comp

SE | Sem III | Comp & I.T (CBGS) | Maths III

**Q.P. Code : 540702**

Total Marks:80
Duration: 3Hrs

NB 1. Question No.1 is compulsory
2. Attempt any three from the remaining six questions
3. Figures to the right indicate full marks

Q1a If the Laplace Transform of $e^{-t}\int_0^t u\cos 2u\,du$ [20]

b Prove that $f(z)=\sinh z$ is analytic and find its derivative

c Obtain Half range Sine Series for $f(x)=x+1$ in $(0,\pi)$

d Find a unit vector normal to the surface $x^2y+2xz=4$ at $(2,-2,3)$

Q2 a Prove that $\overline{F}=(2xy^2+yz)i+(2x^2y+xz+2yz^2)j-(2y^2z+xy)k$ is Irrotational.

Find Scalar Potential for $\overline{F}$ [6]

b Find the inverse Laplace Transform using Convolution theorem

$$\frac{(s-1)^2}{(s^2-2s+5)^2}$$ [6]

c. Find Fourier Series of $f(x)=\begin{cases}\pi x; 0\le x\le 1\\ \pi(2-x); 1\le x\le 2\end{cases}$ [8]

Q3 a Find the Analytic function $f(z)=u+iv$ if $v=\dfrac{x}{x^2+y^2}+\cosh x\cos y$ [6]

b Find Inverse Z transform of $\dfrac{(3z^2-18z+26)}{(z-2)(z-3)(z-4)}$, $3<|z|<4$ [6]

c Solve the Differential Equation $\dfrac{d^2y}{dt^2}+2\dfrac{dy}{dx}+2y=5\sin t$, $y(0)=0$, $y'(0)=0$ using Laplace Transform [8]

Q4 a Find the Orthogonal Trajectory of $3x^2y-y^3=k$ [6]

b Find the Z-transform of $2^K\sinh 3K$, $K\ge 0$ [6]

c Express the function $f(x)=\begin{cases}1 & ;|x|<1\\ 0 & ;|x|>1\end{cases}$ as Fourier Integral. Hence evaluate $\int_0^\infty \frac{\sin\lambda}{\lambda}.\cos(\lambda x)\,d\lambda$ [8]

Q5 a Evaluate using Stoke 's theorem $\int_c (2x-y)dx - yz^2dy - y^2zdz$ where C is the circle $x^2+y^2=1$ corresponding to the sphere $x^2+y^2+z^2=1$ above the XY plane [6]

b Show that $w=\frac{2z+3}{z-4}$ maps the circle $x^2+y^2-4x=0$ into straight line $4u+3=0$ [6]

c Find Inverse Laplace Transform $i)\ e^{-s}\tanh^{-1}s$ ii) $\frac{6}{(2s+1)^3}$ [8]

Q6 a Find the Laplace transform of $f(t)=\frac{2t}{3}, 0\le t\le 3, f(t+3)=f(t)$ [6]

b Find Complex Form of Fourier Series for $\sin(\alpha x)$ ; $(-\pi,\pi)$ , $\alpha$ is not an integer [6]

c Verify Green's theorm for $\int_c (2x^2-y^2)dx+(x^2+y^2)dy$ where C is the boundary of the surface enclosed by lines x=0,y=0,x=2,y=2 [8]

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SE sem III comp (OBG) ECCF



Q. P. Code : 540802

**Time:-3 Hrs** **Marks: 80**

N.B. : 1. Question **ONE** is **compulsory**

2. Solve any **THREE** out of remaining questions

3. Draw neat and clean diagrams

4. Assume suitable data if required.

Q. 1. A. Give reasons for the following 5

I. JFET can be used as a Voltage Variable Resistor

II. JFET is not operated with Forward $V_{GS}$ voltage in an amplifier

B. A difference amplifier is to be designed to amplify the difference between two voltages by a factor of 10. The inputs each approximately equal to 1V. Determine suitable resistor values for the circuit shown in fig.1 using a 741 opamp. 5

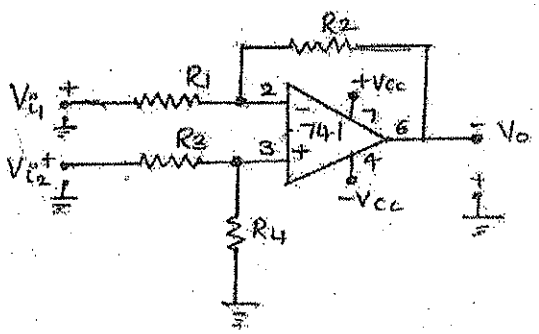


Fig.1

C. With neat block diagram explain how PLL can be used to generate large number of frequencies from a single reference frequency. 5

D. Explain the detection of pulse code modulation. 5

**[TURN OVER]**

Q. 2 A. For the common source circuit shown in fig.2. Calculate the gate input impedance, the drain output impedance, the circuit input and output impedance and the voltage gain. Use the typical parameters for the FET. **10**

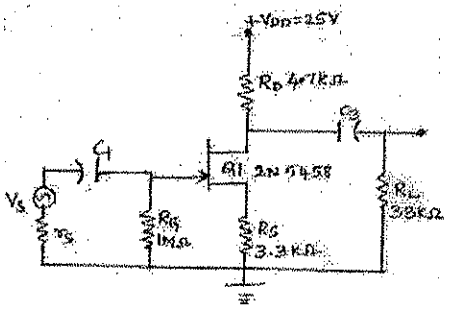


fig 2.

B. List down various parameters of Opamp along with their typical values for IC741. Also explain what is the significance of CMRR and Slew Rate? **10**

Q. 3 A. With neat diagram explain any one application of Op-amp based Comparator. **5**

B. Differentiate between BJT based Class A and Class C power amplifiers. **5**

C. Compare various pulse modulation techniques. **5**

D. Describe Shockley's equation and explain it with the relevant characteristics for JFET. **5**

Q. 4 A. Explain the generation of DSBSC using balanced modulator. **10**

B. Discuss the operating principle of PLL and explain its use as FM detector. **10**

Q. 5 A. Discuss the principle of operation of super heterodyne receiver in detail along with the waveforms at each stage. **10**

B. One input to a conventional AM modulator is a 500 KHz carrier with an amplitude of 20 Vp. The second input is 10 KHz modulating signal that is of sufficient amplitude to cause a change in the output wave of ±7.5 Vp. Determine:

(i) upper and lower side frequencies

(ii) modulation coefficient and percentage modulation

(iii) peak amplitude of the modulated carrier and upper and lower side frequency voltages

(iv)expression for the modulated wave

(v) draw the output spectrum **10**

**[TURN OVER]**

Q. 6 A. Write short note on generation of FM by Armstrong method. 5

B. Mention important specifications of ADC and DAC required for communication. 5

C. Explain the necessity and significance of modulation in communication. 5

D. Compare n-channel and p-channel JFET with respect to their device features and voltage-current characteristics. 5

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**Q.P. Code : 541001**

**(3 Hours)** **[Total Marks : 80]**

**N.B.** 1) Question number 1 is compulsory.
2) Attempt any 3 questions from the remaining 5 questions.
3) Each question carries 20 marks.
4) Within a question, each sub-question carries equal marks.

**1.** a) Convert $(-124)_{10}$ to its equivalent sign magnitude form. **02**
b) Convert decimal 214.32 into base 7. **02**
c) Add $(7)_{10}$ and $(6)_{10}$ in BCD. **02**
d) Simplify (B+A)(B+D)(A+C)(C+D). **02**
e) Construct Hamming code for BCD 0110.Use even parity. **02**
f) Prove that "A positive logic AND operation is equivalent to a negative logic OR operation". **02**
g) List the applications of shift registers. **02**
h) Minimize the following standard POS expression using K-map $Y = \Pi M(0,2,3,5,7)$ **03**
i) Write the entity declaration construct in VHDL for NOR gate. **03**

**2.** a) Obtain the minimal expression using Quine-Mc Cluskey method. **10**
$F(A,B,C,D) = \Sigma m(1,5,6,12,13,14) + d(2,4)$
b) Compare TTL, CMOS and ECL families with respect to gate, voltage level, fan-in, fan-out, propagation delay, power dissipation, speed and noise margin. **10**

**3.** a) Design a logic circuit to convert BCD to Gray code. **10**
b) Implement the following using 8:1 MUX. **05**
$F(A,B,C,D) = \Sigma m(0,1,3,5,7,10,11,13,14,15)$
c) Explain Astable multivibrator. **05**

**4** a) Explain Master-Slave J-K flipflop. **05**
b) Design 1:16 Demultiplexer using 1:4 demultiplexer. **05**
c) Explain Data flow modelling and Behavioural modelling in VHDL. **10**



**(TURN OVER)**

5. a) Convert JK flipflop to SR flipflop and D flipflop. **10**
   b) Design mod 12 asynchronous UP counter. **10**

6. **Write short note on (any four):-**
   a) Ring Counter
   b) State table
   c) 2-bit Magnitude comparator
   d) 3 to 8 line decoder
   e) Universal shift register



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Comp / III / CBSGS

**Q. P. Code : 541101**

**(3 Hours)** **[Total Marks: 80]**

**N.B.** (1) Question No 1 is compulsory
(2) Solve any three question out of remaining five questions
(3) Assumption made should be clearly stated
(4) Figure to the right indicates full marks

**1.** (a) Prove using Mathematical Induction **05**

$$2+5+8+ \dots +(3n-1)=n(3n+1)/2$$

(b) Find the generating function for the following finite sequences **05**

i) 1,2,3,4, ... ii) 2,2,2,2,2

(c) Find solution of $a_{r+2}+2a_{r+1}-3a_r=0$ **05**

(d) Find the complement of each element in $D_{30}$. **05**

**2.** (a) Let A={a,b,c,d,e,f,g,h}. Consider the following subsets of A **04**

A1={a,b,c,d} A2={a,c,e,g,h}

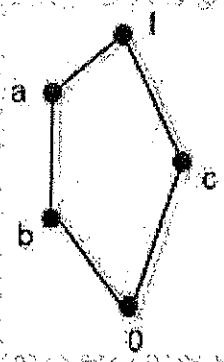
A3={a,c1e,g} A4={b,d} A5={f,h}

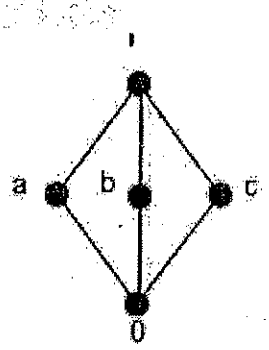
Determine whether following is partition of A or not. Justify your answer.

i) {A1, A2} ii) {A3,A4,A5}

(b) Prove that set G = {1,2,3,4,5,6} is a finite abelian group of order 6 with respect to multiplication module 7. **08**

(c) Explain distributive Lattice. Show that following diagrams represent non-distributive lattice. **08**




**3.** (a) Show that (~P∧(~Q∧R))V(Q∧R)V(P∧R)⇔R **04**

(b) Consider the {3,5) group encoding function defined by **08**

e(000)=00000 e(001)=00110

e(010)=01001 e(011)=01111

e(100)=10011 e(101)=10101

e(110)=11010 e(111)=11000

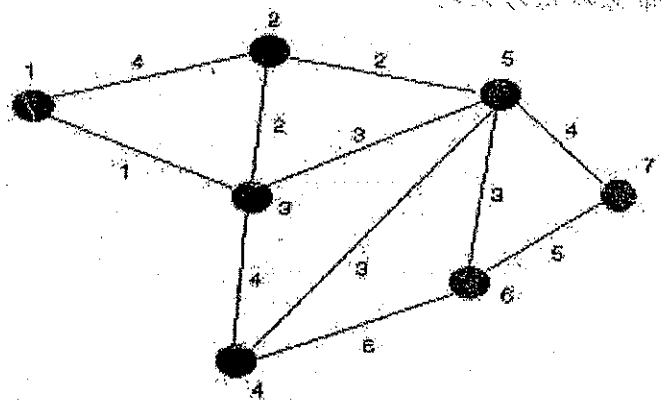


**TURN OVER**

Decode the following words relative to a maximum likelyhood decoding function.

i) 11001 ii) 01010 iii) 00111

(c) Give Prim's algorithm for minimum spanning tree. Use the same to find a minimum tree for the following fig. **08**



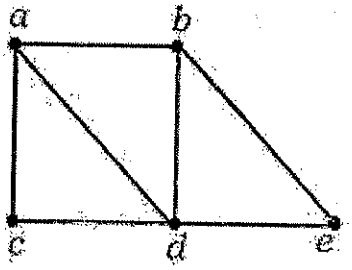

**4.** (a) Let the function $f: R \rightarrow R$, $f(x)=2x-3$ **08**

Find $f^2 = fof$, $f^3 = fofof$

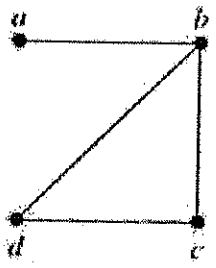
(b) Define Euler Path and Hamiltonian Path. **08**

i) Determine Euler Cycle and path in graph shown in (a)

ii) Determine Hamiltonian Cycle and path in graph shown in (b)




(a)




(b)

(c) In a class of students undergoing a computer course the following were observed. 08
Out of a total of 50 students:
30 know Pascal,
18 know Fortran,
26 know COBOL,
9 know both Pascal and Fortran,
16 know both Pascal and COBOL,
8 know both Fortran and COBOL,
47 know at least one of the three languages.

From this we have to determine
a. How many students know none of these languages?
b. How many students know all three languages?
c. How many students know exactly one language?

5. (a) Define binary tree. Explain various operations on Binary tree. 04

(b) Explain Pigeonhole principle and Extended Pigeonhole Principle. Show that if 7 colors are used to paint 50 bicycles, at least 8 bicycles will be of same color. 08

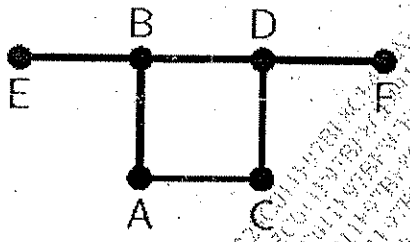
(c) Let A be a set of integers, let R be a relation on AXA defined by (a,b) R (c,d) if and only if a+d=b+c. 08
Prove that R is an equivalence Relation.

6. (a) Define reflexive closure and symmetric closure of a relation. Also find reflexive and symmetric closure of R. 04
A={1,2,3,4}
R={( 1,1),( 1,2 ),( 1,4 ),(2,4),( 3,1 ),(3,2 ),( 4,2 ),( 4,3 ),{1,4)}

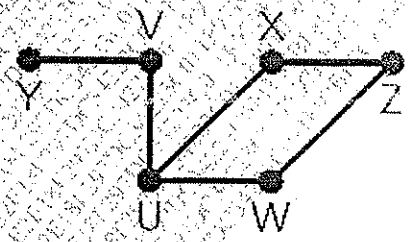
(b) Let $H = \begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix}$ **08**

Be a parity check matrix. Determine the group code $e_H : B^3 \rightarrow B^6$

(c) Determine if following graphs G1 and G2 are isomorphic or not. **08**




G1




G2

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SE|sem|IV comp/I.T (BGS) Maths IV

**QP Code : 541301**

(3 Hours) **[ Total Marks :80**

N.B. : (1) Questions no. 1 is compulsory.
(2) Attempt any **three** questions from Q. 2 to Q. 6.
(3) Use of statistical table permitted.
(4) Figures to the **right** indicate **full** marks.

1. (a) Evaluate $\int_C (z-z^2)\,dz$, where C is the upper half of the circle $|z|=1$. 5

(b) If $A=\begin{bmatrix}2 & 4\\ 0 & 3\end{bmatrix}$, then find the eigen values of $6A^{-1}+A^3+2I$ 5

(c) State whether the following statement is true or false with reasoning : "The regression coefficients between 2x and 2y are the same as those between x and y." 5

(d) Construct the dual of the following L.P.P. 5

Maximise $Z=3x_1+17x_2+9x_3$

Subject to $x_1-x_2+x_3\geq 3$

$-3x_1+2x_3\leq 1$

$2x_1+x_2-5x_3=1$

$x_1, x_2, x_3\geq 0$

2. (a) Evaluate $\int_c \frac{e^{2z}}{(z+1)^4}dz$, where C is the circle $|Z-1|=3$ 6

(b) Show that the matrix $A=\begin{bmatrix}5 & -6 & -6\\ -1 & 4 & 2\\ 3 & -6 & -4\end{bmatrix}$ is derogatory. 6

(c) A manufacturer knows from his experience that the resistance of resistors he produces is normal with $\mu=100$ ohms and standard deviation $\sigma=2$ ohms. What percentage of resistors will have resistance between 98 ohms and 102 ohms? 8

3. (a) A discrete random variable has the probability distribution given below: 6

| x | −2 | −1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| p(x) | 0.2 | k | 0.1 | 2k | 0.1 | 2k |

Find k, the mean and variance

**[ TURN OVER ]**

(b) Solve the following L.P.P. by simplex method 6

Maximise $Z = 3x_1 + 2x_2$

Subject to $x_1 + x_2 \leq 4$

$x_1 - x_2 \leq 2$

$x_1, x_2 \geq 0$

(c) Expand $f(z) = \dfrac{z^2 - 1}{z^2 + 5z + 6}$ around $z = 0$, indicating region of convergence. 8

4. (a) Find the first two moments about the origin of Poisson distribution and hence find mean and variance. 6

(b) Calculate R and r from the following data : 6

| x | 12 | 17 | 22 | 27 | 32 |
|---|---|---|---|---|---|
| y | 113 | 119 | 117 | 115 | 121 |

( R - the rank correlation coefficient, r - correlation coefficient )

(c) Show that the matrix $A = \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ is diagonalisable. 8

Find the transforming matrix and the diagonal matrix.

5. (a) A tyre company claims that the lives of tyres have mean 42,000 kms with S.D of 4000 kms. A change in the production process is believed to result in better product. A test sample of 81 new tyres has a mean life of 42,500 kms. Test at 5% level of significance that the new product is significantly better than the old one. 6

(b) Evaluate $\int_0^{2\pi} \dfrac{d\theta}{5 + 3\sin\theta}$ using Cauchy's residue theorem. 6

(c) Using the Kuhn-Tucker conditions solve the following N.L.P.P. 8

Minimise $Z = 7x_1^2 + 5x_2^2 - 6x_1$

Subject to $x_1 + 2x_2 \leq 10$

$x_1 + 3x_2 \leq 9$

$x_1, x_2 \geq 0$

[ TURN OVER ]

6. (a) 300 digits were chosen at random from a table of random numbers. The frequency of digits was as follows. 6

| Digit | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | 28 | 29 | 33 | 31 | 26 | 35 | 32 | 30 | 31 | 25 | 300 |

Using $\chi^2$-test examine the hypothesis that the digits were distributed in equal numbers in the table.

(b) Use the dual simple method to solve the following L.P.P. 6

Minimise $Z = 6x_1 + x_2$

Subject to $2x_1 + x_2 \geq 3$

$x_1 - x_2 \geq 0$

$x_1, x_2 \geq 0$

(c) (i) Ten individuals are chosen at random from a population and their heights are found to be 63, 63, 64, 65, 66, 69, 69, 70, 70, 71 inches. Discuss the suggestion that the mean height of the universe is 65 inches. 4

(ii) A random variable X has the following probability distribution 4

| x | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| p(x) | $1/6$ | $1/3$ | $1/3$ | $1/6$ |

Find M.G.F about the origin and hence first four raw moments.

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SE/sem/IV/comp/CBGS (AOA).

**Q.P. Code :13174**

**[Time: Three Hours]** **[ Marks:80]**

Please check whether you have got the right question paper.

N.B: Subject AOA CSC 402 CBSGS R-12 SE comp SEM IV CBSGS
1. Q.1 is compulsory.
2. Solve any three from Remaining

**Q. 1** Answer **any four** **20**

a) Write an algorithm for finding maximum and minimum number from given set.

b) Write the algorithm and derived the complexity of Binary Search algorithm.

c) Explain masters method with example

d) Write a note on flow shop scheduling

e) Compare divide and conquer, dynamic programming and Backtracking approache used for algorithm design.

**Q. 2** a) Write and explain string matching with finite automata with an example **10**

b) Explain how branch and bound strategy can be used in 15 puzzle problem. **10**

**Q. 3** a) What is 0/1 knapsack and fractional knapsack problem. **10**

Solve following using 0/1 knapsack method

| Item (i) | Value (vi) | Weight(wi) |
|---|---|---|
| 1 | 18 | 3 |
| 2 | 25 | 5 |
| 3 | 27 | 4 |
| 4 | 10 | 3 |
| 5 | 15 | 6 |

Knapsack capacity=12.

b) Explain insertion sort and derive its complexity **10**

**Q. 4** a) What is a binary search tree? How to generate optimal binary search tree **10**

b) What is a longest common subsequence problem? Find LCS for following string X = ACB AED Y = ABC ABE **10**

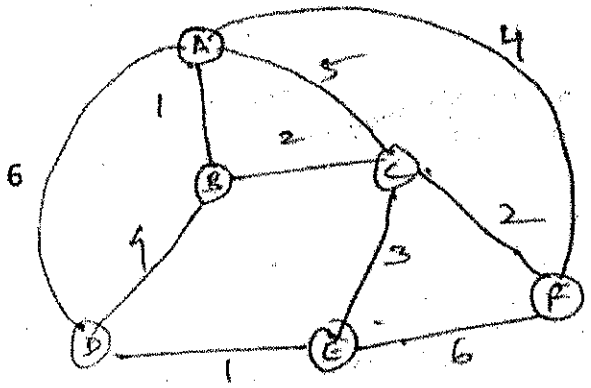
**Q. 5** a) Explain Job Sequencing with deadlines. **10**

Let n=4, $(P_1\ P_2\ P_3\ P_4)$ =(100,10,15,27) and $(d_1\ d_2\ d_3\ d_4)$ (2,1,2,1) find feasible solution.

b) Explain prims algorithm and find minimum spanning tree for the following graph. **10**



**(P.T.O)**




Q.6 Write short notes **(any three)**:- **20**

a) Problem of multiplying Long Integers
b) Strassen's matrix multiplication
c) Knuth Morris Pratt's Pattern matching
d) Multi stage Graphs

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**Q. P. Code: 18323**

Time: 3 Hours Marks: 80

N.B. : (1) Question Number 1 is compulsory

(2) Solve any three question from the remaining questions

(3) Make suitable assumptions if needed

1. (a) Construct an ER diagram for a hospital with a set of patients and a set of medical doctors. Associated with each patient a log of various tests and examination conducted. 10

(b) Explain lossless join decomposition and dependency preserving decomposition 5

(c) List four significant differences between file processing system and database management system 5

2. (a) What is a deadlock? How is it detected? Discuss different types of deadlock prevention scheme. 10

(b) Write SQL queries for the given database 10

Employee(eid,ename,street,city)

Works(eid,cid,salary)

Company(cid,cname,city)

(i) Modify the database so that Jack now lives in 'Mumbai'

(ii) Give all employees of 'ANZ Corporation' a 10% raise in salary

(iii) Find all employee id who live in same cities as the company for which they work

(iv) Give total number of employees

(v) Find the highest paid employee

3. (a) What is an attribute? Explain different types of attributes with examples. 10

(b) Companies manufacture ranges of products which are purchased by customers. The relation schema for this operation is given as :- 10

Company(company_code,company_name,director#,director_name,{product name, cost, {cust#, customer_name, address}}) where { } represents a repeating groups and company_code, dirctor# and cust# contains unique values. Normalize this relation to third normal form.

**TURN OVER**

4. (a) Explain following relational algebra operations with examples 10

   (i) set intersection

   (ii) Generalized projection

   (iii) Natural Join

   (iv) Aggregation operator

4 (b) Explain nested loop join and block nested loop join algorithm in query processing. 10

5 (a) Explain Timestamp ordering protocol and Thomas write rule 10

(b) Describe the three level schema architecture of DBMS. State different level of dependencies in this architecture. 10

6 (a) Explain log based recovery 10

(b) Explain Hash join algorithm in query processing 10

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Computer/ SemIV/ CBGS

**Q.P. Code :09887**

**[Time: Three Hours]** **[ Marks:80]**

Please check whether you have got the right question paper.

N.B:
1. Question No. 1 is compulsory.
2. Attempt any **three** out of remaining **five** questions.
3. Assumptions made should be clearly stated.
4. Figures to the right indicate full marks.
5. Assume suitable data whenever required but justify that.

| | | | |
|---|---|---|---|
| Q. 1 | a) | Differentiate between NFA and DFA | 5 |
| | b) | Explain Chomsky Hierarchy | 5 |
| | c) | Explain Rice's Theorem | 5 |
| | d) | Explain Pumping Lemma for CFG | 5 |
| Q. 2 | a) | Design FA to check divisibility by 3 to binary number. | 10 |
| | b) | Using Pumping Lemma prove that following language is not regular: $L = \{ 0^m 1^{m+1} \mid m>0 \}$ | 10 |
| Q. 3 | a) | Design Moore Machine to generate output A if string is ending with abb, B if string ending with aba and C otherwise over alphabet (a,b).And Convert it to Mealy machine. | 10 |
| | b) | Simplify the given grammar. $S \rightarrow aAa/bBb/BB$ $A \rightarrow C$ $B \rightarrow A/S$ $C \rightarrow S/\varepsilon$. | 10 |
| Q. 4 | a) | Construct NFA for Given Regular expressions:<br>i) (a+b)*ab,<br>ii) aa(a+b)*b,<br>iii) aba(a+b)*,<br>iv) (ab/ba)*/(aa/bb)* | 10 |
| | b) | Construct PDA accepting the language $L= \{a^{2n}b^n \mid n>0\}$. | 10 |
| Q.5 | a) | Design minimized DFA for accepting strings ending with 100 over alphabet (0,1). | 10 |
| | b) | Design Turing machine to recognize wellformedness of parenthesis. | 10 |
| Q. 6 | Write short note on (any four) | | 20 |
| | a) | Greibach Normal form | |
| | b) | Deterministic PDA and Multistack PDA | |
| | c) | Variants of Turing Machine | |
| | d) | Halting Problem | |
| | e) | Church-Turing Thesis | |

———X———

SEM-IV COMP (CBSGS)

**Q.P. Code: 16435**

**Duration: 3 Hours** **Total Marks assigned: 80**

N.B.: (1) Question No. **1 is compulsory.**
(2) Attempt any **three** of remaining **five** questions.
(3) Assume any suitable **data** if necessary and justify the same.

1. (a) Compare Raster and Random Scan Techniques [05]
   (b) What are the disadvantages of DDA algorithm? [05]
   (c) Derive the matrix for 2D rotation about an arbitrary point. [05]
   (d) Write a boundary fill procedure to fill 8-connected region. [05]

2. (a) Explain Bresenham's Circle drawing algorithm in detail. [10]
   (b) Derive the transformation matrix to magnify the triangle with vertices A(0,0), B(1,2),C(3,2) to twice its size so that the point C(3,2) remain fixed. [10]

3. (a) Explain Cohen-Sutherland clipping algorithm for line with suitable example. [10]
   (b) Explain Weiler-Atherton algorithm for polygon clipping. What are the advantages over the other polygon clipping algorithm. Explain its working with an example. [10]

4. (a) Define window, viewport and derive window to viewport transformation. [10]
   (b) Differentiate between parallel and perspective projection. Explain with the help of examples. [10]

5. (a) Explain Back Surface Detection method in detail with an example. [10]
   (b) Discuss Halftoning and Dithering techniques. [10]

6. Write a short note on any two of the following [20]
   (a) B-Spline curves.
   (b) 3-D rotation.
   (c) Fractals.

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Sem VI | Comp |

T2826 / T0871 MOBILE COMMUNICATION AND COMPUTING

**Q. P. Code : 13148**

**( 3 Hours )** **( Marks: 80**

N.B: (1) Question no 1 is compulsory.
(2) Attempt any three of remaining.
(3) Make suitable assumptions wherever necessary and state them.

Q1 Attempt **any 4**

A) What is frequency reuse concept in cellular communication? 05

B) Explain various types of handoffs in GSM network 05

C) Explain wireless local loop 05

D) What is hidden and exposed terminal problem? Discuss solutions to these problems. 05

E) What is an antenna. Explain different types of antennae 05

Q2. A) Explain in detail Bluetooth protocol architecture 10

B) Explain Hiperlan2 10

Q3. A) Why is mobile IP packet required to be forwarded through a tunnel. Explain minimal technique of encapsulation 10

B) Explain the functioning of I-TCP and SNOOP-TCP giving advantages and disadvantages of both 10

Q4. A) Explain GSM in detail 10

B) Explain how Mobile Terminated Call works detailing the role of HLR and VLR 10

Q5. A) Explain in detail 3G architecture 10

B) Explain UTRA-FDD and TDD modes 10

Q6. A) Write short notes on( any 02) 20

A) Security issues in mobile computing.
B) UMTS.
C) Android components
D) Satellites (GEO and LEO)

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VI- COMP.

T2826 / T0869 SOFTWARE ENGINEERING

(S.E.)

**Q.P. Code :11612**

**[Time: 3 Hours]** **[ Marks:80]**

Please check whether you have got the right question paper.

**N.B:** 1. **Question No.1 is compulsory.**
2. **Attempt any three question out of remaining five.**

Q.1 Develop a Software Requirement Specification (SRS) for developing a software for hospital management system. Create an SRS that contains the following: 20
1. Objective and Scope
2. Product perspective
3. Functional requirements (at least 3)
4. Non-functional requirements

Q.2 a) List the various metrics used for software measurement. Explain Function Point estimation technique in detail. 10
b) Explain the various fundamental software design concepts. 10

Q.3 a) Explain the change control and version control activities in SCM. 10
b) What are the different categories of risks? Explain the process of Risk Projection. 10

Q.4 a) What is Agility in context of software engineering? With suitable diagram explain Extreme Programming (XP). 10
b) Explain basis path testing in detail. 10

Q.5 a) Explain Test Driven Development (TDD) with an example. 10
b) What is FTR in SQA? What are its objectives? Explain the steps in FTR. 10

Q.6 Write short notes on any two :- 20
(a) System testing
(b) Coupling and Cohesion
(c) Service Oriented Software Engineering
(d) Software Maintenance

Comp/ Sem VI/ CBSGS/ SPCC

Q.P.Code:11585

(3 Hours) Total Marks: 80

**N.B.: (1) Question No. 1 is compulsory.**
**(2) Attempt any three questions out of remaining five questions.**

Q1. (a) What is system software & application software? (05)
(b) Explain different types of text editor. (05)
(c) Explain left recursion with an example (05)
(d) Write a note on: Input buffering scheme of lexical analyser. (05)

Q2. (a) With reference to assembler, explain the following tables with suitable example. (10)
(i) POT (ii) MOT (iii) ST (iv) LT
(b) Explain the different code optimization techniques in compiler design. (10)

Q3. (a) Draw flowchart and explain with databases the working pass I of macro processor. (10)
(b) Explain various functions of loader. Also explain the design and flowchart of Absolute loader. (10)

Q4. (a) Compare LR(0),LR(1) and LALR parser. (10)
Construct LR(0) parser table for following grammer:-
S-> (L) |id
L-> S|L,S
Variables: S and L
Terminals: ( id , )

(b) Explain different ways to represent three address code. (10)

Q5. (a) Explain run time storage organization in detail. (10)
(b) Explain the different phases of compiler. Illustrate the output after each phase for the following statement: (10)
a = b + c-d*5.

Q6. (a) Differentiate Top-down and Bottom-up parsing techniques. Explain recursive descent parser with an example. (10)

(b) Write short note on: (10)
(i) Basic block and flow graph
(ii) JAVA compiler environment.

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Sem V / Comp / T2825 / T0500 STRUCTURED AND OBJECT ORIENTED ANALYSIS & DESIGN May 2017.

**Q.P. Code : 581400**

**(3 HOURS)** **[Total Marks: 80]**

N.B.: (1) Question no. 1 is compulsory.
(2) Attempt any three questions from remaining.
(3) Assume suitable data wherever necessary.

Q.1. Answer the following: [20]
a) Explain the representation of Zachman Framework for an Enterprise.
b) Describe different phases of SDLC.

Q.2. a) Explain purpose of use case diagram with example. [10]

b) Draw two levels of DFD for Stock/Inventory Management System. The items which are purchased from the various dealers and suppliers are recorded into the database. The software system provides facilities for adding new item, removing an item, updating the stock, purchasing and total stock. [10]

Q.3 a) You are required to present an outline design of a system that will be used by doctors at a medical practice to keep basic patient records. The system should record each consultation between a doctor and patient, any illness diagnosed, and any drugs prescribed to the patient. At regular intervals, an auditor will use the system to check whether the same drug is being prescribed repeatedly to a particular patient. Draw UML Class diagram for system to support this functionality. [10]

b) Explain Cohesion and coupling in short. [10]

Q.4 a) A project requires an initial investment of Rs. 2,25,000 and is expected to generate the following net cash inflows:

| Year | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Cash inflow (Rs.) | 95,000 | 80,000 | 60,000 | 55,000 |

Compute net present value of project if the minimum desired rate of return is 12%. [10]

b) Draw Interaction/Communication diagram for new course registration at college. [10]

Q.5 a) Explain the need of deployment diagram. Draw a deployment diagram to model fully distributed systems. [10]

b) Draw a state diagram for online shopping system where a Customer can browse through the product catalog and add the items to shopping cart. He will require to login for purchase with different payment options and provided to give feedback. [10]

Q.6 Write short notes on: (Any two) [20]
a) Application Architecture
b) Principles of user interface (UI) design
c) Software requirements specification (SRS)
d) Design pattern

COMP — Sem V

T2825 / T0498 MICROPROCESSOR

**Q.P. Code : 581201**

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

**N.B. :** (1) Question **No.1** is **compulsory**.
(2) Answer **any four** questions from **Q.No.2** to **Q.No.7**.
(3) **Figures** to the **right** indicate **full marks**.
(4) Assume suitable **data** if **required**.

1. (a) What is memory segmentation? State advantages of memory segmentation. 5
   (b) What is GDT? Explain structure of GDT. 5
   (c) Explain integer pipeline of Pentium processor? 5
   (d) Briefly explain string instructions of 8086. 5

2. (a) Design 8086 based system for following requirements : 10
      (i) Clock frequency 5 MHz
      (ii) 512 KB RAM using 32 KB x 8
      (iii) 256 KB ROM using 32 KB x 8
   (b) Draw and explain block diagram of 8253. 10

3. (a) Explain DMA data transfer modes in brief. 10
   (b) Explain, with neat diagram, address translation mechanism implemented on 80386DX. 10

4. (a) Explain, with neat diagram, cache memory organization is supported by Pentium processor. 10
   (b) Draw and explain block diagram of Pentium processor. 10

5. (a) Draw and explain block diagram of SuperSparc processor. 10
   (b) Explain interrupt structure of 8086. 10

6. Write short note on : 5
      (a) Mixed language programming 5
      (b) Virtual 86 mode of 80386DX 5
      (c) Branch prediction logic 5
      (d) Control registers of 80386DX

T2825 / T0499 COMPUTER NETWORKS

COMP – Sem. V.

**Q.P. Code : 581301**

**( 3 Hours )** **[ Total Marks : 80**

**N.B. :** (1) Question **No.1** is **compulsory**.
(2) Attempt **any Three** questions out of remaining questions.
(3) Make **suitable** assumptions whenever **necessary**.

1. (a) Enumerate the main responsibilities of the data link layer. **20**
(b) What are the different guided and unguided transmission media?
(c) Explain with examples the classification of IPV4 addresses.
(d) Compare and contrast a circuit switching and a packet switching network.

2. (a) Consider a message represented by the polynomial $M(x) = x^5 + x^4 + x$. Consider a generating polynomial $G(x) = x^3 + x^2 + 1$ (1101). Generate a 3 bit CRC and show what will be the transmitted frame. How is error detected by CRC? **10**
(b) What is ISO-OSI reference model? Compare it with TCP/IP reference model. Which layer is used for the following : **10**
(i) to route packets
(ii) to convert packets to frame
(iii) to detect and correct errors
(iv) to run services like FTP, Telnet etc.

3. (a) Explain Distance Vector Routing. What are its limitations and how are they overcome? **10**
(b) What are Congestion Prevention Policies? Explain Congestion control in Vitiual Circuit and Datagram Subnets. **10**

4. (a) With the help of suitable example explain sliding window protocol with selective reject. Compare its performance to sliding window with Go-back-n technique. **10**
(b) Explain with the help of suitable diagram TCP connection management and release. **10**



**TURN OVER**

**Q.P. Code : 581301**



5. (a) Explain 1-persistent, p-persistent and 0-persistent CSMA giving strong and weak points of each. **10**

   (b) What is subnetting? Given the class C network 192.168.10.0 use the subnet mask 255.255.255.192 to create subnets and answer the following : **10**

   (i) What is the number of subnets created?

   (ii) How many hosts per subnet?

   (iii) Calculate the IP address of the first host, the last host and the broadcast address of each subnet.

6. Write a short notes on the following **(any two)** : **20**

   (i) SNMP and MIB

   (ii) Bluetooth Architecture

   (iii) Border Gateway Protocol

Comp/ Sem V/ CBSGS/ OS

QP CODE : 581101

(3 Hours) Total Marks : 80

N.B. 1. Q.no.1 is **compulsory**
2. Attempt any **three** out of the remaining five questions
3. Figures to **right** indicate **full** marks
4. Assume suitable data if necessary but justify the same

Q.1. Attempt the following (Any four)
a. Compare the monolithic and microkernals [5]
b. Explain the Internal and External Fragmentation [5]
c. What is mutual exclusion? Explain its significance [5]
d. What is a semaphore? Elaborate with example, the significance of semaphores [5]
e. Explain the effect of page size on performance of Operating System [5]

Q.2. a. Calculate hit and miss for the following string using page replacement policies – FIFO, LRU and Optimal. Compare it for the frame size 3 & 4.
1 2 3 2 1 5 2 1 6 2 5 6 3 1 3 6 1 2 4 3 [10]
b. What is a deadlock? Explain the necessary and sufficient conditions for the deadlock. Also suggest techniques to avoid deadlocks. [10]

Q.3. a. Explain an algorithm for dining philosophers problem [10]
b. Explain the banker's algorithm in detail. [10]

Q. 4. a. Explain the hardware support for paging [10]
b. Assume the following processes arrive for execution at the time indicated and the length of cpu burst time given in msec. [10]

| Job | Burst time | Priority | Arrival time |
|---|---|---|---|
| P1 | 10 | 5 | 0 |
| P2 | 6 | 2 | 0 |
| P3 | 7 | 4 | 1 |
| P4 | 4 | 1 | 1 |
| P5 | 5 | 3 | 2 |

For the above process parameters, find average waiting times and average turnaround times for the following scheduling algorithms- First Come First Serve, Shortest Job First, non preemptive priority Round Robin (assume quantum=5 units)

Q.5. a. Explain the process transition diagram for UNIX operating system [10]

b. Compare the following Disk scheduling algorithms using appropriate example- SSTF, FCFS, SCAN, C-SCAN, LOOK [10]

Q.6. Write notes on the following: [20]

a. Resource Allocation Graph
b. Process Control Block
c. System Components in Windows Architecture
d. Scheduling in Linux system

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BE/sem VII Comp (IBGS) DSP.

Q. P. Code : 622701

(3 hours) Total Marks: 80

N.B. 1. Question No. 1 is compulsory
2. Attempt any three out of remaining
3. Assume suitable data if necessary and justify the assumptions
4. Figures to the right indicate full marks

Q1 A Compare IIR systems with FIR systems. 05

B State whether $x[n] = \sin(n\pi/3)$ is an energy or power signal with proper justification. 05

C If $x[n] = \{1,2,2,1,3,1\}$ is a periodic signal. Plot it in circular representation for 05
i) $x[-n]$ ii) $x[n-2]$ iii) $x[n+2]$ iv) $x[-(n-2)]$ v) $x[-(n+2)]$

D State BIBO stability criterion for LTI systems. Determine the range of values of 'p' and 'q' for the stability of LTI system with impulse response: 05

$$h[n] = p^n \quad ; n \leq 0$$
$$= q^n \quad ; n \geq 0$$

Q2 A Check whether the system $y[n] = a^n u[n]$ is: 10
i) Static or Dynamic
ii) Linear or Non-linear
iii) Causal or Non-Casual
iv) Shift variant or Shift Invariant

B Check the periodicity of the following signals and if periodic, find their fundamental period. 10
i) $\cos(n/6) \cdot \cos(n\pi/6)$
ii) $\sin(2\pi n/3) + \cos(2\pi n/5)$

Q3 A Determine the output response of the LTI system using time domain method, whose input is $x[n] = 3\,\delta[n+1] - 2\,\delta[n] + \delta[n-1] + 4\,\delta[n-2]$ and $h[n] = 2\,\delta[n+1] + 5\,\delta[n-2] + 3\,\delta[n-3]$. 10

B If a continuous time signal $x(t) = \sin(2\pi \times 2000t) + 2\sin(2\pi \times 1000t)$ is sampled at 8000 samples/sec. Find out the 4-point DFT of it. Sketch the phase and magnitude spectrum. 10

Q4 A Explain any five properties of DFT. 10

B Compute linear convolution of the causal sequences $x[n] = \{2,-3,1,-4,3,-2,4,-1\}$ and $h[n] = \{2,-1\}$ using overlap save method. 10



[TURN OVER]

Q5 A Compute circular convolution of the causal sequences x[n] = {1,-1,1,-1} and h[n] = {1,2,3,4} using radix- 2 DIT FFT method. 10

B If the DFT of x[n] is X (k) = {2,-j3,0,j3} using DFT properties ,find : 10
i) DFT of x[n-2]
ii) Signal energy
iii) DFT of x*[n]
iv) DFT of $x^2$ [n]
v) DFT of x[-n]

Q6 A Explain the significance of Carl's Correlation Coefficient Algorithm in digital signal processing. Evaluate Carl's Coefficient for two causal sequences x[n] = {2,4,4,8} and y[n]= {1,1,2,2}. 10

B i) Calculate the percentage saving in calculations in a 64 point radix-2 FFT systems with respect to the number of complex additions and multiplications required, when compared to direct DFT system. 5

B ii) Write a detailed note on DSP processor. 5

Comp/ Sem VII / CBSGS/ CSS

**QP Code:811500**

3 hrs. 80 marks

Note :
1. **Question 1 is compulsory.**
2. **Attempt any 3 questions out of the rest.**
3. **Make suitable assumptions whenever necessary and justify them**
4. **Each question carries equal marks.**

Q1.

a) Use the Play fair cipher with the keyword : "MEDICINE" to encipher the message "The greatest wealth is health". (5)

b) Explain key rings in PGP. (5)

c) Briefly define idea behind RSA and also explain (10)

1) What is the one way function in this system?
2) What is the trap door in this?
3) Give Public key and Private Key.
4) Describe security in this system.

Q2)a) Explain DES, detailing the Feistel structure and S-block design (10)

b) Consider a Voter data management system in E-voting system with sensitive and non-sensitive attributes. (10)

1) Show with sample queries how attacks ( Direct, Inference) are possible on such data sets
2) Suggest 2 different ways to mitigate the problem.

Q 3)

a) Explain Diffie-Hellman Key exchange algorithm with suitable example. Also explain the problem of MIM attack in it (10)

b) What are Denial of Service attacks? Explain any three types of DOS attacks in detail (10)

Q 4)

a) IPSec offers security at n/w layer. What is the need of SSL? Explain the services of SSL protocol? (10)

b) What are the types of firewalls? How are firewalls different from IDS (10)

Q 5)a) What are the various ways in which public key distribution is implemented. Explain the working of public key certificates clearly detailing the role of certificate authority. (10)

b) Why are Digital Signatures & Digital certificates required? What is the significance of Dual Signature. (10)

Q6 Attempt any 4 (20)

a) SHA-1
b) Timing and Storage Covert Channel
c) Session Hijacking and Spoofing
d) Blowfish
f) S/MIME

T4527 / T1308 ARTIFICIAL INTELLIGENCE

sem-VII - comp.

**Q. P. Code : 811600**

**(3 Hours)** **Total Marks : 80**

N.B. 1. Question No. **1** is **compulsory**
2. Attempt any three (3) out of remaining five (5) questions
3. Assume suitable data **if necessary** and **justify** the assumptions
4. Figures to the **right** indicate full marks

Q1 Attempt an four (4) from the following

[A] Define AI. What are applications of AI? [05]

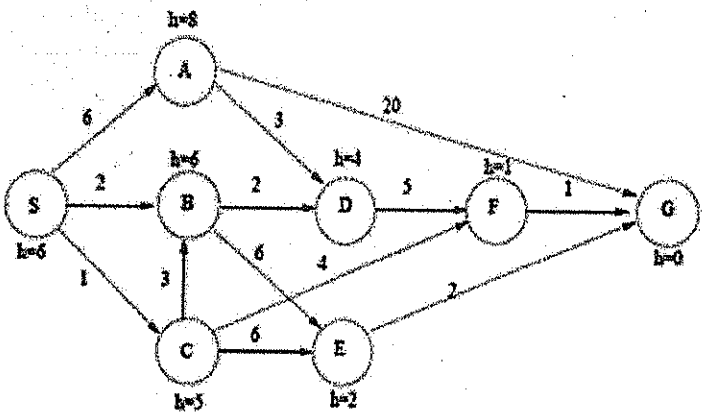
[B] Define heuristic function. Give an example heuristics function for 8-puzzle problem. Find the heuristics value for a particular state of the Blocks World Problem. [05]

[C] Compare Model based Agent with Utility based Agent. [05]

[D] What are the problems/frustrations that occur in hill climbing technique? Illustrate with an example [05]

[E] What is supervised learning and unsupervised learning? Give example of each. [05]

Q2 [A] Consider the search problem below with start state S and goal state G. The transition costs are next to the edges and the heuristic values are next to the states. What is the final cost using A * search. [10]




[B] Explain the architecture of Expert System. What are advantages and limitations of Expert System? [10]

Q3 [A] Explain with example various uninformed search techniques. [10]

[B] Illustrate Forward chaining and backward chaining in propositional logic with example [10]

**[TURN OVER]**



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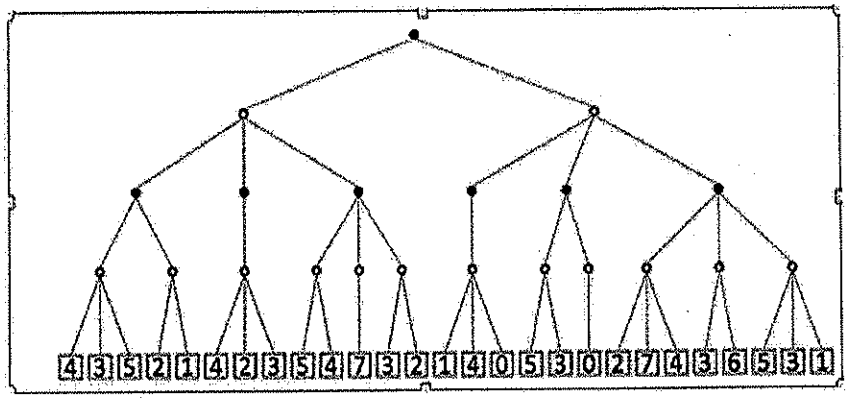
Q4 [A] Apply alpha-Beta pruning on following example considering first node as MAX [10]




[B] Explain a partial order planner with an example. [10]

Q5 [A] Consider the following facts about dolphins: [10]

Whoever can read is literate. Dolphins are not literate. Some dolphins are intelligent.

(i) Represent the above sentences in first order predicate logic (FOPL).
(ii) Convert them to clause form
(iii)Prove that **"Some who are Intelligent cannot read"** using resolution technique

[B] What is Uncertainty? Explain Bayesian Network with example [10]

Q6 Write short note on any two of the following: [20]

(i) Steps in Natural Language Processing

(ii) Decision Tree Algorithm with an example

(iv) Genetic Algorithms

**Q.P. Code : 790700**

**( 3 Hours )** **[Total Marks : 80**

**N.B. :** (1) Question **No.1** is **compulsory**.
(2) Solve **any three** out of **five** remaining questions.

1. (a) Explain hard limit and soft limit activation function. 5
   (b) Explain Mc Culloch Pitts neuron model with the help of an example. 5
   (c) Explain fuzzy extension principle with the help of an example. 5
   (d) Explain linear separable and non-linearly separable pattern with example. 5

2. (a) What is learning in neural networks? Differentiate between supervised and unsupervised learning. 10
   (b) What are the different types of encoding, selection, crossover, mutations of GA. Explain each type with suitable examples. 10

3. (a) Explain error back propagation training algorithm with the help of a flowchart. 10
   (b) Explain any four defuzzification methods with suitable example. 10

4. Design a fuzzy controller to determine the wash time of domestic washing machine. Assume that input is dirt and grease on clothes. Use three descriptors for input variables and five descriptors for out variables. Derive set of rules for control the action and defuzzification. The design should be supported by figures. Show if the clothes are soiled to larger degree the wash time will be more and vice-versa. 20

5. (a) Prove the following identities : 10
   (i) For unipolar continuous activation
   $$f'(net) = 0\ (1 - 0).$$
   (ii) For bipolar continuous activation function
   $$f'(net) = 0\ (1 - 0^2)/2.$$
   (b) Explain learning vector quantization Algorithm. 10

6. Write short notes on **any two** : 20
   (a) Kohonen self-organizing feature maps.
   (b) ANFIS architecture.
   (c) Newton Method.

**Q.P. Code : 812001**

**(3 Hours )** **[ Total Marks : 80**

**N.B. :** (1) Question number 1 is compulsory.
(2) **Attempt** any **three** questions out of the remaining five questions.
(3) Assume suitable data.

1. Design Domain-Specific Software Architecture (OSSA) for online shopping website Management System. Assume suitable entities, attributes etc. Domain Model must consists following :- **20**
   a) Domain Dictionary and Information Model.
   b) Feature Model and Operational Model.

2. a) Define Architectural analysis. Discuss various analysis types with an example. **10**
   b) Define the following terminology :- **10**
   1) Component
   2) Configuration
   3) Ambiguity
   4) Architectural Pattern
   5) Precision

3. a) Discuss Service-Oriented Architecture (SOA) and Web Service. **10**
   b) Explain with an example Software System Mobility and Architecture. **10**

4. a) Explain the distributed object style in connection with CORBA middleware. **10**
   b) What is C2 style? Explain its architecture. **10**

5. a) Discuss frameworks for the Pipe-and-Filter Architectural Style. **10**
   b) Discuss Elements of the Architectural Style. **10**

6. Write short notes on the following. **20**
   a) Peer-to-Peer style.
   b) Challenges in Migrating Code.
   c) System Stakeholders.
   d) Simulation-Based Analysis.

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BE/Sem VIII/ Comp/03565/ BDA

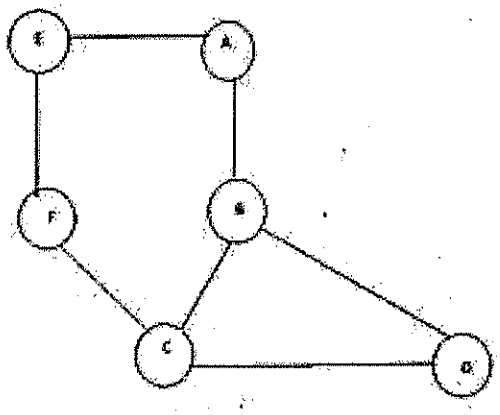
**QP Code : 725401**

(3 Hours) **[ Total Marks :80**

N.B. : (1) Question no. **1** is **compulsory**
(2) Attempt any three from the remaining.
(3) Assume suitable data.

1. (a) What is Big Data? What is Hadoop? How Big Data and Hadoop are linked? **5**
(b) Explain Page Rank with Example. Can a Website's Page rank Ever Increase? What are its chances of Decreasing? **5**
(c) Explain Hubs and Authorities with neat diagram. **5**
(d) With respect to data stream querying, give example of **5**
(a) One Time queries
(b) Continuous Queries
(c) Pre-defined queries
(d) Ad-hoc queries

2. (a) Explain Hadoop Ecosystem with core components, Explain its Physical architecture. State Limitations of Hadoop. **10**



(b) What is MapReduce ? Explain How Map and Reduce Work? What is Shuffling in MapReduce? **10**

3 (a) For the Graph given below use betweenness factor and find all communities. **10**
(b) How would you get the features of the document in a content -based system? Explain document similarity. **5**
(c) What is triangular matrix? How it is used for main memory counting? **5**



**[TURN OVER]**

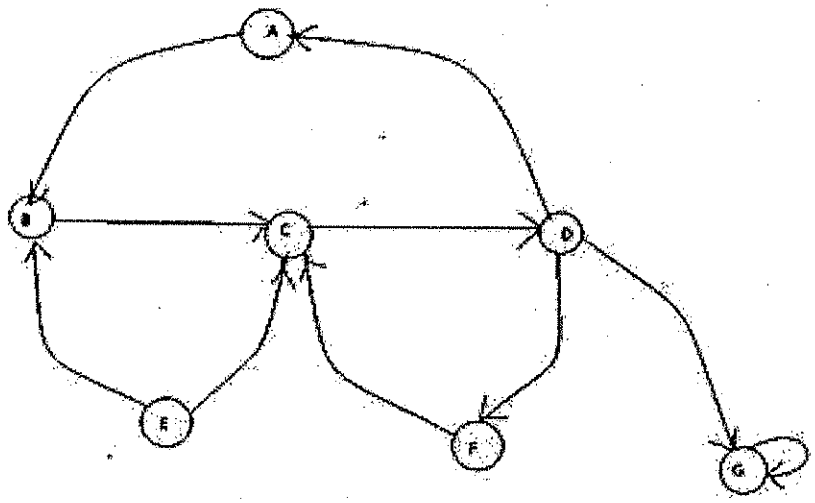
4 (a) Explain Collaborative Filtering based recommendation System. How it is different from content based recommendation systems ? 10

(b) What are Combiners? When Should one use combiner in mapreduce job? 5

(c) How to count distinct elements in a stream? Explain Flajolet-Martin Algorithm. 5

5 (a) Given a 1 Dim Dataset {1,5,8,10,2} Use the agglomerative clustering algorithm with Euclidean distance to establish hierarchical grouping relationship. Draw the dendrogram . 10

(b) Consider a Portion of Web Graph Shown below: 10




(a) Compute the hub and authority scores for all the nodes.

(b) Does this graph contains spider traps? Dead ends? If so, which nodes?

(c) Compute the page Rank of the nodes with teleportation $\beta$ =0.8? (Show two iterations only)

6. (a) What is NoSQL? What are the business drivers for NoSQL? Discuss any two architectural patterns ofNoSQL. 10

(b) What is a Data Stream Management System? Explain with Block Diagram 10

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BE/Sem VIII/Comp/CBSGS/DF

QP Code : 11996

(3 Hours)

Total Marks: 80

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

(2) Attempt any three questions from the remaining five questions.

(3) Make suitable assumptions wherever necessary but justify your assumptions.

1. (a) What is incident response? Explain goals of incident response. 05

(b) Explain the term Cyber terrorism with examples. 05

(c) What is Evidence? Explain the types of Evidence. 05

(d) What is DOS attack? How to achieve recovery from DOS attack? 05

2. (a) Explain volatile data collection procedure for Windows system. 10

(b) What are possible investigation phase carried out in Data Collection and Analysis. 10

3. (a) Explain Incident Response Methodology in detail. 10

(b) What are the steps involved in computer evidence handling? Explain in detail. 10

4. (a) Explain importance of forensic duplication and its methods. 10

(b) Describe levels of culpability. 10

5. (a) Explain various ethical issues concern in computer forensics. 10

(b) How you will trace the crime which has been happened through email using tool. 10

6. Write a short note on 20

(1) NTFS Disk

(2) Laws related to computer forensic

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BE/Sem VIII/ Comp/CBSGS/BDA

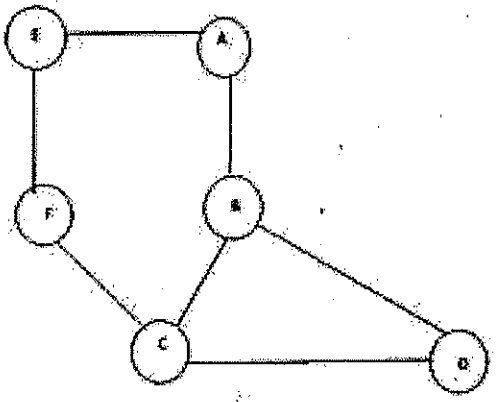
**QP Code : 725401**

(3 Hours) **[ Total Marks :80**

N.B. : (1) Question no. **1** is **compulsory**
(2) Attempt any three from the remaining.
(3) Assume suitable data.

1. (a) What is Big Data? What is Hadoop? How Big Data and Hadoop are linked? **5**
(b) Explain Page Rank with Example. Can a Website's Page rank Ever Increase? What are its chances of Decreasing? **5**
(c) Explain Hubs and Authorities with neat diagram. **5**
(d) With respect to data stream querying, give example of **5**
(a) One Time queries
(b) Continuous Queries
(c) Pre-defined queries
(d) Ad-hoc queries

2. (a) Explain Hadoop Ecosystem with core components, Explain its Physical architecture. State Limitations of Hadoop. **10**




(b) What is MapReduce ? Explain How Map and Reduce Work? What is Shuffling in MapReduce? **10**

3 (a) For the Graph given below use betweenness factor and find all communities. **10**
(b) How would you get the features of the document in a content -based system? Explain document similarity. **5**
(c) What is triangular matrix? How it is used for main memory counting? **5**



**[TURN OVER]**

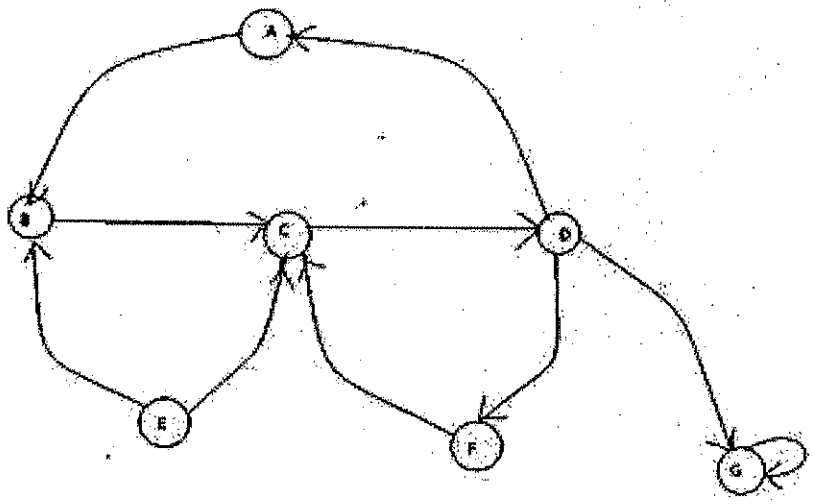
4 (a) Explain Collaborative Filtering based recommendation System. How it is different from content based recommendation systems ? 10

(b) What are Combiners? When Should one use combiner in mapreduce job? 5

(c) How to count distinct elements in a stream? Explain Flajolet-Martin Algorithm. 5

5 (a) Given a 1 Dim Dataset {1,5,8,10,2} Use the agglomerative clustering algorithm with Euclidean distance to establish hierarchical grouping relationship. Draw the dendrogram . 10

(b) Consider a Portion of Web Graph Shown below: 10




(a) Compute the hub and authority scores for all the nodes.

(b) Does this graph contains spider traps? Dead ends? If so, which nodes?

(c) Compute the page Rank of the nodes with teleportation $\beta$ =0.8? (Show two iterations only)

6. (a) What is NoSQL? What are the business drivers for NoSQL? Discuss any two architectural patterns ofNoSQL. 10

(b) What is a Data Stream Management System? Explain with Block Diagram 10

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BE/Sem VIII/Comp/CBSGS/DF

QP Code : 11996

(3 Hours)

Total Marks: 80

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

(2) Attempt any three questions from the remaining five questions.

(3) Make suitable assumptions wherever necessary but justify your assumptions.

1. (a) What is incident response? Explain goals of incident response. 05

(b) Explain the term Cyber terrorism with examples. 05

(c) What is Evidence? Explain the types of Evidence. 05

(d) What is DOS attack? How to achieve recovery from DOS attack? 05

2. (a) Explain volatile data collection procedure for Windows system. 10

(b) What are possible investigation phase carried out in Data Collection and Analysis. 10

3. (a) Explain Incident Response Methodology in detail. 10

(b) What are the steps involved in computer evidence handling? Explain in detail. 10

4. (a) Explain importance of forensic duplication and its methods. 10

(b) Describe levels of culpability. 10

5. (a) Explain various ethical issues concern in computer forensics. 10

(b) How you will trace the crime which has been happened through email using tool. 10

6. Write a short note on 20

(1) NTFS Disk

(2) Laws related to computer forensic

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B.E. sem (VIII) DWM computer

**Q. P. Code: 17089**

**Time: 3 Hours** **Marks: 80**

**Note:** 1. Question 1 is compulsory

2. Answer any three out of remaining questions.

Q1 A) What is dimensional modelling? Design the data warehouse for wholesale furniture Company. The data warehouse has to allow analysing the company's situation at least with respect to the Furniture, Customer and Time. More ever, the company needs to analyse: The furniture with respect to its type, category and material. The customers with respect to their spatial location, by considering at least cities, regions and states. The company is interested in learning the quantity, income and discount of its sales. [10]

B) Discuss different steps involved in Data Pre-processing. [10]

Q2 A) The college wants to record the Marks for the courses completed by students using the dimensions: i) Course, ii) Student, iii) Time & a measure Aggregate marks. Create a Cube and describe following OLAP operations: (i) Slice (ii) Dice (iii) Roll up (iv) Drill down (v) Pivot [10]

B) Apply the Naive Bayes classifier algorithm for buys computer classification and classify the tuple X=(age="young", income="medium", student="yes" and credit-rating="fair") [10]

| Id | Age | Income | Student | Credit-rating | buys computer |
|---|---|---|---|---|---|
| 1 | young | high | no | fair | no |
| 2 | young | high | no | good | no |
| 3 | middle | high | no | fair | yes |
| 4 | old | medium | no | fair | yes |
| 5 | old | low | yes | fair | yes |
| 6 | old | low | yes | good | no |
| 7 | middle | low | yes | good | yes |
| 8 | young | medium | no | fair | no |
| 9 | young | low | yes | fair | yes |
| 10 | old | medium | yes | fair | yes |
| 11 | young | medium | yes | good | yes |
| 12 | middle | medium | no | good | yes |
| 13 | middle | high | yes | fair | yes |
| 14 | old | medium | no | good | no |

Q3 A) Explain ETL of data warehousing in details? [10]

B) Explain types of attributes and data visualization for data exploration. [10]

Q4 A) Illustrate the architecture of Data Warehouse system. Differentiate Data warehouse and Data Mart [10]

B) Explain K-Means clustering algorithm? Apply K-Means algorithms for the following Data set with two clusters. [10]
Data Set = { 15,15,16,19,19,20,20,21,22,28,35,40,41,42,43,44,60,61,65}

Q5 A) Explain Updates to dimension tables in detail. [10]

B) A database has ten transactions. Let minimum support = 30% and minimum Confidence = 70% [10]
i] Find all frequent patterns using Apriori Algorithm.
ii] List strong association rules.

| Transaction _Id | Items |
|---|---|
| 01 | A,B,C,D |
| 02 | A,B,C,D,E,G |
| 03 | A,C,G,H,K |
| 04 | B,C,D,E,K |
| 05 | D,E,F,H,L |
| 06 | A,B,C,D,L |
| 07 | B,I,E,K,L |
| 08 | A,B,D,E,K |
| 09 | A,E,F,H,L |
| 10 | B,C,D,F |

Q6 Write short note on the following (Answer any **FOUR**) [20]

a) Major issues in Data Mining

b) Metadata in Data Warehouse

c) FP Tree

d) DBSCAN

e) Hierarchical Clustering

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