. **10**
   (b) Explain the Breadth first search method with suitable algorithm. **6**
   (c) Write a short note on sets and dijoint set. **4**

5. (a) What is Linked List ? Explain how to insert and delete any element from Linked List. **8**
   (b) Explain Graph and its components. **6**
   (c) Explain different traversal methods in Binary Tree. **6**

6. (a) Explain minimal spanning Tree. Explain with one example. **6**
   (b) Explain merge sort algorithm with suitable algorithm. **8**
   (c) Explain what is algorith and its properties. **4**

7. (a) Explain stack and its features. **5**
   (b) Explain Divide and Conquer General method. **8**
   (c) Explain Queues how to insert and delete any item from queues. **7**

[TURN OVER

Con.-247-14. 2 **PB-6082**

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

1. Attempt **both** the questions:-
   (a) Define URL. Explain the different components of URL 5
   (b) Explain text formatting tags in HTML. 5

2. Attempt any **three** questions:-
   (a) What is Internet ? What is its application ? 5
   (b) Define E-Commerce. And state its advantages. 5
   (c) Explain Domain Name System. 5
   (d) What is a browser ? Explain any 4 browsers. 5

3. Attempt any **three** questions:-
   (a) List and explain the HTML tags associated with the creation of a TABLE structure. 5
   (b) List and explain the attributes of <BODY> tag. 5
   (c) Define Image-Maps. List and explain the concept of client-side Image-Maps with an example. 5
   (d) Write a HTML code to create a BIODATA form for displaying the user details. Name; Phone Number should be accepted as a Text Box. Address should be accepted as a Text Area. For Gender use Radio Buttons ("Male" or "Female"). For Hobbies use Options ("Reading", "Cooking" and "Dancing") 5

4. Attempt any **three** questions:-
   (a) Explain how function can be used as an event handler ? 5
   (b) Write a program using JavaScript to find a factorial of a number. 5
   (c) Explain <INPUT> tag with example. 5
   (d) How to create lists in HTML ? What are-different types of lists ? Explain with example. 5

5. Attempt any **three** questions:-
   (a) What are regular expressions ? Explain with example. 5
   (b) Explain different types of popup boxes in JavaScript. 5
   (c) Explain how a function can be used as Event Handler ? 5
   (d) Write a program using JavaScript to find a number is prime or not. 5

6. Attempt any **three** questions:-
   (a) Write a short note on XSL. 5
   (b) Differentiate between HTML and XML. 5
   (c) Write a short note on Internal DTD. 5
   (d) What is meant by XML Schema ? 5

7. Attempt any **three** questions:-
   (a) "PHP is a loosely typed language" — Comment and Justify. 5
   (b) Write a short note on using Cookies in PHP. 5
   (c) What are the different types of arrays in PHP ? Explain with example. 5
   (d) Explain any 5 string functions in PHP with an example. 5

F.Y.B.Sc. (I.T) Electronic & Tele Communication system (old) June 14
Sem - II Microprocessor & Microcontrollers (Rev)

Con. 248-14 **(OLD COURSE)** **PB-6536**

(3 Hours) **[Total Marks : 100**

Note:
1) Question No. 1 is **compulsory.**
2) Answer **any four questions from the remaining.**
3) Assume suitable data if needed.

Q. 1		Write short note on:	
	A	Composite Video Signal	05
	B	LED (Light Emitting Diode)	05
	C	Superposition Theorem	05
	D	Oscillator	05
Q. 2	A	What is the difference between AM (Amplitude Modulation) and FM (Frequency Modulation).	10
	B	List and explain the types of Digital Modulation Techniques	10
Q. 3	A	What is a Balanced Modulator? Explain in detail using diode or FET?	10
	B	Explain DC Amplifier with neat diagram	10
Q. 4	A	Explain NPN and PNP transistors and their characteristics	10
	B	Compare Amplifier and Oscillator	10
Q. 5	A	Draw and explain AM Radio Receiver	10
	B	What are the advantages of SSB (Single Side Band) over AM (Amplitude Modulation)	10
Q. 6	A	Explain P-N junction Diode. Explain forward biasing and reverse biasing of a diode	10
	B	Explain the working of Full Wave Bridge Rectifier	10
Q. 7	A	Differentiate between TDM (Time Division Multiplexing) & FDM (Frequency Division Multiplexing)	10
	B	Differentiate between RC Oscillator and LC Oscillator	10

[TURN OVER

(REVISED COURSE)

(3 Hours) [Total Marks : 100

Q.1 Attempt any two of the following.

1. Differentiate between SRAM and DRAM. (5)
2. Explain the flag register of microprocessor 8085 in detail with the significance of each flag. (5)

Q.2 Attempt any three of the following.

1. What is a tri-state buffer? Explain its types with suitable diagrams. (5)
2. What is a decoder? Explain 3 to 8 decoder in detail. (5)
3. Write a short note on (i) EPROM (ii) EEPROM (5)
4. Explain chip select logic using logic gates (5)

Q.3 Attempt any three of the following.

1. Write a short note on System bus of microprocessor 8085. (5)
2. Explain following registers of microprocessor 8085
   (i) Accumulator (ii) Stack Pointer (iii) Program Counter (5)
3. Explain in detail the following pins of microprocessor 8085 in detail
   (i) TRAP (ii) ALE (iii) READY (5)
4. Differentiate between I/O mapped I/O and memory mapped I/O. (5)

Q.4 Attempt any three of the following.

1. Explain Register Indirect addressing modes in 8085 microprocessor with suitable example. (5)
2. Explain following instructions in microprocessor 8085.
   (i) RAL (ii) RLC (iii) JMP address (5)
3. Explain immediate addressing modes in 8085 microprocessor with suitable example. (5)
4. Explain following instructions in microprocessor 8085.
   (i) RAR (ii) XCHG (iii) RRC (5)

Q.5 Attempt any three of the following.

1. What is Cache Memory? Why is it needed? (5)
2. What are the benefits of RAID? (5)
3. What is a bus? Explain the system bus structure in modern computer system. (5)
4. Explain PCI bus in detail. (5)

Q.6 Attempt any three of the following.

1. Describe the PSW register of 8051 microcontroller. (5)
2. Describe internal memory structure of 8051 microcontroller. (5)
3. Explain how stacks are accessed in 8051 microcontroller. (5)
4. Write a short note on special function register in8051 microcontroller. (5)

Q.7 Attempt any three of the following.

1. Explain following instructions in microcontroller 8051.
   (i) MUL AB (ii) INC DPTR (iii) CPL A (iv) CPL C (v) RET (5)
2. Explain following addressing modes in 8051 microprocessor with suitable example.
   (i) Register Addressing Mode (ii) Direct Addressing Mode (5)
3. Explain PORT 0 of 8051 microcontroller in detail. (5)
4. Explain following instructions in microcontroller 8051
   (i) DIV AB (ii) MOV DPTR, #4000H (iiiCLR A (iv) ADD A,R0 (v) SWAP A (5)

F.Y.B.Sc. (I.T) Sem. II Mathematics - II (Old) Applied Mathematics - II (Rev) June 14

RT–Exam.–Feb.–14–1–99

Con. 246–14. **(OLD COURSE)** **PB–6026**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Answer any **four** questions from Question Nos. **2** to **7**.
(3) **All** questions carry **equal** marks.

1. (a) Find the Laplace transform of the following :– **10**

(i) $\left(t+\frac{1}{t}\right)^3$ (ii) $t^2 \sin 3t$.

(b) Evaluate (i) $\int_0^3\int_0^x xy\, dy\, dx$ (ii) $\int_0^\pi\int_0^3 r^2 \sin\theta\, dr\, d\theta$ **10**

2. (a) State and prove De Moivre's theorem for Complex Number. **10**
(b) Find the inverse Laplace transform of the following functions :– **10**

(i) $\frac{1}{s^2+3s+10}$ (ii) $\frac{s}{s^2+2s+3}$

3. (a) Find curl and divergence of $f(x) = 3x^3yi + 5xyzj + xyz^2k$ at the point (1,2,3). **10**

(b) Evaluate (i) $\int_0^\infty 7^{-3x^2}\, dx$ (ii) $\int_0^1 x^3(1-x^2)^4\, dx$. **10**

4. (a) State and prove C–R equations for Analytic function. **10**
(b) Prove that $f(z) = e^z \sin z$ is Analytic on and hence find $f'(z)$. **10**

5. (a) Evaluate $\iint (x+y)\, dy\, dx$ over the region bounded by $y = x$, x – axis and $x = 1$. **10**
(b) Find the Fourier series of $f(x) = x \cos x$ in $(-\pi, \pi)$. **10**

6. (a) Evaluate $\iiint x^2yz\, dx\, dy\, dz$ over the volume bounded by the planes $x = 0$, $y = 0$, $z = 0$ and $x + y + z = 1$. **10**

(b) Evaluate $\int_0^\pi \sin^3\theta(1+\cos\theta)^2\, d\theta$. **10**

7. (a) Evaluate $\iiint (x^2+y^2+z^2)^2\, dx\, dy\, dz$ over the first octant of the sphere $x^2 + y^2 + z^2 = 25$. **10**
(b) Express $f(x) = x^3$ as half range sine series in (0, 3). **10**

[TURN OVER

(REVISED COURSE)

(3 Hours) [Total Marks : 100

N.B. : (1) **All** questions are **compulsory**.
(2) **Figures** to the **right** indicate **full** marks.

Q. 1) Attempt ANY 1 of the following :- 10

i) Show that $\log\left(\frac{x-iy}{x+iy}\right) = -i\tan^{-1}\left(\frac{2xy}{x^2-y^2}\right)$

ii) Show that $\int_0^3 \int_1^2 xy(1+x+y)dydx = \int_1^2 \int_0^3 xy(1+x+y)dxdy$

Q. 2) Attempt ANY 3 of the following :- 15

i) Find square root of the complex number -21+20i

ii) State and prove De-Moivre's Theorem.

iii) Solve : $x^6 + x^4 + x^2 + 1 = 0$

iv) Find sixth roots of unity.

Q. 3) Attempt ANY 3 of the following :- 15

i) Check whether given function is a harmonic function or not.
$u = 4xy - x^3 + 3xy^2$

ii) Check whether given functions is an analytical function or not.
$f(z) = \text{Cosh}z$

iii) Obtain v if $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ & $f(z) = u + iv$ is analytic.

iv) Evaluate $\int_0^{1+i}(x^2 + iy)\,dz$ along the path $y = x^2$.

Q. 4) Attempt ANY 3 of the following :- 15

i) State Convolution Theorem and also verify Convolution Theorem for the given functions $f_1(t) = \text{Cos}(t)$ and $f_2(t) = t$

ii) Solve : $y'' + 2y' - 3y = \sin t$ where $y = [dy/dt] = 0$, when $t = 0$.

iii) Obtain $L^{-1}\left[\frac{s^2-10s+13}{(s-7)(s^2-5s+6)}\right]$

iv) Find laplace of the following :
a) $L[t^2(\sin 2t \,.\, \cos t)]$
b) $L[\sin at / t]$

Q. 5) Attempt ANY 3 of the following :- **15**

i) Evaluate $\int_0^\infty \frac{x^3}{3^x} dx$

ii) Prove that $\int_0^t \text{erf}(ax)\, dx = t.erf(at) + \frac{1}{a\sqrt{\pi}}(e^{-a^2t^2} - 1)$

iii) Evaluate $\int_0^1 x^3(1-\sqrt{x})^5\, dx$

iv) Solve: $\int_0^1 x^2(logx)^3 dx$

Q. 6) Attempt ANY 3 of the following :- **15**

i) Find Fourier series for the function f(x)= x^2 on the interval $(-\pi, \pi)$

ii) Find Half-Range Cosine Series for the function f(x)= sinh(3x) on the interval $(0,2\pi)$

iii) Find Fourier Series for the function of function f(x)=(x-2) on the interval $(0,2\pi)$

iv) Obtain Fourier cosine & sine transform of $F(t)=2e^{-5t}5e^{-2t}$

Q. 7) Attempt ANY 3 of the following :- **15**

i) Evaluate $\int_{-1}^{2}\int_{1}^{3}(2x^2y^3 + 3xy^2 + xy)dydx$

ii) Find area of the region bounded by the curves y^2= -x and y = x

iii) Evaluate $\int_{-1}^{2}\int_{-y}^{2y}\int_{-x}^{x^2}(2xyz + 3xz^2 + xyz^2)dz\, dx\, dy$

iv) Evaluate : $\int \int_R xy\ dx\, dy$ over the region bounded by the circle $x^2+y^2=a^2$ in second quadrant

*****

F.Y.B.Sc. (IT)
Sem-II

Computer Graphics (old)
Database Management system (Rev)

June 14

Con. 250-14 **(OLD COURSE)** **PB-6716**

(3 Hours) **[Total Marks : 100**

Q.1. a. Explain the functions of computer graphics. (5)
b. Explain Refresh Cathode Ray Tube with neat diagram. (5)
c. Distinguish between Raster Scan Display & Random Scan Display. (5)

Q.2. a. Rasteurize line AB having end point co-ordinates A (10,20) & B (20, 12) using DDA algorithm. (5)
b. Calculate the pixel positions along a straight line AB having end points A(5,5) & B (13, 9) using Bresenhan's line drawing algorithm. (5)
c. Derive the steps in Midpoint circle algorithm

Q.3. a. Give the matrix representations for the following 3D transformations. (5)
i) Translation
ii) Rotation
iii) Scaling
iv) Reflection
b. Translate an object ABC with A(1,1), B(3,1) & C(2,3) by 3 units along x-axis & 4 units along y axis. (5)
c. . Scale the triangle ABC as A(2,2), B(4,2), C(3,4) for given values of Sx & Sy.
i) SX = 2, SY = 2.5 (5)
ii) SX = SY = 0.5

Q.4. a. A rectangle A (2,2), B(5,2), C(5,3) & D(2,3) is rotated by 90° about origin in Anticlockwise direction. Find new co-ordinate of rectangle after rotation. (5)
b. Find the mirror reflection of triangle P (10, 50), Q (40, 80), & R(10,80) about Line y=2x + 4. (5)
c. Scale an object ABCD with respect to point A by scaling factors Sx = 2 & Sy = 3 as A(2,1), B(5,1), C(5,3), D(2,3). (5)

Q.5. a. Explain Flood fill algorithm using 8 point connectivity. (5)
b. Explain Boundary fill algorithm using 4 point connectivity. (5)
c. Write a note on inside-outside test. (5)

Q.6. a. Develop the perspective transformation of an object onto the xy-plane with the Center of projection at (100,100,-100). What will be the projection of line segment? AB with A(150,250,150) & B(250,350,100)? (5)
b. State and explain steps of animation. (5)
c. Write a note on Key Frame animation. (5)

Q.7. a. Explain Bezier curves? (5)
b. What is animation? (5)
c. Write a note on Key Frame animation. (5)

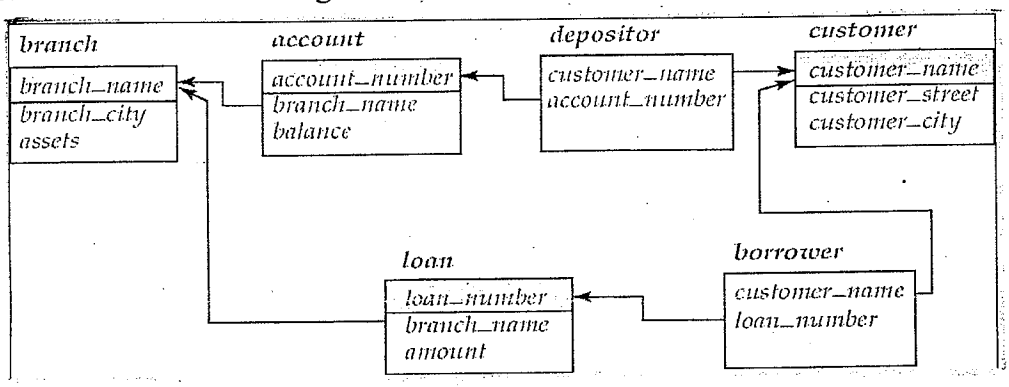
[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. ➢ **All questions are compulsory.**
➢ **Figures to right indicate full marks.**
➢ **Draw neat and labelled diagrams wherever necessary.**
➢ **Write answer to new question on a fresh page.**

1. Given below is the banking schema (10)



(a) Solve the queries below using relational algebra
   i. Find the names of all customers who have a loan at the Kurla branch.
   ii. Find the names of all customers who have a loan at the Dadar branch but do not have an account at any branch of the bank.
   iii. Find the names of all customers who have a loan at the Colaba branch.
   iv. Find the names of all customers who have a loan and an account at bank.
   v. Find all customers who have an account at all branches located in Pune.

(b) Solve the queries below using SQL
   i. Find the names of all branches in the loan relations, and remove duplicates
   ii. Find the name, loan number and loan amount of all customers having a loan at the Pune branch.
   iii. Find the names of all customers whose street includes the substring "main".
   iv. List in alphabetic order the names of all customers having a loan in Andheri branch.
   v. Find all customers who have both an account and a loan at the bank.

2. Answer any 3 from the following (15)
   (a) What are the problems associated with file systems?
   (b) What are the advantages of relational database systems?
   (c) What are the disadvantages of database systems?
   (d) Explain the different types of database users?

3. Answer any 3 from the following (15)
   (a) Explain the merits and demerits of hierarchical database model.
   (b) Explain the merits and demerits of network database model.
   (c) Explain the demerits of relational database model.
   (d) What is data abstraction? Explain the different levels of data abstraction?

4. Answer any 3 from the following (15)
   (a) Explain the steps in database design process?
   (b) Explain the different types of mapping constraints?
   (c) List & explain the different types of keys?
   (d) What is UML? Explain any 3 types of UML diagrams?

5. Answer any 3 from the following (15)
   (a) Explain the different SET operators in relational algebra?
   (b) Explain the various types of joins in relational algebra?
   (c) Explain the different unary operators in relational algebra?
   (d) Differentiate between relational algebra and relational calculus?

6. Answer any 3 from the following (15)
   (a) Mention the different categories of data integrity?
   (b) Explain primary key & foreign key constraints?
   (c) What is a view? What are the advantages of views?
   (d) What is SQL? Explain the major categories of SQL commands?

7. Answer any 3 from the following (15)
   (a) Define a transaction? State the ACID properties of transactions?
   (b) What states does a transaction pass through during its lifetime?
   (c) What are the disadvantages of using lock – based protocols?
   (d) Write short note on time – stamp based protocols.

F.Y.B.Sc. (IT) Professional Skills Development Course (old) June-14
Sem-II Data communication and

Con. 249-14 Networking (OLD COURSE) (Rev) **PB-6040**

(3 Hours) **[Total Marks : 100**

N.B. 1. Answer any five questions from the following.

2. Figures to the right indicate full marks.

Q1. A. Imagine that you are a Manager of Sunlight Pvt. Ltd., Mumbai. You are required to draft a notice along with agenda for Annual General Body Meeting. 10

B. Distinguish between oral and written communication. 10

Q2. A. You have been appointed as Chairman to the committee appointed to investigate in to the possibilities of setting up of computer manufacturing unit at Navi Mumbai. Draft a detailed investigative report on behalf of the committee. 10

B. Write short notes on any TWO of the following: 10

i. Email

ii. Colour as a medium of Non Verbal Communication

iii. Physical and Mechanical Barriers to Communication

Q3. A. Explain the important features of a business letter. 10

B. Wanted an assistant manager for a Mahape, Navi Mumbai based Software Company. Candidate must be good at computer skills and must possess management skills. Preference will be given to candidates with a fluent command over English and some relevant work experience. Write along with bio-data to Box. No.3245. The Indian Express, Mumbai-400 023. 10

Q4. A. What are the common formats of the memorandums? Explain it by giving details of the essential components. 10

B. Draft an attractive brochure to sale a new personal computer. 10

Q5. A. What do you understand by a user instruction manual? Explain the elements of formal instructions. 10

B. Draft an instruction manual to install a car tape. 10

Q6. A. What is the role of chairman in conducting effective meeting? Explain his/her role in detail. 10

B. What do you understand by negation skills? Explain the major negation skills in detail. 10

Q7. A. Differentiate between formal and informal presentations. What preparations you need to undertake to make effective presentations? 10

B. Discuss the various strategies of effective listening. 10

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : 1. All questions are compulsory (Q1-Q7)

2. Attempt any 3 sub questions out of 4 from Q2 to Q7

3. Draw neat and labelled diagram wherever necessary.

Q1	a	What is signal? Explain digital signal in detail.	5m
	b	Explain Bus and Ring topology.	5m
Q2	a	Explain signal propagation.	5m
	b	Explain the concept of Fourier Analysis.	5m
	c	Explain data transmission rate and bandwidth.	5m
	d	Define Analog Signal. Describe the various characteristics of the analog signal.	5m
Q3	a	Explain structure of an IPV4 Address with example.	5m
	b	Explain the functionalities of OSI Data Link Layer and Application Layer.	5m
	c	Write short note of TCP/IP protocol suite.	5m
	d	State the various design issues of OSI reference Model.	5m
Q4	a	What is CRC? How can you use it for error detection?	5m
	b	Explain error with its types in detail.	5m
	c	Explain Hamming distance with example.	5m
	d	What is checksum? Explain with example.	5m
Q5	a	What do you mean by guided and unguided media? Explain.	5m
	b	Write short note on digital to analog conversion.	5m
	c	Explain the process of digital to analog conversion.	5m
	d	Write short note on transmission impairment.	5m
Q6	a	What is routing? Explain any on routing algorithm.	5m
	b	Distinguish between Circuit diagram and Packet Switching.	5m
	c	Explain Mesh Topology in detail with advantages and disadvantages.	5m
	d	Write a short note on virtual circuit packet switching.	5m
Q7	a	What is the need of IPv6?	5m
	b	Explain IPv6 header format.	5m
	c	Explain IPv6 addresses.	5m
	d	Explain the concept of Dynamic Host Configuration Protocol(DHCP).	5m

---

F.Y.B.Sc. (I.T) Professional Skills Development Course (PSD) June 12
Sem- II Data Communication and Networking (OLD COURSE)

Con. 249-14

PB-6040

(3 Hours) **[Total Marks : 100**

N.B. 1. Answer any five questions from the following.

2. Figures to the right indicate full marks.

Q1. A. Imagine that you are a Manager of Sunlight Pvt. Ltd., Mumbai. You are required to draft a notice along with agenda for Annual General Body Meeting. 10

B. Distinguish between oral and written communication. 10

Q2. A. You have been appointed as Chairman to the committee appointed to investigate in to the possibilities of setting up of computer manufacturing unit at Navi Mumbai. Draft a detailed investigative report on behalf of the committee. 10

B. Write short notes on any TWO of the following: 10

i. Email

ii. Colour as a medium of Non Verbal Communication

iii. Physical and Mechanical Barriers to Communication

Q3. A. Explain the important features of a business letter. 10

B. Wanted an assistant manager for a Mahape, Navi Mumbai based Software Company. Candidate must be good at computer skills and must possess management skills. Preference will be given to candidates with a fluent command over English and some relevant work experience. Write along with bio-data to Box. No.3245. The Indian Express, Mumbai-400 023. 10

Q4. A. What are the common formats of the memorandums? Explain it by giving details of the essential components. 10

B. Draft an attractive brochure to sale a new personal computer. 10

Q5. A. What do you understand by a user instruction manual? Explain the elements of formal instructions. 10

B. Draft an instruction manual to install a car tape. 10

Q6. A. What is the role of chairman in conducting effective meeting? Explain his/her role in detail. 10

B. What do you understand by negation skills? Explain the major negation skills in detail. 10

Q7. A. Differentiate between formal and informal presentations. What preparations you need to undertake to make effective presentations? 10

B. Discuss the various strategies of effective listening. 10

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : 1. All questions are compulsory (Q1-Q7)

2. Attempt any 3 sub questions out of 4 from Q2 to Q7

3. Draw neat and labelled diagram wherever necessary.

Q1	a	What is signal? Explain digital signal in detail.	5m
	b	Explain Bus and Ring topology.	5m
Q2	a	Explain signal propagation.	5m
	b	Explain the concept of Fourier Analysis.	5m
	c	Explain data transmission rate and bandwidth.	5m
	d	Define Analog Signal. Describe the various characteristics of the analog signal.	5m
Q3	a	Explain structure of an IPV4 Address with example.	5m
	b	Explain the functionalities of OSI Data Link Layer and Application Layer.	5m
	c	Write short note of TCP/IP protocol suite.	5m
	d	State the various design issues of OSI reference Model.	5m
Q4	a	What is CRC? How can you use it for error detection?	5m
	b	Explain error with its types in detail.	5m
	c	Explain Hamming distance with example.	5m
	d	What is checksum? Explain with example.	5m
Q5	a	What do you mean by guided and unguided media? Explain.	5m
	b	Write short note on digital to analog conversion.	5m
	c	Explain the process of digital to analog conversion.	5m
	d	Write short note on transmission impairment.	5m
Q6	a	What is routing? Explain any on routing algorithm.	5m
	b	Distinguish between Circuit diagram and Packet Switching.	5m
	c	Explain Mesh Topology in detail with advantages and disadvantages.	5m
	d	Write a short note on virtual circuit packet switching.	5m
Q7	a	What is the need of IPv6?	5m
	b	Explain IPv6 header format.	5m
	c	Explain IPv6 addresses.	5m
	d	Explain the concept of Dynamic Host Configuration Protocol(DHCP).	5m

---

F.Y.B.Sc. (I.T) Computer Graphics (OLD) June 12
Sem-II Database Management System (Rev)

Con. 250-14 **(OLD COURSE)** **PB-6716**

(3 Hours) **[Total Marks : 100**

Q.1. a. Explain the functions of computer graphics. (5)
b. Explain Refresh Cathode Ray Tube with neat diagram. (5)
c. Distinguish between Raster Scan Display & Random Scan Display. (5)

Q.2. a. Rasteurize line AB having end point co-ordinates A (10,20) & B (20, 12) using DDA algorithm. (5)
b. Calculate the pixel positions along a straight line AB having end points A(5,5) & B (13, 9) using Bresenhan's line drawing algorithm. (5)
c. Derive the steps in Midpoint circle algorithm

Q.3. a. Give the matrix representations for the following 3D transformations. (5)
i) Translation
ii) Rotation
iii) Scaling
iv) Reflection
b. Translate an object ABC with A(1,1), B(3,1) & C(2,3) by 3 units along x-axis & 4 units along y axis. (5)
c. . Scale the triangle ABC as A(2,2), B(4,2), C(3,4) for given values of Sx & Sy.
i) SX = 2, SY = 2.5 (5)
ii) SX = SY = 0.5

Q.4. a. A rectangle A (2,2), B(5,2), C(5,3) & D(2,3) is rotated by 90° about origin in Anticlockwise direction. Find new co-ordinate of rectangle after rotation. (5)
b. Find the mirror reflection of triangle P (10, 50), Q (40, 80), & R(10,80) about Line y=2x + 4. (5)
c. Scale an object ABCD with respect to point A by scaling factors Sx = 2 & Sy = 3 as A(2,1), B(5,1), C(5,3), D(2,3). (5)

Q.5. a. Explain Flood fill algorithm using 8 point connectivity. (5)
b. Explain Boundary fill algorithm using 4 point connectivity. (5)
c. Write a note on inside-outside test. (5)

Q.6. a. Develop the perspective transformation of an object onto the xy-plane with the Center of projection at (100,100,-100). What will be the projection of line segment? AB with A(150,250,150) & B(250,350,100)? (5)
b. State and explain steps of animation. (5)
c. Write a note on Key Frame animation. (5)

Q.7. a. Explain Bezier curves? (5)
b. What is animation? (5)
c. Write a note on Key Frame animation. (5)

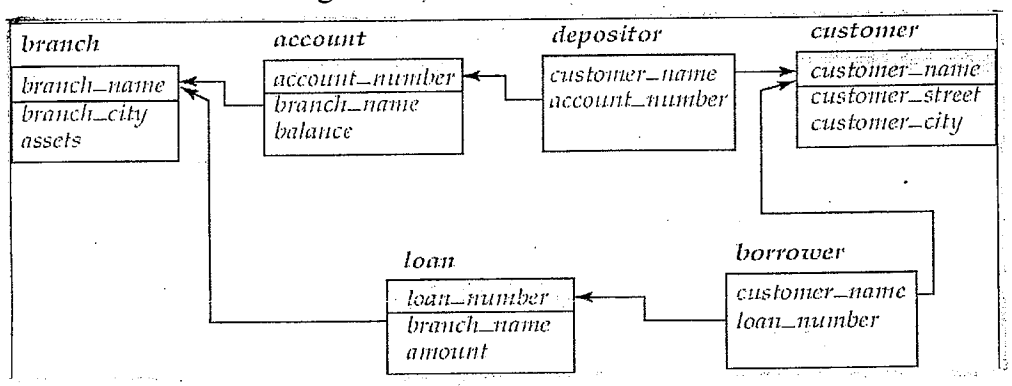
[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. ➢ **All questions are compulsory.**
➢ **Figures to right indicate full marks.**
➢ **Draw neat and labelled diagrams wherever necessary.**
➢ **Write answer to new question on a fresh page.**

1. Given below is the banking schema (10)



(a) Solve the queries below using relational algebra
   i. Find the names of all customers who have a loan at the Kurla branch.
   ii. Find the names of all customers who have a loan at the Dadar branch but do not have an account at any branch of the bank.
   iii. Find the names of all customers who have a loan at the Colaba branch.
   iv. Find the names of all customers who have a loan and an account at bank.
   v. Find all customers who have an account at all branches located in Pune.

(b) Solve the queries below using SQL
   i. Find the names of all branches in the loan relations, and remove duplicates
   ii. Find the name, loan number and loan amount of all customers having a loan at the Pune branch.
   iii. Find the names of all customers whose street includes the substring "main".
   iv. List in alphabetic order the names of all customers having a loan in Andheri branch.
   v. Find all customers who have both an account and a loan at the bank.

2. Answer any 3 from the following (15)
   (a) What are the problems associated with file systems?
   (b) What are the advantages of relational database systems?
   (c) What are the disadvantages of database systems?
   (d) Explain the different types of database users?

3. Answer any 3 from the following (15)
   (a) Explain the merits and demerits of hierarchical database model.
   (b) Explain the merits and demerits of network database model.
   (c) Explain the demerits of relational database model.
   (d) What is data abstraction? Explain the different levels of data abstraction?

4. Answer any 3 from the following (15)
   (a) Explain the steps in database design process?
   (b) Explain the different types of mapping constraints?
   (c) List & explain the different types of keys?
   (d) What is UML? Explain any 3 types of UML diagrams?

5. Answer any 3 from the following (15)
   (a) Explain the different SET operators in relational algebra?
   (b) Explain the various types of joins in relational algebra?
   (c) Explain the different unary operators in relational algebra?
   (d) Differentiate between relational algebra and relational calculus?

6. Answer any 3 from the following (15)
   (a) Mention the different categories of data integrity?
   (b) Explain primary key & foreign key constraints?
   (c) What is a view? What are the advantages of views?
   (d) What is SQL? Explain the major categories of SQL commands?

7. Answer any 3 from the following (15)
   (a) Define a transaction? State the ACID properties of transactions?
   (b) What states does a transaction pass through during its lifetime?
   (c) What are the disadvantages of using lock – based protocols?
   (d) Write short note on time – stamp based protocols.

F.Y.B.Sc. (IT) Mathematics - II - (Old) June-11
Sem - II Applied Mathematics - II (Rev)

RT–Exam.–Feb.–14–1–99

Con. 246–14. **(OLD COURSE)** **PB–6026**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Answer any **four** questions from Question Nos. **2** to **7**.
(3) **All** questions carry **equal** marks.

1. (a) Find the Laplace transform of the following :– **10**

(i) $\left(t+\frac{1}{t}\right)^3$ (ii) $t^2 \sin 3t$.

(b) Evaluate (i) $\int_0^3\int_0^x xy\ dy\ dx$ (ii) $\int_0^\pi\int_0^3 r^2 \sin\theta\ dr\ d\theta$ **10**

2. (a) State and prove De Moivre's theorem for Complex Number. **10**
(b) Find the inverse Laplace transform of the following functions :– **10**

(i) $\frac{1}{s^2+3s+10}$ (ii) $\frac{s}{s^2+2s+3}$

3. (a) Find curl and divergence of $f(x) = 3x^3yi + 5xyzj + xyz^2k$ at the point (1,2,3). **10**

(b) Evaluate (i) $\int_0^\infty 7^{-3x^2}\,dx$ (ii) $\int_0^1 x^3\left(1-x^2\right)^4 dx$. **10**

4. (a) State and prove C–R equations for Analytic function. **10**
(b) Prove that $f(z) = e^z \sin z$ is Analytic on and hence find $f'(z)$. **10**

5. (a) Evaluate $\iint (x+y)\,dy\,dx$ over the region bounded by $y = x$, x – axis and $x = 1$. **10**
(b) Find the Fourier series of $f(x) = x\cos x$ in $(-\pi, \pi)$. **10**

6. (a) Evaluate $\iiint x^2yz\ dx\,dy\,dz$ over the volume bounded by the planes $x = 0$, $y = 0$, $z = 0$ and $x + y + z = 1$. **10**

(b) Evaluate $\int_0^\pi \sin^3\theta\left(1+\cos\theta\right)^2 d\theta$. **10**

7. (a) Evaluate $\iiint \left(x^2+y^2+z^2\right)^2 dx\,dy\,dz$ over the first octant of the sphere $x^2 + y^2 + z^2 = 25$. **10**
(b) Express $f(x) = x^3$ as half range sine series in (0, 3). **10**

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. : (1) **All** questions are **compulsory**.
(2) **Figures** to the **right** indicate **full** marks.

Q. 1) Attempt ANY 1 of the following :- **10**

i) Show that $\log\left(\frac{x-iy}{x+iy}\right) = -i\tan^{-1}\left(\frac{2xy}{x^2-y^2}\right)$

ii) Show that $\int_0^3 \int_1^2 xy(1+x+y)dydx = \int_1^2 \int_0^3 xy(1+x+y)dxdy$

Q. 2) Attempt ANY 3 of the following :- **15**

i) Find square root of the complex number -21+20i

ii) State and prove De-Moivre's Theorem.

iii) Solve : $x^6 + x^4 + x^2 + 1 = 0$

iv) Find sixth roots of unity.

Q. 3) Attempt ANY 3 of the following :- **15**

i) Check whether given function is a harmonic function or not.
$u = 4xy - x^3 + 3xy^2$

ii) Check whether given functions is an analytical function or not.
$f(z) = \text{Cosh}z$

iii) Obtain v if $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ & $f(z) = u + iv$ is analytic.

iv) Evaluate $\int_0^{1+i} (x^2 + iy)\, dz$ along the path $y = x^2$.

Q. 4) Attempt ANY 3 of the following :- **15**

i) State Convolution Theorem and also verify Convolution Theorem for the given functions $f_1(t) = \text{Cos}(t)$ and $f_2(t) = t$

ii) Solve : $y'' + 2y' - 3y = \sin t$ where $y = [dy/dt] = 0$, when $t = 0$.

iii) Obtain $L^{-1}\left[\frac{s^2-10s+13}{(s-7)(s^2-5s+6)}\right]$

iv) Find laplace of the following :
a) $L[t^2(\sin 2t \,.\, \cos t)]$
b) $L[\sin at / t]$

Q. 5) Attempt ANY 3 of the following :- **15**

i) Evaluate $\int_0^\infty \frac{x^3}{3^x} dx$

ii) Prove that $\int_0^t \text{erf}(ax)\, dx = t.erf(at) + \frac{1}{a\sqrt{\pi}}(e^{-a^2t^2} - 1)$

iii) Evaluate $\int_0^1 x^3(1-\sqrt{x})^5\, dx$

iv) Solve: $\int_0^1 x^2(logx)^3 dx$

Q. 6) Attempt ANY 3 of the following :- **15**

i) Find Fourier series for the function f(x)= x^2 on the interval $(-\pi, \pi)$

ii) Find Half-Range Cosine Series for the function f(x)= sinh(3x) on the interval $(0,2\pi)$

iii) Find Fourier Series for the function of function f(x)=(x-2) on the interval $(0,2\pi)$

iv) Obtain Fourier cosine & sine transform of $F(t)=2e^{-5t}5e^{-2t}$

Q. 7) Attempt ANY 3 of the following :- **15**

i) Evaluate $\int_{-1}^{2}\int_{1}^{3}(2x^2y^3 + 3xy^2 + xy)dydx$

ii) Find area of the region bounded by the curves y^2= -x and y = x

iii) Evaluate $\int_{-1}^{2}\int_{-y}^{2y}\int_{-x}^{x^2}(2xyz + 3xz^2 + xyz^2)dz\, dx\, dy$

iv) Evaluate : $\int \int_R xy\, dx\, dy$ over the region bounded by the circle $x^2+y^2=a^2$ in second quadrant

*****

F.Y. Bse. (IT) Electronic & Tele Communication System (old) June-14
Sem-II Microprocessor & Microcontrollers. (Rev)

Con. 248-14 **(OLD COURSE)** **PB-6536**

(3 Hours) **[Total Marks : 100**

Note:
1) Question No. 1 is **compulsory.**
2) Answer **any four questions from the remaining.**
3) Assume suitable data if needed.

Q. 1		Write short note on:	
	A	Composite Video Signal	05
	B	LED (Light Emitting Diode)	05
	C	Superposition Theorem	05
	D	Oscillator	05
Q. 2	A	What is the difference between AM (Amplitude Modulation) and FM (Frequency Modulation).	10
	B	List and explain the types of Digital Modulation Techniques	10
Q. 3	A	What is a Balanced Modulator? Explain in detail using diode or FET?	10
	B	Explain DC Amplifier with neat diagram	10
Q. 4	A	Explain NPN and PNP transistors and their characteristics	10
	B	Compare Amplifier and Oscillator	10
Q. 5	A	Draw and explain AM Radio Receiver	10
	B	What are the advantages of SSB (Single Side Band) over AM (Amplitude Modulation)	10
Q. 6	A	Explain P-N junction Diode. Explain forward biasing and reverse biasing of a diode	10
	B	Explain the working of Full Wave Bridge Rectifier	10
Q. 7	A	Differentiate between TDM (Time Division Multiplexing) & FDM (Frequency Division Multiplexing)	10
	B	Differentiate between RC Oscillator and LC Oscillator	10

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

Q.1 Attempt any two of the following.

1. Differentiate between SRAM and DRAM. (5)
2. Explain the flag register of microprocessor 8085 in detail with the significance of each flag. (5)

Q.2 Attempt any three of the following.

1. What is a tri-state buffer? Explain its types with suitable diagrams. (5)
2. What is a decoder? Explain 3 to 8 decoder in detail. (5)
3. Write a short note on (i) EPROM (ii) EEPROM (5)
4. Explain chip select logic using logic gates (5)

Q.3 Attempt any three of the following.

1. Write a short note on System bus of microprocessor 8085. (5)
2. Explain following registers of microprocessor 8085
   (i) Accumulator (ii) Stack Pointer (iii) Program Counter (5)
3. Explain in detail the following pins of microprocessor 8085 in detail
   (i) TRAP (ii) ALE (iii) READY (5)
4. Differentiate between I/O mapped I/O and memory mapped I/O. (5)

Q.4 Attempt any three of the following.

1. Explain Register Indirect addressing modes in 8085 microprocessor with suitable example. (5)
2. Explain following instructions in microprocessor 8085.
   (i) RAL (ii) RLC (iii) JMP address (5)
3. Explain immediate addressing modes in 8085 microprocessor with suitable example. (5)
4. Explain following instructions in microprocessor 8085.
   (i) RAR (ii) XCHG (iii) RRC (5)

Q.5 Attempt any three of the following.

1. What is Cache Memory? Why is it needed? (5)
2. What are the benefits of RAID? (5)
3. What is a bus? Explain the system bus structure in modern computer system. (5)
4. Explain PCI bus in detail. (5)

Q.6 Attempt any three of the following.

1. Describe the PSW register of 8051 microcontroller. (5)
2. Describe internal memory structure of 8051 microcontroller. (5)
3. Explain how stacks are accessed in 8051 microcontroller. (5)
4. Write a short note on special function register in8051 microcontroller. (5)

Q.7 Attempt any three of the following.

1. Explain following instructions in microcontroller 8051.
   (i) MUL AB (ii) INC DPTR (iii) CPL A (iv) CPL C (v) RET (5)
2. Explain following addressing modes in 8051 microprocessor with suitable example.
   (i) Register Addressing Mode (ii) Direct Addressing Mode (5)
3. Explain PORT 0 of 8051 microcontroller in detail. (5)
4. Explain following instructions in microcontroller 8051
   (i) DIV AB (ii) MOV DPTR, #4000H (iiiCLR A (iv) ADD A,R0 (v) SWAP A (5)

F.Y.B.Sc. (I.T) Design and Analysis of Algorithms (old) June 14
Sem. II Web Technology (Rev)

AGJ 1st half (b) 15

Con.-247-14. **(OLD COURSE)** **PB-6082**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from Q. **2** to Q. 7.

1. (a) Explain back tracking General Method of 8 Queen's problem. **10**
   (b) Explain the selction Sort Method with suitable diagram and algorithm. **10**

2. (a) Explain Greedy method with suitable algorithm. **10**
   (b) Write a short note on i) Game Trees **10**
   ii) AND/OR Graph

3. (a) Explain PUSH and POP operation on stack. **7**
   (b) Explain the Binary search method. **7**
   (c) Draw a Binary Tree for the following set of numbers **6**
   60 17 32 30 5 10 73 111 5 26

4. (a) Explain Heap and Heapsort method with suitable algorithm. **10**
   (b) Explain the Breadth first search method with suitable algorithm. **6**
   (c) Write a short note on sets and dijoint set. **4**

5. (a) What is Linked List ? Explain how to insert and delete any element from Linked List. **8**
   (b) Explain Graph and its components. **6**
   (c) Explain different traversal methods in Binary Tree. **6**

6. (a) Explain minimal spanning Tree. Explain with one example. **6**
   (b) Explain merge sort algorithm with suitable algorithm. **8**
   (c) Explain what is algorith and its properties. **4**

7. (a) Explain stack and its features. **5**
   (b) Explain Divide and Conquer General method. **8**
   (c) Explain Queues how to insert and delete any item from queues. **7**

[TURN OVER

Con.-247-14. 2 **PB-6082**

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

1. Attempt **both** the questions:-
   (a) Define URL. Explain the different components of URL 5
   (b) Explain text formatting tags in HTML. 5

2. Attempt any **three** questions:-
   (a) What is Internet ? What is its application ? 5
   (b) Define E-Commerce. And state its advantages. 5
   (c) Explain Domain Name System. 5
   (d) What is a browser ? Explain any 4 browsers. 5

3. Attempt any **three** questions:-
   (a) List and explain the HTML tags associated with the creation of a TABLE structure. 5
   (b) List and explain the attributes of <BODY> tag. 5
   (c) Define Image-Maps. List and explain the concept of client-side Image-Maps with an example. 5
   (d) Write a HTML code to create a BIODATA form for displaying the user details. Name; Phone Number should be accepted as a Text Box. Address should be accepted as a Text Area. For Gender use Radio Buttons ("Male" or "Female"). For Hobbies use Options ("Reading", "Cooking" and "Dancing") 5

4. Attempt any **three** questions:-
   (a) Explain how function can be used as an event handler ? 5
   (b) Write a program using JavaScript to find a factorial of a number. 5
   (c) Explain <INPUT> tag with example. 5
   (d) How to create lists in HTML ? What are-different types of lists ? Explain with example. 5

5. Attempt any **three** questions:-
   (a) What are regular expressions ? Explain with example. 5
   (b) Explain different types of popup boxes in JavaScript. 5
   (c) Explain how a function can be used as Event Handler ? 5
   (d) Write a program using JavaScript to find a number is prime or not. 5

6. Attempt any **three** questions:-
   (a) Write a short note on XSL. 5
   (b) Differentiate between HTML and XML. 5
   (c) Write a short note on Internal DTD. 5
   (d) What is meant by XML Schema ? 5

7. Attempt any **three** questions:-
   (a) "PHP is a loosely typed language" — Comment and Justify. 5
   (b) Write a short note on using Cookies in PHP. 5
   (c) What are the different types of arrays in PHP ? Explain with example. 5
   (d) Explain any 5 string functions in PHP with an example. 5

F.Y.B.Sc. N.T. Basic ship construction and stability - Paper-I May 2014

Con. 236-14. NR-6018

(3 Hours) [Total Marks : 100

[Pass Marks : 60

Note:

1. Use of non-programmable scientific calculator, Nories / Burton's Tables, Hindship Tables, and Graph paper IS PERMITTED
2. Attempt any TWO questions from Section 1 and any THREE questions from Section 2, a total of FIVE questions. All questions carry EQUAL marks.
3. If a question is sub-divided into parts, unless otherwise expressly provided against each part, all parts shall carry equal marks

---

Section 1:

Q.1 (a) Draw a neat sketch of a cellular container ship and describe its salient features.
(b) Define with the help of suitable sketches (i) Sheer (ii) Flare (iii) Moulded Breadth

Q.2. (a) Draw load line of a General cargo ship on port side.
(b) Show by sketch how a draft of 9.45 m will appear on draft marks.

Q.3. (a) Describe fireman's outfit and it's use.
(b) Explain bilge pumping arrangement from the holds of a Bulk carrier with nine holds cargo ship.

Section 2:

Q.4. (a) Define (i) Summer displacement (ii) Freeboard
(b) A boxed shaped vessel 120 m long and 15 m beam has block coefficient of 0.700 and is floating at the load draft of 7 m in fresh water. Find how much cargo can be loaded if the ship is to float at the same draft in salt water.

Q.5. (a) Explain effect of following on KG of the ship using suitable sketches:
i) Loading ii) Discharging
(b) M.V. Hindship arrives at a port in water of RD 1.012 with drafts F 6.15 m, A 7.22 m. Her sailing draft in water of RD 1.025 was F 5.33 m, A 5.98 m. Calculate the weight of cargo discharged at that port, if 85 tonnes of fuel and fresh water were consumed in the port.

Q.6. (a) Define and state formulas for calculation of (i) TPC (ii) DWA
(b) Show by sketches (i) Unstable equilibrium (ii) Neutral equilibrium

Q.7. a) Explain with the help of sketches the effect on centre of gravity of a ship (i) due to shifting of a weight already on board (ii) after loading a weight on the ship.
b) A ship has displacement of 3200 tonnes (KG = 3 m and KM = 5.5 m). She then loads 5200 tonnes of cargo (Kg = 5.2 m). Find how much deck cargo having Kg = 10 m may now be loaded if the ship is to complete loading with a KG of 5.2 m.

Q.8. (a) Define (i) (ii) Block coefficient
(b) A vessel floating in DW of RD 1.005 has the upper edge of her summer loadline in the water line to the starboard and 50 mm above the waterline to port. If her FWA is 180 mm and TPC is 24, find the amount of cargo that the vessel can load to bring her to her permissible draft.

<<<***>>>

F.Y. Bsc. N.T. Basic Cargo Handling and Stowage Technology - P-I May 2014

Con. 235-14.

NR-6750

(3 Hours)

[Total Marks : 100

[Pass Marks : 60

Note:
1. Use of non-programmable scientific calculator, Nories / Burton's Tables, ASTM Tables and Graph Paper IS PERMITTED
2. Attempt any TWO questions from Section 1 and any THREE questions from Section 2, a total of FIVE questions. All questions carry EQUAL marks.
3. If a question is sub-divided into parts, unless otherwise expressly provided against each part, all parts shall carry equal marks

SECTION I

1. Draw a schematic diagram of the cargo hold bilge pumping arrangement and explain the pumping arrangement.

2. How is temperature, humidity and carbon di-oxide gas build up controlled on a reefer ship.

3. Discuss the accelerations experienced by a parcel of cargo on a ship in a seaway and the factors to be considered when securing.

SECTION II

4. What are the procedures and precautions to be taken on an oil tanker before and during loading at a terminal.

5. Sketch and explain the re-liquefaction cycle on a gas carrier.

6. Write short notes on the following:
   a. Flammability b. Static Electricity c. Toxicity.

7. How is purging and gas – freeing carried out on an oil tanker.

8. Discuss the precautions to be taken prior making an entry into enclosed space and the procedures for entry.

F.Y.B.Sc. N.T. Basic of Bridge Watch-Keeping Technology -P-I may 201

Con. 234-14. **NR-6610**

(3 Hours) **[Total Marks : 100**

Note:

1. Use of Non-programmable scientific calculator, Nories / Burton's Tables and Ship's weather code IS PERMITTED
2. Attempt any TWO questions from Section 1 and any THREE questions from Section 2, a total of FIVE questions. All questions carry EQUAL marks.
3. If a question is sub-divided into parts, unless otherwise expressly provided against each part, all parts shall carry equal marks

Section 1

Q1 a) What is Beaufort scale? Why is it used on ships and what information can be obtained from it and how?

b) Define the followings and what are signals displayed during day and night:

i) Vessel aground

ii) Towing vessel

iii) Trawlers when shooting their nets

iv) Trawlers when hauling their nets.

Q2 a) A vessel is heading on a course 015 and speed 12 knots. The wind is blowing from right ahead and an estimated speed of 22 knots. Find True wind direction and speed?

b) What is relative humidity and how is it determined?

c) Describe diurnal variation of pressure and in which latitudes is it experienced?

d) With respect to chronometers explain

i) Time signal and its purpose

ii) Chronometer error

iii) Chronometer variance or rate

iv) Chronometer log

Q 3 Describe the following GMDSS equipment and list the information they are capable of sending and / or receiving

a) EPIRB

b) SART

c) NAVTEX

d) GMDSS Radios

TURN OVER

Q4

a) Explain the term"in sight of one another "as per ROR.

b) Explain the term "course or speed changes in succession" as per ROR.

c) Sketch and describe a Dry Card Compass.

d) Define frequency, Pulse Repetition Rate and Beam Width used in an Echo Sounder.

Q5 a) What action will you take when you see a vessel aground 3 miles right ahead of you?

b) What are various controls and use of ARPA?

c) Explain the term "Departure from Rules to avoid immediate danger "as stated in ROR.

d) How will you find out error on VRM and EBL on Radar Set?

Q6 a) What lights are exhibited by a power driven vessel underway of under 50 metres in length and their position and range?

b) What are the limitations of Radar?

c) What are the uses of the following flag signalling?

i) Single letter hoist

ii) Two letter hoist

iii) Three letter hoist with prefix M

iv) Substitutes

d) How will you ensure that the pilot ladder is safe for use?

Q7 a) What errors are likely to be experienced on a magnetic compass and a gyro compass?

b) What checks will you carry out before taking over Bridge watch when river pilot onboard?

c) As a stand on vessel, what action would you take if the other vessel does not appear to take any action?

d) What will be your action when you receive a distress message on GMDSS?

Q8 a) What pyrotechnics are carried on a vessel? How will you use Line Throwing Apparatus?

b) You are OOW and what preparations are required before the vessel starts coasting?

c) Write short notes on setting, starting and testing of "Off Course Alarm".

d) What is the difference between dead reckoning position and observed position ?

F.Y.B.Sc. N.T. Basic celestial Navigation Technology - P-I may 20

Con. 233-14.

NR-6006

(3 Hours)

[Total Marks : 100

[Pass Marks : 70

Note:

1. Use of Non-scientific calculator, Norie's or Burton's Tables, Tide Tables and Nautical Almanac IS PERMITTED.
2. Attempt any TWO questions from Section 1 and any THREE questions from Section 2, a total of FIVE questions. All questions carry EQUAL marks.
3. If a question is sub-divided into parts, unless otherwise expressly provided against each part, all parts shall carry equal marks.

Section 1:

1. Explain (a) Light year (b) Astronomical Unit (AU) (c) The planets in the Solar system (d) the 4 planets suitable for navigation (e) Constellation.

2. With diagram/s, prove: Sin Amp = Sin Dec/Cos Lat.

3. Draw a diagram on the plane of the rational horizon using Latitude 30°S and Declination 23°N and, on it, show the following:
   (a) Elevated Pole (b) Equinoctial (c) Body while rising (d) Body at mer pass (e) Polar distance at mer pass.

Section 2:

4. On 22nd Sept 1992, in DR 34° 36'N 160° 20'E, the sextant altitude of the Sun's LL, when on the meridian was 55° 10.1', I.E. 1.0' off the arc, HE 13m. Find the latitude of the observer and state the direction of the PL.

5. In latitude 40° N a star with the declination 24° N, bore 270° (C) when the LHA of the star was 060°. Calculate the deviation for ships head if Variation was 2° E.

6. AM at ship in DR 28° 36' N 128° 30' W, the true altitude of the sun was 28° 31.4'. If GHA was 088° 42.6' & dec was 19° 26' S, calculate the direction of PL the intercept.

7. State the properties of a spherical triangle with respect to:
   1.1. Maximum value of an angle,
   1.2. Maximum value of a side.
   1.3. Sum of the three sides.
   1.4. Sum of the three angles.
   1.5. The sum of any two sides.

8. In a spherical triangle PQR, PQ = 49° 55', Q = 69° 50' and QR = 90°. Calculate P, Q & R.

-o0o-

F.Y. B.Sc. N.T. Basic Terrestrial Navigation Technology - P-I May-12

Con. 232-14.

NR-6728

(3 Hours)

[Total Marks : 100

[Pass Marks : 70

Notes:

1. Use of Non-scientific calculator, Nories / Burton's Nautical Tables, and Nautical Almanac is permitted
2. Attempt any TWO questions from Section 1 and THREE questions from Section 2. All questions carry EQUAL marks
3. If a question is sub-divided into parts, unless otherwise expressly provided against each part, all parts shall carry equal marks.
4. Use BA Chart No. 5049 (English Channel). Dev. card & Tide Curve attached. Ship's speed 12 knots unless specified in the question.

Section – I

Q.1. Define the following:

1. Meridioanl Parts
2. Statute Mile
3. Meridian
4. Middle Latitude
5. D'Long

Q.2. Two ships A and B steer the same course. A is three times as fast as B but makes only two times the D'long made by B. If A is in latitude 17° N, calculate B's latitude.

Q.3. From the log abstract find:

a. Course & distance made good noon to noon

b. Position arrived at next day noon
Dep. Noon Pos: 25° 00.0'N 036° 00.0'E

	Compass Co	Var	Dev	L'Way	Wind	Log
Noon	060° C	2°W	1°E	1°	E	000
2000 A/C	070° C	2°W	3°E	2°	E	100
0200 A/C	165° C	3°W	1°E	3°	E	191
0800 A/C	222° C	3°W	2°E	Nil	Nil	265
Noon						315

Current was setting NW @ 2 knots throughout. Clocks were retarded by 1 hour at midnight. The engines were stopped for repairs from 0400 to 0600 hours.

[TURN OVER

SECTION II (CHART NO. 5049 (Supplied))

Q.4. At 0300 hrs Berry head Lt (50° 24'N 003° 30'W) bore 350° (T) and start point lt (50° 12'N 003° 40'W) was 15 n.m. from the vessel. Find the position of the vessel. From this position vessel steered a course of 290° (T) at Engine speed 15 kts. At 0430 hrs. Eddystone Rock (50° 11'N 004° 15'W) bore 020° (T) distance 18 n.m. find the actual set & rate of current experienced by the vessel.

Q.5. a) At 1600 hrs. Vertical Sextant Angle of Bill of Portland Lt. Ho (50°31'N, 002°27'W) (145 feet or 44.2 meters) was 00° 20' and the bearing of the same Light House was 000° (T). Find the ship's position. (I.E. 3' on the arc.)

b) From 1600 hrs. position, find the Compass Course to steer so as to pass Start point 6 miles off , counteracting a current known to be setting 135° (T) at 2.5 knots and Leeway 3°, wind north. (Variation 2° E, Deviation 0.5° E, Engine speed 10 knots.)

c) Find the time and distance off when Berry Head Light is abeam.

Q.6. a) Find the Gyro Compass Course to steer from a position at 1900 hrs. with Beachy Head Light(50°44'N, 000°15 E) bearing 000° (T) at 10 miles, to a position 12 miles off St. Catherine Point Light.(50°35'N,001°18'W), allowing for the Current setting 315° (T) at 2 Knots and Leeway of 3°, Wind South.

b) Whilst on the above course NAB Tower Light (50°40'N, 000°57'W) is expected to be raised at a distance of 19 miles. Find the time and the relative bearing when the Light is raised (Ship's speed 12 Knots, Gyro Error 2° High).

Q.7. a) Write short notes on:

a. Isogonic Lines
b. Natural scale of chart
c. Drying height
d. Bench Mark

b) Differentiate between geographic range, luminous range & Nominal range of a light.

Q8. Find height of Tide at BOMBAY at 2200 hrs on 25 Feb from the extract of tide table given below:

0400	3.5
1036	1.3
1732	3.3
2335	2.4

****

F.Y.B.Sc. N.T. Basic ship operation Technology - paper-I

may 20

Con. 237-14.

NR-6626

(3 Hours)

[Total Marks : 100

[Pass Marks : 50

Note:

1. Use of non-programmable Scientific calculator, Nories / Burton's Tables, and Graph Paper IS PERMITTED
2. Attempt any TWO questions from Section 1 and any THREE questions from Section 2, a total of FIVE questions. All questions carry EQUAL marks.
3. If a question is sub-divided into parts, unless otherwise expressly provided against each part, all parts shall carry equal marks

SECTION 1

Question 1

Part i) **Fill in the Blanks** *(1 mark each)*

a) Annex I of Marpol covers _____.

b) The term used to indicate reducing the swinging of a vessel as rapidly as possible is called as _____.

c) Diseases like cholera was spread through the transfer of _____.

d) A gun tackle is rove to disadvantage if the hauling part comes from the _____.

e) West country stopper is used for stopping _____ hawsers .

Part ii) **Answer True or False** *(1 Mark each)*

a) A back splice can be used for a rope which is not to be rove through a block .

b) Surge the cable means to stop the cable running out by using the brakes.

c) The minimum sheave and drum diameter is 12 times the diameter of the rope.

d) Lubricating oil has to heated to 240 deg C for it to catch fire.

e) Binder is the component in paints which binds the components together.

Part iii) *(5 Marks)*

What are the limitations on the use of foam ?

Part iv) *(5 Marks)*

Describe Slurry method and Shroud method in wet blasting .

TURN OVER

Question 2

Part i) **Fill in the Blanks** *(1 Mark each)*

a) _____ dry chemical can be used on Class A,B & C fire.

b) To facilitate easy identification by an aircraft _____ are pasted on the bulwarks of a lifeboat.

c) A _____ is appointed to take charge when entering enclosed space.

d) _____ gives details on manouevres in a MOB situation.

e) A International ship security certificate is valid for _____.

Part ii) **Answer True or False** *(1 Mark each)*

a. The marks placed on the ship's side showing the maximum a ship could be loaded is called draught marks.

b. A fully loaded lifeboat must make a speed of atleast 4 knots in calm weather.

c. Category "A" causes major hazard to the marine environment and human health under Annex II of Marpol 73/78.

d. The phrase " brought up" is used when a vessel is holding to her anchor and chain.

e. A wire rope of 6 x 24 has greater strength than a wire rope of 6x37 classification.

Part iii) *(5 Marks)*

List any five advantages of Foam as a fire-fighting agent

Part iv) *(5 Marks)*

Write a short note on the precautions to be taken when working aloft and over the shipside

Question 3

Part i) **Fill in the Blanks** *(1 Mark each)*

a) The document issued to a company complying with ISM requirements is called _____.

b) The Indian merchant shipping act as it exists today is in _____ parts.

c) The Annex IV of Marpol 73/78 deals with the prevention of pollution resulting from _____ .

d) _____ is the one which gives paints the colour.

e) Class C involves _____ fire .

Part ii) **Answer True or False** *(1 Mark each)*

a) The most effective way of eliminating the presence of organisms in ship's Ballast water from harming the host environment is by heating the water.

b) The smallest percentage of a gas that will make an ignitable mixture is called the Upper explosive limit.

c) The nautical advisor to the Govt of India is also the Chief examiner for Masters and Mates .

d) The basic unit of a wire rope is a single strand .

e) Discharges from a cargo pump room is permitted within a special area if certain criteria are met .

Part iii) *(5 Marks)*

Draw a sketch of the "Scharnov Turn", and write a short note about this turn.

Part iv) *(5 Marks)*

Define hypothermia . What are the signs and actions to take in case of hypothermia ?

SECTION 2

Question 4 *(Each part carries 10 marks)*

Part i) Why do ships need to have a 'Ship Security Plan'. What is a Ship Security assessment and list atleast four elements of this assessment.

Part ii) Explain with the help of a diagram the procedure to pass a rope stopper and chain stopper.

Question 5 *(Each part carries 10 marks)*

Part i) Name three of the important Maritime Conventions of the IMO, with short notes on the significance of each of them.

Part ii) List the advantages of foam as a fire extinguishing medium.

Question 6 *(Each part carries 10 marks)*

Part i) What are the regulations governing prevention of pollution by Noxious Liquid substances as per Annex II of MARPOL 73/78 ? List the substances which fall under the various categories.

Part ii) Mark the parts of an anchor with the help of a neat diagram .

Question 7 *(Each part carries 10 marks)*

Part i) What safety precautions should be followed when carrying out Ballast Water exchange on ships ?

Part ii) Describe in detail (a) Oxidative paint (b) Physically drying paint (c) Chemically curing paints .

Question 8 *(Each part carries 10 marks)*

Part i) List the limitations on the use of Carbon dioxide as an extinguisher. Also name five different types of dry chemical extinguishing agents.

Part ii) List the actions to be taken once inside the life raft or life boat.

****

S.Y.B.Sc. (IT) Data base Concepts and Systems (Old) September - 13
Sem - IV mk.3-2nd hlf 13-(a) Multimedia (Rev)

Con. 256-13.

QU-1050

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
(2) Answer any **four** questions from the remaining questions.
(3) **All** questions carry **equal** marks.
(4) Write specific **points** and give **examples** where needed in **support** of your **answer**.

1. (a) What are transactions ? Explain ACID properties. **20**
(b) Explain SET operators in detail.

2. (a) Explain the duties of database administrator. Explain the different types of database users. **20**
(b) What are the drawback of using file system and the advantages of using DBMS ?

3. (a) What is the difference between generalization and specialization ? Why do we not display the difference in schema diagrams ? **20**
(b) Explain the concept of aggregation. Illustrate with the help of an example.

4. (a) Explain with an example all the operators used in relational algebra. **20**
(b) List the different constraints in DDL and explain any three of them.

5. (a) What is normal form ? Explain the various normal forms. **20**
(b) What is the goal of query optimization ? Why is it important ?

6. (a) Write short note on lock based protocol and timestamp based protocol. **20**
(b) How can deadlocks be handled in DBMS ?

7. (a) Write short note on data analysis, data mining and data warehousing. **20**
(b) Write short note on information retrieval systems.

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. All questions are **compulsory**.

1. Attempt **both** questions :— **10**
   (a) Explain the analog to digital conversion in detail.
   (b) What are different steps involved in image processing ?

2. Attempt any **three** :— **15**
   (a) What do you mean by multimedia presentation ? Write some of its important characteristics.
   (b) What are different software and hardware required for multimedia ?
   (c) Distinguish between images and graphics, video and animation.
   (d) Describe different types of Multimedia database.

3. Attempt any **three** :— **15**
   (a) What is Quantization error ?
   (b) Distinguish between spatial and temporal waves.
   (c) Explain Nyquist's sampling theorem and its importance.
   (d) What are analog signals and its essential properties?

4. Attempt any **three** :— **15**
   (a) What is font ? List different types of fonts.
   (b) Describe RGB Color Model. Why it is called as additive color model ?
   (c) Differentiate between RGB and CMYK color Models.
   (d) What is scanner ? List different types of scanning mechanism.

5. Attempt any **three** :— **15**
   (a) Describe fundamental characteristics of sound.
   (b) Describe the principle of raster scanning.
   (c) State difference between interlaced and non-interlaced scanning.
   (d) Define PDP and write its advantages and disadvantages.

6. Attempt any **three** :— **15**
   (a) What is compression and decompression ?
   (b) Write notes on Run Length Encoding.
   (c) List and describe the file format of video storage.
   (d) Explain working of CODEC

7. Attempt any **three** :— **15**
   (a) What is authoring ?
   (b) List and describe type of multimedia users.
   (c) Write notes on Timeline, Animation, Tweening and Action script.
   (d) Write notes on Multimedia Production.

S.Y.B.Sc. (I.T) C++ and JAVA (old) September.13
sem-IV JAVA and Data structures (Rev)

1 : 2 ND HALF-13-JP

Con. 258–13. (OLD COURSE) **QU–1305**

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from question nos. **2** to **7**.

1. (a) Explain the term class and object in c++. **10**
   (b) Explain features of Java. **10**

2. (a) Explain different ways for creating thread with example in Java. **10**
   (b) Write steps for developing Applet and write a simple Applet program for display message. **10**

3. (a) Write a program for Running Multiple threads in Java. **10**
   (b) Explain single and multiple inheritance with example in Java. **10**

4. (a) Explain different ways of using synchronization in Java. **10**
   (b) Explain exception handling, write a program for multiple catch blocks in Java. **10**

5. (a) What is constructors ? Explain overloading of constructors in Java. **10**
   (b) How Java is different from c++ ? **5**
   (c) Explain overloading methods with example. **5**

6. (a) What is thread priority ? Write a program for thread. **10**
   (b) Explain use of this and super keyword in Java with example. **10**

7. (a) Write a program for read string and read characters from stream using Java. **10**
   (b) Explain the concept of static member function in c++. **10**

Con. 258–13. **QU–1305**

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. (1) **All** questions from question nos. **1** to **7** are **compulsory**.
(2) **Figures** to **right** indicate the **marks**.

1. Attempt **both** the questions :—
   (a) Write a short note on JVM. **5**
   (b) Describe the concept of using packages in Java. **5**

[TURN OVER

2. Attempt any **three** questions :—
   (a) Define operator. List and explain different types of operators in Java. 5
   (b) Write a short note on Parameterized constructors. 5
   (c) Write a Java program to find the user entered number is prime or not. 5
   (d) Write a Java program to find the factorial of a number using a recursive function. 5

3. Attempt any **three** questions :—
   (a) Define super keyword. List and explain the uses of super keyword. 5
   (b) Describe the methods exception handling in Java. 5
   (c) Write a java program to find the user entered text is palindrome or not. 5
   (d) Create an interface with a function prototype for adding two numbers and return the sum. 5
   Write a Java program to implement the interface for adding the two numbers and display the sum.

4. Attempt any **three** questions :—
   (a) Write a short note on Files and Directories. 5
   (b) Define Input–Stream and Output–Stream. List and explain any two methods of Input–Stream and Output–Stream. 5
   (c) Write a Java program to accept a text from the user and count the number of words in the text. (Use StreamTokenizer). 5
   (d) Write a Java program to save the content in a file. 5

5. Attempt any **three** questions :—
   (a) Write a short note on Asymptotic notations. 5
   (b) Define Stack. Write down the Algorithm for stack implementation. 5
   (c) Write a Java program to implement binary search algorithm. 5
   (d) Write a Java program to implement the concept of circular queue. 5

6. Attempt any **three** questions :—
   (a) List and explain different types of hashing functions. 5
   (b) Write a short note on Tree Traversal methods. 5
   (c) Write a short note on AVL tree. 5
   (d) Explain the method of inserting and deleting a node from a doubly linked list. 5

7. Attempt any **three** questions :—
   (a) Explain the Prim's algorithm to find the minimum cost spanning tree. 5
   (b) Describe the different methods of graph representation. 5
   (c) Write a Java program to implement the selection sort. 5
   (d) Write a Java program to implement the merge sort. 5

S.Y.B.Sc. (IT) Sem - IV Software Engineering (OH) Software Engineering (Rev) Septemb '13

3 : 2 ND HALF-13-JP

Con. 260–13. **(OLD COURSE)** **QU–1214**

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory.**
(2) Attempt any **four** questions from Question Nos. **2** to **7.**
(3) Draw **neat** and **labelled** diagram wherever **necessary**.

1. (a) Explain Waterfall Model in detail. State the advantages and disadvantages of Waterfall Model. **20**
   (b) Explain Verification and Validation with example.

2. (a) Explain Spiral Model in detail. State the advantages and disadvantages of Spiral Model. **10**
   (b) Explain DFD and ERD with suitable example. **10**

3. (a) Write short note on :— **10**
      (i) Alpha testing and
      (ii) Beta testing
   (b) Write short note on :— **10**
      (i) Unit testing and
      (ii) Integration testing

4. (a) What is Software Engineering ? Explain SDLC in detail. **10**
   (b) Distinguish between functional oriented and object oriented design approach. **10**

5. (a) Explain coupling and cohesion in detail. **10**
   (b) Explain SRS with its component in detail. **10**

6. (a) What is Code walkthrough and code inspection ? **10**
   (b) Explain Black Box testing in detail with example. **10**

7. (a) What are the different types of categories of software metric ? **10**
   (b) What is Risk ? Explain various activities of Risk Management. **10**

Con. 260–13. **QU–1214**

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. All questions are **compulsory**.

1. Attempt the following :—
   (a) Explain software engineering with its process. **5**
   (b) Explain Event processing system. **5**

[TURN OVER

2. Attempt any **three** from the following :—
   (a) Explain the characteristics of software. 5
   (b) Explain System engineering in detail. 5
   (c) What is Legacy system ? Explain its component. 5
   (d) Explain critical system and its types. 5

3. Attempt any **three** from the following :—
   (a) Explain Water-fall model. 5
   (b) What are the stages in the Testing process ? 5
   (c) Write a short note on Alpha and Beta testing. 5
   (d) Explain functional and non-functional requirements. 5

4. Attempt any **three** from the following :—
   (a) Explain Feasibility study. 5
   (b) Explain requirement management planning. 5
   (c) Explain types of system model. 5
   (d) Explain Architectural design. 5

5. Attempt any **three** from the following :—
   (a) What are the component of Editing System ? 5
   (b) Explain OOD. 5
   (c) Explain software prototyping. 5
   (d) Explain RAD model. 5

6. Attempt any **three** from the following :—
   (a) Explain planning produced for Verification and Validation. 5
   (b) What are the importance of Verification and Validation ? 5
   (c) Distinguish between top-down and bottom-up testing. 5
   (d) Explain Staffing. 5

7. Attempt any **three** from the following :—
   (a) What is Quality ? Explain processed based quality. 5
   (b) What are the different approaches to quality control ? 5
   (c) What is quality planning ? 5
   (d) Explain services as reusable components. 5

S.Y.B.Sc. (IT) Sem - IV

Operating System (Old)
Quantitative Techniques. (Rev)

September-R

mk.5-2nd hlf 13-(a)

Con. 257-13.

QU-1282

(OLD COURSE)

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
(2) Answer any **four** questions from Question Nos. **2** to **7**.

1. Write a short notes on :—
   (a) Explain various functions of operating system. **10**
   (b) Explain FCFS algorithm with proper example. **10**

2. Answer the following :—
   (a) Explain Real time OS. Explain its types. **6**
   (b) Explain Multiprogrammed OS with diagram. **7**
   (c) Explain Distributed OS. Explain its types. **7**

3. Answer the following :—
   (a) What is OS ? Explain various services provided by OS. **6**
   (b) Explain Caching. **7**
   (c) Explain Preemptive and non-preemptive algorithm. **7**

4. Answer the following :—
   (a) Explain various multithreaded model in detail. **6**
   (b) What is Scheduling ? Explain long-term and short-term Scheduling. **7**
   (c) What is process ? Explain various process states with neat diagram. **7**

5. Answer the following :—
   (a) What are Best-fit, First-fit and Next-fit algorithms ? Explain with neat diagram. **6**
   (b) Explain various file operations. **7**
   (c) How paging is performed explain in detail. **7**

6. Answer the following :—
   (a) Explain advantages and disadvantages of a GUI based operating system. **6**
   (b) What is deadlock ? What is resources allocation graph ? **7**
   (c) Explain PCB. **7**

7. Answer the following :—
   (a) Write a note on Semaphores. **6**
   (b) Explain Various technique in memory management. **7**
   (c) Explain Deadlock avoidance techniques. **7**

[TURN OVER

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N.B. (1) **All** questions are **compulsory**.
(2) From Question Nos. **2** to **7**, sub-question **(a)** is **compulsory**, attempt any **one** from sub-questions **(b)** and **(c)**.
(3) **Figures** to the **right** indicate **full** marks.
(4) Use of non-programmable **simple** calculator is **allowed**.

1. Attempt any one of the following: (10)

   (a) Solve the following equations by Gauss elimination method:
   $2x + y + z = 12, 3x + 2y + 2z = 8, 5x + 10y - 8z = 10.$

   (b) Use the Runga-Kutta method of second order to find $y(0.1)$ and $y(0.2)$ given $\frac{dy}{dx} = y - x$ and $y(0) = 2$.

2. (a) Using Newton-Raphson method obtain a root, correct up to three decimal places of the equation $\sin x = 1 - x$. (08)

   (b) Use Newton's interpolation formula to find $f(2)$ for the following data: (07)

x	1	3	5	7	9
$f(x)$	0	24	120	336	720

OR

   (c) Use Lagrange's interpolation formula to estimate polynomial through $(0, 1)$, $(1, 3), (4, 21)$. (07)

3. (a) Evaluate $\int_0^{\pi} (4 + 2\sin x)\, dx$ using Trapezoidal rule. (Take $n = 6$) (08)

   (b) Solve the following equations using Gauss-Jordan method: (07)
   $2x - 3y + z = -1, x + 4y + 5z = 25, 3x - 4y + z = 2.$

OR

   (c) Use Euler's method to estimate $y(0.5)$ of the equation $\frac{dy}{dx} = x + y + xy$, $y(0) = 1$ with $h = 0.25$ (07)

4. (a) An urn contains 6 red and 4 blue balls. 2 balls are drawn at random. If X is number of blue balls, find the expectation and variance of X. (08)

(b) In a Poisson frequency distribution, frequency corresponding to 3 successes is 2/3 times frequency corresponding to 4 successes. Find the mean and standard deviation of the distribution. (07)

OR

(c) A random variable X follows normal distribution with mean 10 and standard deviation 2. Find the following probabilities : (i) $P(X > 12)$, (ii) $P(X < 13.5)$ and (iii) $P(7.5 < X < 13)$. (07)

5. (a) Find the Karl Pearson's Correlation Coefficient for the following data: (08)

x	8	4	10	2	6
y	9	11	5	8	7

(b) Fit a regression equation y on x for the following data: (07)

x	3	5	7	9	11
y	9	12	16	14	15

OR

(c) Fit a second degree equation for the following data: (07)

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

6. (a) A die is thrown 8000 times and a throw 2 or 6 is observed 3420 times. Can we say that the die is a fair die? (08)

(b) It is claimed that the population of a certain item contains 2% defective items. To test the claim, 300 items were selected and out of which 10 were found to be defective. Can the claim be accepted at 95% confidence level? (07)

OR

(c) In a sample of 45 persons from a City A, 20 are smokers and in another sample of 50 persons from City B, 24 are smokers. Use Z-test to test the claim that proportion of smokers in the two cities do not differ significantly. (07)

7. (a) Solve the LPP using Simplex method: (08)
Maximise $z = 9600x + 11600y + 9800z$,
subject to: $x + y + z \leq 100, 5x + 6y + 5z \leq 400$,
and $x \geq 0, y \geq 0, z \geq 0$.

(b) Use Yate's correction and test whether A and B are independent. Observed frequencies are as under: (07)

	A	Not A	Total
B	45	55	100
Not B	60	40	100
Total	105	95	200

OR

(c) Solve the LPP graphically: Minimise $z = x + y$ (07)
subject to: $2x + y \geq 12, 5x + 8y \geq 74, x + 6y \geq 24$
and $x \geq 0, y \geq 0$.

S.Y.B.Sc(IT) Sem IV E-Commerce (old) Embedded System (Rev) Sept. 13

5 : 2 ND HALF-13-JP

Con. 259–13. (OLD COURSE) **QU–1020**

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**
(2) Attempt any **four** questions from the remaining.

1. Write a short note on :— **20**
   (a) Internet and Intranet
   (b) E-commerce
   (c) FTP
   (d) E-mail.

2. (a) Explain SET. **8**
   (b) Explain following topology :— **8**
      (i) Star
      (ii) Ring.
   (c) Write a short note on Gopher. **4**

3. (a) Explain OSI reference model. **8**
   (b) Explain symmetric and asymmetric key cryptography. **8**
   (c) Write a short notes on :— **4**
      (i) SMTP
      (ii) POP.

4. (a) What is the difference between traditional commerce and e-commerce ? **8**
   (b) Discuss direct and in-direct benefits of EDI. **8**
   (c) Explain DNS. **4**

5. (a) Discuss digital signature concept with suitable example. **8**
   (b) Explain X.400 MHS functional model. **8**
   (c) Discuss cyber cash concept. **4**

6. (a) Discuss communication media with suitable diagram. **8**
   (b) Explain security issues of E-transaction. **8**
   (c) Explain WHOIS concept. **4**

7. (a) Explain SSL and working of SSL. **8**
   (b) Explain briefly hashing technique. **8**
   (c) Explain different internet technical groups. **4**

[TURN OVER

(REVISED COURSE)

(3 Hours) [Total Marks : 100

N.B. (1) **All** questions are **compulsory**.
(2) **Figures** on **right** indicate maximum **marks**.

1. Attempt the following :—
   (a) What is the difference between embedded systems and general purpose systems? 5
   (b) What is interrupt ? What is I/O mapping ? 5

2. Attempt any **three** of the following :—
   (a) Discuss the classification of embedded system. 5
   (b) What is Application Specific Integrated Circuit (ASIC) ? Explain its role in embedded system design. 5
   (c) Write note on RISC controllers. 5
   (d) Explain different applications of Embedded System. 5

3. Attempt any **three** of the following :—
   (a) Discuss embedded system as used in any one device or application. 5
   (b) Explain the Reliability, a quality attribute in the embedded system design. 5
   (c) Explain the quality attribute Response and Throughput in the embedded system design context. 5
   (d) Explain different characteristics of embedded system. 5

4. Attempt any **three** of the following :—
   (a) Explain the role of infinite loop in embedded system program. 5
   (b) Explain the role of linker in embedded system programming. 5
   (c) What is debugging ? Explain. 5
   (d) Write note on Compilers. 5

5. Attempt any **three** of the following :—
   (a) Discuss the various types of ROM. 5
   (b) Write note on Flash memory. 5
   (c) What is memory map ? Explain in detail. 5
   (d) Discuss in detail Cyclic Redundancy Check (CRC). 5

6. Attempt any **three** of the following :—
   (a) Explain the role of control register and status register. 5
   (b) Explain the importance of device driver. 5
   (c) How real time operating system is different from PC operating system ? 5
   (d) Write note on Watchdog timer. 5

7. Attempt any **three** of the following :—
   (a) Write note on Simulators. 5
   (b) Discuss in detail embedded product development life cycle. 5
   (c) What are the trends in embedded industry ? 5
   (d) What is cross compilation ? Explain in detail. 5