Computer Department

Bachelor Of Engineering

Question Papers May-June 2019

Sem III to VIII

S E C (m) (III) (choice based)
8th May 2019

Q. P. Code: 21237

Time: 3 Hours

Marks: 80

Note :   1) Q.1 is COMPULSORY.

2) Attempt ANY 3 questions from Q.2 to Q.6

3) Use of scientific calculators allowed.

4) Figures to right indicate marks.

Q.1   a) Find the Laplace transform of t e^t sin2t cost.   (05)

b) Find the inverse Laplace transform of $\dfrac{s+2}{s^2(s+3)}$ (05)

c) Determine whether the function f(z) = $x^2 - y^2$ + 2ixy is analytic and if so find its derivative.   (05)

d) Find the Fourier series for f(x) = $e^{-|x|}$ in the interval (-π , π).   (05)

Q.2 a) Evaluate $\int_0^\infty \dfrac{e^{-t}-cost}{te^{4t}}$ dt   (06)

b) Find the Z- Transform of f(k) = $\begin{cases} 3^k, & k < 0 \\ 2^k, & k \geq 0 \end{cases}$ (06)

c) Show that the function u = 2x (1 − y) is a harmonic function. Find its harmonic conjugate and corresponding analytic function.   (08)

Q.3 a) Find the equation of the line of regression of y on x for the following data   (06)

X	10	12	13	16	17	20	25
y	19	22	24	27	29	33	37

b) Find the bilinear transformation which maps z = 2 , 1 , 0 onto w = 1, 0 , i . (06)

c) Obtain the expansion of f(x) = x (π - x) , 0 < x < π as a half range cosine series.

Hence show that $\sum_1^\infty \dfrac{(-1)^{n+1}}{n^2} = \dfrac{\pi^2}{12}$.   (08)

Q.4 a) Find the inverse Laplace Transform by using convolution theorem

$\dfrac{1}{(s^2 + 1)(s^2+9)}$ (06)

b) Calculate the coefficient of correlation between Price and Demand.   (06)

Price   : 2, 3, 4, 7, 4.

Demand : 8, 7, 3, 1, 1.

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c) Find the inverse Z-transform for the following ; (08)

i) $\frac{z}{z-5}$, $|z| < 5$ ii) $\frac{1}{(z-1)^2}$, $|z| > 1$

Q.5 a) Find the Laplace transform of $e^{-t} \sin t \, H(t - \pi)$ (06)

b) Show that the set of functions { sinx , sin3x , sin5x , …….} is orthogonal over [0, π/2]. Hence construct orthonormal set of functions. (06)

c) Solve using Laplace transform $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = 3t\,e^{-t}$, given y(0) = 4 and y '(0) = 2. (08)

Q.6 a) Find the complex form of Fourier series for f(x) = 3x in (0, 2π). (06)

b) If f(z) is an analytic function with constant modulus then , prove that f(z) is constant. (06)

c) Fit a curve of the form $y = ax^b$ to the following data. (08)

x	1	2	3	4
y	2.5	8	19	50

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14/05/19

S.E. (COMP) Choice Base CBCGS III Sem

(Time: 3 Hours)　　　　　　　　　　　　　　　　(Marks:80)

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

　　　(2)Assume suitable data if necessary

　　　(3)Attempt any three questions from remaining questions

1　　Attempt ant 5

　(a) Convert $(451.43)_{10}$ into octal, binary and hexadecimal and base 7.　(4)

　(b) Subtract using 1's and 2's complement method $(73)_{10} - (49)_{10}$　(4)

　(c) Perform $(52)_{10} - (68)_{10}$ in BCD using 9's complement.　(4)

　(d) State De Morgan's theorem. Prove OR-AND configuration is equivalent to NOR-NOR configuration.　(4)

　(e) Encode the data bits 111010001using Hamming code.　(4)

　(f) Explain SOP and POS and solve the following using K-Map
　　　$F(A,B,C,D)=\pi M(1,3,5,6,7,10,11)+d(2,4)$　(4)

　(g) Explain lockout condition. How can it be avoided　(4)

2 (a) Reduce equation using Quine McCluskey method and realize circuit using basic gates.　(10)

　　　$F(A,B,C,D) = \sum m (1,5,6,12,13,14) + d(2,4)$

　(b) Design 4-bit BCD subtractor using IC 7483.　(10)

3 (a) Implement the following using only one 8:1 Mux.　(5)

　　　$F(A,B,C,D) = \sum m (0,2,4,6,8,10,12,14)$

　(b) Design a Full Subtractor using only NAND gates.　(5)

　(c) Design a logic circuit to convert 4-bit gray code to its corresponding BCD code.　(10)

4(a) Compare different logic families with respect to fan in, fan out, speed, Propogation delay and power dissipation.　(5)

　(b) Implement 3 bit binary to gray code converter using Decoder.　(5)

　(c) Explain 4 bitbidirectional shift register.　(10)

5 (a) Design mod 13 synchronous counter using T flipflop　(10)

　(b) Convert SR flipflop to JK flipflop and D flipflop.　(10)

6 Write short note on (any four):-　(20)

　(a) ALU

　(b) 3 bit Up/Down Asynchronous Counter

　(c) Octal to Binary Encoder

　(d) 4-bit Universal shift register

　(e) VHDL

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SE (Comp) / Sem-III / Choice based

QP CODE : 40415

(3 hrs)   Max. Marks: 80

1) Question **no.1** is **compulsory**.
2) Solve any **THREE** questions out of remaining **FIVE** questions.
3) All questions carry equal marks as indicated by figures to the right.
4) Assume appropriate data whenever required. State all assumptions clearly.

Q.1 a) Prove using Mathematical Induction   (05M)
$$2+5+8+...+(3n-1)=n(3n+1)/2$$
b) Find the generating function for the following finite sequences   (05M)
i) 1,2,3,4,... ii) 2,2,2,2,2
c) Let A = {1, 4, 7, 13} and R = {(1,4), (4,7), (7,4), (1,13)}
Find Transitive Closure using Warshall's Algorithm   (05M)
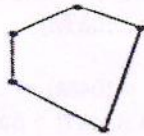d) Let f : R O R, where $f(x) = 2x - 1$ and $f^{-1}(x) = (x+1)/2$ (05M)
Find $(f \ O \ f^{-1})(x)$

Q.2 a) Define Lattice. Check if the following diagram is a lattice or not.   (04M)

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 M)
c) A travel company surveyed it's travelers, to learn how much of their travel is taken with an
Airplane, a Train or a Car. The following data is known; make a complete Venn Diagram with all
the data. The number of people who flew was 1307. The number of people who both flew and
used a train was 602. The people who used all three were 398 in number. Those who flew but
didn't drive came to a total of 599. Those who drove but did not use a train totaled 1097. There
were 610 people who used both trains and cars. The number of people who used either a car or
a train or both was 2050. Lastly, 421 people used none of these Find out how many people drove
but used neither a train nor an airplane, and also, how many people were in the entire survey.

(08 M)

Q.3 a) Prove $\neg(p \vee (\neg p \wedge q))$ and $\neg p \wedge \neg q$ are logically equivalent by developing a
series of logical equivalences.   (04 M)
b) Consider the (3,5) group encoding function defined by   (08 M)
e(000)=00000   e(001)=00110
e(010)=01001   e(011)=01111
e(100)=10011   e(101)=10101
e(110)=11010   e(111)=11000
Decode the following words relative to a maximum likelyhood decoding function.
i) 11001   ii) 01010   iii) 00111
c) Mention all the elements of set D_{36} also specify R on D_{36} as aRb if a | b. Mention Domain and
Range of R. Explain if the relation is Equivalence Relation or a Partially Ordered Relation. If it is
a Partially Ordered Relation, draw its Hasse Diagram.   (08 M)
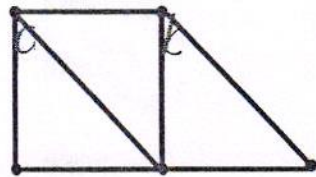
1

Q.4 a) Explain Extended pigeonhole Principle. How many friends must you have to guarantee that at least five of them will have birthdays in the same month. **(04 M)**

b) Define Euler Path and Hamiltonian Path.
   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 group of 6 boys and 4 girls, four children are to be selected. In how many different ways can they be selected such that at least one boy should be there? **(08 M)**

Q.5 a) Let G be a group. Prove that the identity element e is unique. **(04M)**

b) A pack contains 4 blue, 2 red and 3 black pens. If 2 pens are drawn at random from the pack, NOT replaced and then another pen is drawn. What is the probability of drawing 2 blue pens and 1 black pen? **(08M)**

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. Prove that R is an equivalence Relation. **(08M)**

Q.6 a) Define reflexive closure and symmetric closure of a relation. Also find reflexive and symmetric closure of $\bar{R}$. **(04 M)**

A={1,2,3,4}
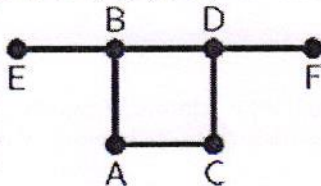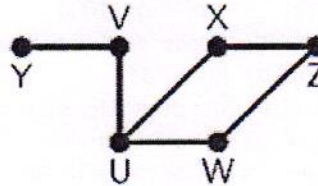R={(1,1),(1,2),(1,4),(2,4),(3,1),(3,2),(4,2),(4,3),(4,4)}

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

Be a parity check matrix. Determine the group code $e_H: B^3 \rightarrow B^6$ **(08M)**

c) Determine if following graphs G_1 and G_2 are isomorphic or not. **(08M)**

G1   G2

2

Paper / Subject Code: 50904 / Electronics Circuits and Communication Fundamentals   24/5/2019

S. E (comp) choice based. Sem-II   Q. P. Code: 35356

(3 Hours)   [Total Marks : 80]

N.B. : 1. Question **ONE** is **Compulsory.**
       2. Solve any **THREE** out of remaining.
       3. **Draw** neat and **clean** Diagrams.
       4. Assume suitable **data** if required

Q.1. Attempt the following

    A. Explain with diagram Input and output characteristic of Common base configuration   5
    B. List the ideal Characteristic of op-amp   5
    C. Calculate the percent power saving an SSB signal if the AM wave is modulated to a depth of (a) 100 % and (b) 50%   5
    D. Define the term Information theory. Give definitions for Information Rate and Entropy   5

Q.2. A. For the circuit shown in Figure below calculate V_{CB}, I_E, and I_B if ß=100   10
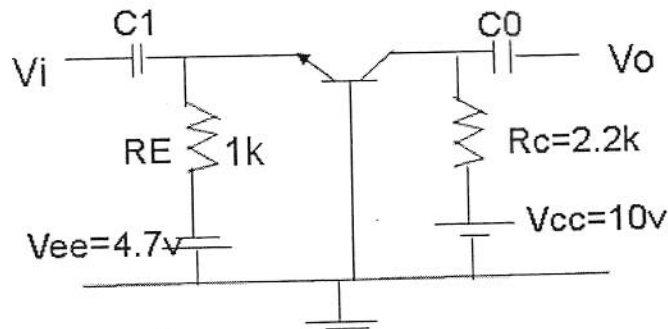
    B. Explain how op-amp can be used as a differentiator.   10

Q.3. A. What do you mean by Zero Crossing detector? Explain with diagram   5
    B. Write Short note on generation of FM by Armstrong method.   5
    C. Use op-amp IC741 to realize the expression
        $V0=5V_1+2V_2-3V_3$ 5
    D. What is a Nyquist criteria? What is its significance   5

Q.4. A. Explain Delta Modulation with neat diagram and waveforms after each block.   10
    B. An AM signal appears across a 50 Ω load and has the following equation   10
        $v(t)=12(1+\sin 12.566 \times 10^3 t)\sin 18.85 \times 10^8 t$ volts
        1. Sketch the envelope of this signal in time domain
        2. Calculate modulation index, sideband frequencies, total power and bandwidth

Q.5. A. Compare PAM,PWM and PPM pulse modulation techniques   10
    B. Explain the generation of DSBSC using Balance modulator   10

Q.6. A. What do you mean by multiplexing? Explain TDM   10
    B. List down various parameters of op-amp with their practical values for IC741.
        Explain common mode gain and differential mode gain.   10

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Paper / Subject Code: 50905 / Data Structures

SE (comp) sem-III Choice Base   30/5/2019

N.B: (1) Question No.1 is compulsory
      (2) Attempt any three questions of the remaining five questions
      (3 Figures to the right indicate full marks
      (4) Make suitable assumptions wherever necessary with proper justifications

Q.1 (a) Explain Linear and Non-Linear data structures.   (5)
    (b) Explain Priority Queue with example.   (5)
    (c) Write a program in 'C' to implement Quick sort.   (10)

Q.2 (a) Write a program to implement Circular Linked List. Provide the following
        operations: (10)
            (i) Insert a node .
            (ii) Delete a node
            (iv) Display the list
    (b) Explain Threaded Binary tree in detail   (10)

Q.3 (a) Explain Huffman Encoding with suitable example   (10)
    (b) Write a program in 'C' to check for balanced parenthesis in an expression
        using stack   (10)

Q.4 (a) Write a program in 'C' to implement Queue using array.   (10)
    (b) Explain different cases for deletion of a node in binary search tree. Write function
        for each case   (10)

Q.5 (a) Write a program in 'C' to implement Stack using Linked-List .Perform the following
        operations: (10)
            (i) Push
            (ii) Pop
            (iii) Peek
            (iii) Display the stack contents
    (b) Explain Depth First search (DFS) Traversal with an example. Write the recursive
        function for DFS   (10)

Q.6. Write Short notes on (any two)   (20)
            (a) Application of Linked-List –Polynomial addition
            (b) Collision Handling techniques
            (c) Expression Tree
            (d) Topological Sorting

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SE (IV) (choice Base) (CM) 7th May 19

(Time: 3 hours)   Max. Marks: 80

N.B. (1) Question No. 1 is compulsory.
(2) Answer any three questions from Q.2 to Q.6.
(3) Use of Statistical Tables permitted.
(4) Figures to the right indicate full marks.

Q.1 (a) Find all basic, feasible and degenerate solutions for the following equations:
$2x_1 + 6x_2 + 2x_3 + x_4 = 3$; $6x_1 + 4x_2 + 4x_3 + 6x_4 = 2$ 05

(b) Integrate the function $f(z) = x^2 + i\,xy$ from A (1,1) to B (2,4) along the curve $x = t, y = t^2$.   05

(c) A machine is set to produce metal plates of thickness 1.5 cms with S.D. of 0.2 cms. A sample of 100 plates produced by the machine gave an average thickness of 1.52 cms. Is the machine fulfilling the purpose? Test at 1% Level of Significance.   05

(d) The sum of the Eigen values of a 3×3 matrix is 6 and the product of the Eigen values is also 6. If one of the Eigen value is one, find the other two Eigen values.   05

Q.2 (a) Evaluate $\oint \dfrac{\sin^6 z}{(z - \pi/6)^n}\,dz$ where c is the circle $|z| = 1$ for n = 1, n =3.   06

(b) Solve the following LPP using Simplex Method
Maximize $z = 3\,x_1 + 5x_2$
subject to
$$3x_1 + 2x_2 \le 18,$$
$$x_1 \le 4,$$
$$x_2 \le 6,$$
$$x_1, x_2 \ge 0$$ 06

(c) The following data is collected on two characters. Based on this, can you say that there is no relation between smoking and literacy? Use Chi-square test at 5% Level of significance.   08

	Smokers	Non-smokers
Literates	40	35
Illiterates	35	85

Q.3 (a) Find the Eigen values and Eigen vectors of the following matrix.
$$A = \begin{bmatrix} 3 & 10 & 5 \\ -2 & -3 & -4 \\ 3 & 5 & 7 \end{bmatrix}$$ 06

(b) The incomes of a group of 10,000 persons were found to be normally distributed with mean of rs. 750 and Standard deviation of rs. 50. What is the lowest income of richest 250?   06

(c) Obtain Taylor's and Laurent's expansions of $f(z) = \dfrac{z-1}{z^2 - 2z - 3}$ indicating region of convergence.   08

67635   Page 1 of 2

Q.4 (a) A man buys 100 electric bulbs of each of two well-known makes taken at random from stock for testing purpose. He finds that 'make A' has a mean life of 1300 hrs with a S.D. of 82 hours and 'make B' has a mean life of 1248 hours with S.D. of 93 hours. Discuss the significance of these results. **06**

(b) Using the Residue theorem, Evaluate $\int_0^{2\pi} \frac{d\theta}{5-3\cos\theta}$. **06**

(c) (i) Out of 1000 families with 4 children each, how many would you expect to have (a) at least one boy (b) at most 2 girls.

(ii) Find the Moment Generating Function of Binomial Distribution and hence find its mean. **04+04**

Q.5 (a) Check whether the following matrix is Derogatory or Non-Derogatory:
$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & -3 & 3 \end{bmatrix}$$ **06**

(b) The means of two random samples of sizes 9 and 7 are 196.42 and 198.82 respectively. The sum of the squares of the deviations from the means are 26.94 and 18.73 respectively. Can the samples be regarded to have been drawn from the same normal population? **06**

(c) Use the dual simplex method to solve the following L.P.P.
Minimise $z = x_1 + x_2$
subject to
$$2x_1 + x_2 \geq 2$$
$$-x_1 - x_2 \geq 1$$
$$x_1, x_2 \geq 0$$ **08**

Q.6 (a) Show that the matrix A satisfies Cayley-Hamilton theorem and hence find A^{-1}.
Where $A = \begin{bmatrix} 2 & 0 & -1 \\ 0 & 2 & 0 \\ -1 & 0 & 2 \end{bmatrix}$ **06**

(b) A random variable X has the probability distribution
$P(X = x) = \frac{1}{8} 3c_x, x = 0, 1\,2, 3.$ Find mean and variance. **06**

(c) Using Kuhn-Tucker conditions, solve the following NLPP
Maximize $z = 10x_1 + 10x_2 - x_1^2 - x_2^2$
subject to
$$x_1 + x_2 \leq 8$$
$$-x_1 + x_2 \leq 5$$
$$x_1, x_2 \geq 0$$ **08**

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B.E (COMP) (Choice Base) Sem IV   13/05/19.

Duration : 3 Hrs   **Maximum Marks : 80**

Note:

1) Question No 1 is compulsory.

2) Solve any three questions out of remaining five questions.

Q.1)		**Solve any 4**	**20**
	1)	Derive the complexity of quick sort for best case and worst case.	
	2)	What is asymptotic analysis? Define Big O, Omega and Theta notations.	
	3)	Write an algorithm to find all pairs shortest path using dynamic programming.	
	4)	Write a note on "Optimal Storage on Tapes".	
	5)	Define master theorem. Solve the following using master method. $T(n)=8T(n/2)+n^2$	

Q.2.   A)   Write an algorithm for finding minimum and maximum using divide and conquer. Also derive its complexity.   **10**

      B)   Write Kruskal's algorithm and show its working by taking suitable example of graph with 5 vertices.   **10**

Q.3.   A)   Solve fractional knapsack problem for the following.   **10**
            n=6, p=(18, 5, 9, 10, 12, 7) w=(7, 2, 3, 5, 3, 2)

      B)   Write an algorithm for Knuth Morris Pratt (KMP) pattern matching.   **10**

Q.4.   A)   Write an algorithm to solve N Queens problem. Show its working for N =4.   **10**

      B)   Write an algorithm to solve sum of subset problem and solve the following problem. n=4, w = {4, 5, 8, 9}, required sum = 9.   **10**

Q.5.   A)   Prove that Vertex Cover problem is NP Complete.   **10**

      B)   Find the longest common subsequence for the following two strings.   **10**
            X=ABACABB Y= BABCAB

Q.6)   Write short note on **any 2.**   **20**

(a) Assembly Line Scheduling

(b) Job Sequencing with Deadlines

(c) 15 Puzzle Problem (d) P, NP and NPC Classes

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SE (comp) / Sem –IV / Choice based

(3Hrs)

Max Marks: 80

NB: 1. Question No.1 Compulsory.
    2. Solve any THREE from Q.2 to Q.6
    3. Assume suitable data whenever necessary with justification.

Q1.   Answer any FOUR questions

    (A)   Explain Instruction and Instruction Cycle.   (05)

    (B)   Differentiate between Memory Mapped IO and IO Mapped IO.   (05)

    (C)   Give different instruction formats.   (05)

    (D)   Explain Memory Interleaving Techniques.   (05)

    (E)   Explain Superscalar Architecture.   (05)

Q2.   (A)   Explain Branch Predication Logic and delayed branch.   (10)

    (B)   A program having 10 instructions (without Branch and Call instructions) is   (10)
    executed on non-pipeline and pipeline processors. All instructions are of same
    length and having 4 pipeline stages and time required to each stage is 1nsec.

    i) Calculate time required to execute the program on Non-pipeline and

      Pipeline processor.

    ii) Calculate Speedup.

Q3.   (A)   Explain different technique for design of control unit of computer.   (10)

    (B)   What is Microprogram? Write microprogram for following operations.   (10)

    i) ADD R1, M, Register R1 and Memory location M are added and

       result store at Register R1.
    ii) MUL R1, R2 Register R1 and Register R2 are multiplied and result
       store at Register R1.

Q4.   (A)   Explain Bus Contention and different method to resolve it.   (10)

    (B)   Explain different data transfer technique.   (10)

Q5.   (A)   Explain Booth's Multiplication algorithm and Perform $(17)_{10}$ X $(5)_{10}$.   (10)

    (B)   Consider a cache memory of 16 words. Each block consists of 4 words. Size of   (10)
    the main memory is 256 bytes. Draw associative mapping and calculate TAG,
    and WORD size.

Q6.   (A)   Explain different type of pipeline hazards.   (10)

    (B)   Draw and explain floating point addition subtraction algorithm.   (10)

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S.E. Computer- Sem IV - Choice Based
Q.P.Code: 21849
23/05/2019

[3 Hours]   [Total Marks: 80]

Please check whether you have got the right question paper.

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

Q 1   a)   What is aliasing and antialiasing?   5
      b)   Write the flood fill approach for 8 connected method.   5
      c)   Explain the concept of halftoning with example.   5
      d)   Prove that two successive rotations are additive   5

Q 2   a)   Plot the points for midpoint ellipse with rx=3 and ry=5 for region 1.   10
      b)   Explain the steps for 2D rotation about arbitrary point.   10

Q 3   a)   Explain Liang Barsky line clipping algorithm. Apply the algorithm to the line
           with coordinates (30,60) and (60,25) against the window(xmin,ymin)=(10,10)   10
           and (xmax,ymax)=(50,50).
      b)   Explain Weiler Artherton polygon clipping algorithm with suitable example.   10

Q 4   a)   What is window and viewport? Derive the matrix for viewport transformation. 10
      b)   Explain what is meant by Bezier curve? State the various properties of Bezier 10
           curve.

Q 5   a)   What is meant by parallel and perspective projection? Derive matrix for
           perspective projection.   10
      b)   Explain Z Buffer algorithm for hidden surface removal.   10

Q 6   Write short notes on(any two)
      a)   Koch curve
      b)   Sweep representation   20
      c)   Gouraud and phong shading
      d)   Inside Outside test

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SE (Comp) Sem–IV Choice Base   29/5/2019 Evning

Duration: 3hours   Marks: 80

NB: (1) Question no. 1 is compulsory.
     (2) Attempt any three out of remaining five questions.
     (3) Assume data if required

Q-1   Attempt any FOUR
a   Define Operating System. Brief the Functions of OS.
b   Explain Shell. Explain use of chmod command in linux.   5
c   Discuss various scheduling criteria.   5
d   Explain the effect of page frame size on performance of page replacement algorithms.   5
e   Explain Thrashing.   5
                                                                          5

2-a Differentiate between monolithic, layered and microkernel structure of OS.   10
b   Describe the differences among short term, medium-term, and long term Scheduling   10

3-a Discuss how the following pairs of scheduling criteria conflict in certain settings.   10
         a) CPU utilization and response time
         b) Average Turnaround time and maximum waiting time
b   Consider the following snapshot of the system. Using Bankers Algorithm, determine whether or not system is in safe state. If yes determine the safe sequence.

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	3	0	1	4	5	1	1	7	0	3	0	1
P1	2	2	1	0	3	2	1	1				
P2	3	1	2	1	3	3	2	1				
P3	0	5	1	0	4	6	1	2				
P4	4	2	1	2	6	3	2	5				

4-a Calculate number of page faults and page hits for the page replacement policies FIFO, Optimal   10
     and LRU for given reference string 6, 0, 5, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 5, 2, 0, 5, 6, 0, 5 (assuming
     three frame size).

b   Explain synchronization problem in detail. How counting semaphore can be used to solve readers   10
     writers problem.

5-a Given memory partitions of 150k,500k,200k,300k,550k(in order) how would each of the first fit,   10
     best fit and worst fit algorithm places the processes of 220k,430k,110k,425k(in order).Evaluate,
     which algorithm makes most efficient use of memory?

b   Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a   10
     request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests
     in FIFO is ordered as 80, 1470, 913, 1777, 948, 1022, 1750,130. What is the total distance that the
     disk arm moves for following by applying following algorithms?
     1. FCFS 2. SSTF   3. LOOK 4. SCAN

Q-6 Write short notes on: (any two):   20
         (a) Linux Virtual File system
         (b) Process State transition
         (c) System Calls

67643

TE (CM) (I) (choiced Based) 9th May 2019

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

N.B. 1) Question No. 1 is compulsory.
2) Attempt any **three** questions out of remaining.
3) Assume suitable data wherever necessary and state them clearly.

Q.1 a) Give the advantages of memory segmentation of 8086 microprocessor.   05

b) Differentiate Procedure and macro with example.   05

c) Explain VM, RF, IOPL and NT flags of 80386 microprocessor.   05

d) Explain an instruction issue algorithm of Pentium processor.   05

Q. 2 a) Explain minimum mode configuration of 8086 microprocessor   10

b) Explain cache organization of Pentium processor.   10

Q. 3 a) i) Write a short note on mixed language programming.   05
ii) Write a program to find the largest number from an array.   05

b) Draw and explain the block diagram of 8255 Programmable Peripheral Interface (PPI) with control word formats.   10

Q.4 a) Differentiate Real Mode, Protected Mode and virtual 8086 mode of 80386 microprocessor.   10

b) Design 8086 based system for following specifications: 10
i) 8086 in minimum mode with clock frequency 5MHz.
ii) 128 KB EPROM using 32KB*8 chips
iii) 32 KB RAM using 16KB*8 chips

Q.5 a) Explain different addressing modes of 8086 microprocessor.   10

b) Explain the operation of three 8259 PIC in cascaded mode.   10

Q.6 a) Draw and explain memory read and memory write machine cycle timing diagrams in maximum mode of 8086.   10

b) Explain the following:
i) Types of interrupts   05
ii) Modes of 8253 Programmable Interval timer   05

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of 1

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15/05/19

T.E. (COMP.) CBCGS (Choice Base) Sem V

[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 3 questions out of rest.

3. Make suitable assumptions if any.

4. All questions carry equal marks.

Q.1	a)	Differentiate between file system and database system with an example	05
	b)	Explain Referential Integrity with suitable example	05
	c)	List the steps required to map ER , EER model to relational model	05
	d)	Explain the ACID properties of transactions	05

Q.2   a) Explain the following Relational Algebra operations with suitable example.   10

        a) Project   b) Select

        c) Union   d) Cartesian Product

    b) Construct an EER diagram and convert into Relational Model for a library   10
Management System.

Specify 2 complex SQL queries on the above-one using Group by clause and the other
using Join operation with an example

Q.3   a) Explain the following terms with an example:-   10

      i) Natural join.   ii)Set Intersection. iii)Weak Entity. iv) Foreign key

    b) Explain the Overall Architecture of DBMS in detail. .   10

Q.4   a) Define Deadlock. Explain how deadlock can be handled   10

    b) Explain Specialization and Generalization with suitable example   10

Q.5 a) For the schema mentioned below **10**

Employee(eid, ename, address, city)   Works(eid, cid, salary)

Company(cid, cname, city)

Create an ER diagram for the same and Specify the SQL queries for each

of the statements given below

1) Modify database so that John now lives in Mumbai, assuming the database entry has John staying in Delhi.

2) Find Employees who live in same city as the company for which they work.

3) Give all employees of"AZ Corporation" whose salary has increased by15% in the year 2018-19.

b) Define the term Normalization as used in database design. Explain the various normal   **10**

forms with an example

Q.6 Write short notes on **any two**   **20**

a) Log based recovery mechanism

b) Triggers and transaction control commands

c) Conflict and View Serializability

d) Data Independence

21/05/19

TE(Computer) / sem - V / choice Based

[Time: 3 hrs]

[Marks: 80]

N.B: 1. Question No.1 is compulsory.
2. Assume suitable data if necessary.
3. Attempt any three questions from remaining questions.

Q.1	a) Explain design issues of layers. Explain ISO OSI reference model with diagram.	10
	b) Explain design issues of Data Link layer. Explain Sliding Window protocol Selective Repeat.	10
Q.2	a) Explain with diagram the relationship between Protocol, Interface and Service.	05
	b) Explain Repeater, Hub, Bridge, Switch Gateway.	05
	c) Describe TCP header with diagram.	10
Q.3	a) Explain different framing methods? What are the advantage of variable length frame over fixed layer frame.	10
	b) Describe IPV4 header format with diagram.	10
Q.4	a) Classify transmission media and compare them.	10
	b) Explain Distance vector routing protocol. What is count to infinity problem How to overcome it?	10
Q.5	a) Explain Channel allocation problem. Explain CSMA/CD protocol. A network with CSMA/CD has 10 Mbps bandwidth and 25.6 ms maximum propogation delay. What is the minimum frame size?	10
	b) Explain Congestion control. Explain leaky bucket algorithm	10
Q.6	Short note on (**any 4**)	20

   a) HDLC
   b) Network Address Translation (NAT)
   c) Berkeley Sockets
   d) ARP
   e) ICMP
   f) DNS
   g) SMTP

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TE COMP SEM - V CHOICE BASED Date: 27/05/2019

Time: 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) Differentiate DFA and NFA.   05
   (b) Design a DFA to accept string of 0's and 1's ending with the string 100.   05

   (c) Explain the applications of Regular Expressions.   05
   (d) What are Recursive and Recursively Enumerable Languages?   05

2. (a) Design NFA for recognizing the strings that end in "aa" over $\sum$ ={a,b} & convert   10
   above NFA to DFA.
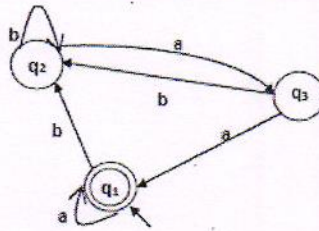   (b) Design moore m/c for following:-   10
   If input ends in '101' then output should be A, if input ends in '110' output should be
   B, otherwise output should be C and convert it into mealy m/c.

3. (a) Obtain a regular expression for the FA shown below: 10

   (b) Explain the types of Turing machine in detail.   10

4. (a) Design a turing machine that computes a function f(m,n)=m+n i.e. addition of two   10
   integers.
   (b) State and explain pumping Lemma for Context Free Languages. Find out whether   10
   the language L= $\{x^n y^n z^n \mid n \geq 1\}$ is context free or not.

5. (a) Design PDA for the following language: 10

   L(M) = $\{wcw^R \mid w \ \{a,b\}^*\}$ where w^R is reverse of w & c is a constant.
   (b) Convert the following Grammars to the Chomsky normal form (CNF).   10
      S →0A0 | 1B1| BB
      A →C
      B →S | A
      C →S | ε

6. Write detailed note on **(any two)**:-   20
   (a) Post Correspondence Problem
   (b) Halting Problem.
   (c) Rice's Theorem.

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T.E (comp) sem-I choire base 31/05/2019

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

Note: (1) Question 1 is compulsory
      (2) Solve any three questions out of remaining
      (3) Assume suitable data wherever necessary

Q.1. (a) Mention different types of Operating systems and list their salient features.   (5M)
     (b) With the help of examples explain Test and Set condition in Microprocessor
         systems.   (5M)
     (c) What is a superblock? Elaborate on its structure and role in Operating system.   (5M)
     (d) What are the characteristics of Real time Operating Systems?   (5M)

Q.2. (a) With the help of a neat diagram discuss process states and state transitions with
         respect to Unix O.S.   (10M)
     (b) Bring out the design issues of Multiprocessor Operating systems.   (10M)

Q.3. (a) Give the structure of a buffer header. Discuss any scenario that the kernel may
         follow to allocate a buffer for a disk block..   (10M)
     (b) What is the relevance of an inode in Unix? What are direct and indirect blocks in an
         inode?   (10M)

Q.4. (a) Explain in brief Gang based scheduling and affinity based scheduling algorithms for
         multiprocessor systems.   (10M)
     (b) Discuss in detail transparency issues of distributed operating systems.   (10M)

Q.5. (a) Consider 3 periodic processes scheduled on a preemptive uniprocessor. The
         execution times and periods are as shown in the following table:

Process	Execution Time	Period
1	1	8
2	2	5
3	4	10

The units of time may be considered to be schedulable time slices. The deadlines are that
each periodic process must complete within its period. Depict the scheduling of the processes
with the help of a timing diagram. Calculate the Utilization and state whether the system is
schedulable with EDF.   (10M)

     (b) Compare and contrast i) EDF and RMA scheduling ii) Test and Set and Compare-
         and-Swap instructions.   (10M)

Q.6.   Write short notes on: (any two)   (20M)
        i.   Architecture of Unix OS
        ii. Android OS
        iii. Cloud OS.

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TE (cm) (VI) (choice based) 16th May 2019

Time: 3 Hours   Marks: 80

Note:- 1. Q1 is compulsory.
         2. Solve any 3 question from remaining questions.

Q1 Attempt any 4

a) Differentiate in between waterfall and spiral model.   (5)
b) List out Requirement Elicitation Techniques. Explain any two methods.   (5)
c) What is process and project metrics? Explain 3 P's of software Engineering.   (5)
d) Illustrate   design issues.   (5)
e) Explain FTR.   (5)
f) What is testing? What is the role of testing in software engineering.   (5)

Q 2 a) Develop the SRS for University Management System.   (10)
     b) Explain the process of CMM.   (10)

Q3 a) Explain Coupling and Cohesion? Explain the types of couplings with example.   (10)
    b) What are the testing strategies?   (10)

Q4 a) Differentiate between FP based & LOC based cost estimation techniques.   (10)
    b) What is user interface design? Explain it with example.   (10)

Q5a) What is maintenance? Explain the different types of maintenance.   (10)
    b) What is the use of use case diagram? Draw use case diagram for hospital
       management system.   (10)

Q6 a) Differentiate between White Box and Black Box Testing.   (10)
    b) Illustrate Change Control & version control.   (10)

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67606

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(Time: 3 Hours)   Total Marks: 80

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

(2) Attempt ant three questions out of remaining five questions

Q.1 (a) Differentiate between system software and application software.   [05]
     (b) Explain different functions of loader.   [05]
     (c) Explain forward reference problem and how it is handled in assembler [05]
          design.
     (d) Explain macro and macro expansion.   [05]

Q.2 (a) Find FIRST & FOLLOW for the following grammar   [05]
          S→Bb | Dd
          B→aB | ε
          D→cD | ε
     (b) Generate three address code for following code   [05]
          while(a<b) do
               if(c<d) then
                    x=y+2
               else
                    x=y-2
     (c) With reference to assembler explain the following table with suitable [10]
          example
               (i)MOT   (ii)POT   (iii)ST   (iv)BT

Q.3 (a) Explain Synthesized and Inherited attribute with example.   [10]
     (b) Explain different code optimization techniques with example.   [10]

Q.4 (a) Apply dead code elimination techniques for following code   [05]
          int count;
          void foo( )
          {
               int i;
               i=1;
               count=1;
               count=2;
               return
               count=3;
          }
     (b) Eliminate left recursion from the following grammar   [05]
          S→(L) | x
          L→ L,S | S
     (c) Explain different types of loaders in detail.   [10]

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Q.5 (a) Draw flowchart of a Pass-I of two pass assembler design and explain in detail.   [10]

(b) Explain different features of macro with example.   [10]

Q.6 (a) For the following grammar construct LL(1) parsing table and parse the string (a-a)   [10]
   S→F
   S→(S-F)
   F→a

(b) Explain different issues in code generation.   [10]

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Time: 03 Hours   **Marks: 80**

Note: 1. Question 1 is compulsory.
2. Answer any three out of remaining five questions.
3. Assume any suitable data wherever required and justify the same.

Q1 a) What are spatial data structures? Outline their importance in GIS.   [5]
b) What is Metadata? Why do we need metadata when search engines like Google seem   [5]
so effective?
c) In real-world data, tuples with *missing values* for some attributes are a common   [5]
occurrence. Describe various methods for handling this problem.
d) With respect to web mining, is it possible to detect visual objects using meta-objects?   [5]

Q2 a) Suppose that a data warehouse for *DB-University* consists of the four dimensions   [10]
student, course, semester, and *instructor,* and two measures count and *avg-grade.* At the
lowest conceptual level (e.g., for a given student, course, semester, and instructor
combination), the *avg-grade* measure stores the actual course grade of the student. At
higher conceptual levels, *avg-grade* stores the average grade for the given combination.
  i.   Draw a *snowflake schema* diagram for the data warehouse.
  ii. Starting with the base cuboid [*student, course, semester, instructor*], what specific
       OLAP operations (e.g., roll-up from *semester* to year) should you perform in order
       to list the average grade of CS courses for each *DB-University* student.

b) What is the relationship between data warehousing and data replication? Which form of   [10]
replication (synchronous or asynchronous) is better suited for data warehousing? Why?
Explain with appropriate example.

Q3 a) The following table consists of training data from an employee database. The data have   [10]
been generalized. For example, "31 ... 35" for *age* represents the age range of 31 to 35.
For a given row entry, *count* represents the number of data tuples having the values for
department, status, age, and *salary* given in that row.

department	status	age	salary	count
sales	senior	31 ... 35	46K ... 50K	30
sales	junior	26 ... 30	26K ... 30K	40
sales	junior	31 ... 35	31K ... 35K	40
systems	junior	21 ... 25	46K ... 50K	20
systems	senior	31 ... 35	66K ... 70K	5
systems	junior	26 ... 30	46K ... 50K	3
systems	senior	41 ... 45	66K ... 70K	3
marketing	senior	36 ... 40	46K ... 50K	10
marketing	junior	31 ... 35	41K ... 45K	4
secretary	senior	46 ... 50	36K ... 40K	4
secretary	junior	26 ... 30	26K ... 30K	6

Let *status* be the class label attribute.
  i.   How would you modify the basic decision tree algorithm to take into consideration
       the *count* of each generalized data tuple (i.e., of each row entry)?
  ii. Use your algorithm to construct a decision tree from the given data.

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Q3 b) Why is *tree pruning* useful in decision tree induction? What is a drawback of using a **[10]** separate set of tuples to evaluate pruning? Given a decision tree, you have the option of (i) *converting* the decision tree to rules and then pruning the resulting rules, or (ii) *pruning* the decision tree and then converting the pruned tree to rules. What advantage does (i) have over (ii)?

Q4 a) Suppose that the data mining task is to cluster points (with (x, y) representing location) **[10]** into three clusters, where the points are: A_1 (2, 10), A_2 (2, 5), A_3 (8, 4), B_1 (5, 8), B_2 (7, 5), B_3 (6, 4), C_1 (1, 2), C_2 (4, 9).
The distance function is Euclidean distance. Suppose initially we assign A_1, B_1, and C_1 as the center of each cluster, respectively. Use the *k-means* algorithm to show only (i) The three cluster centers after the first round of execution (ii) The final three clusters.

b) Briefly outline with example, how to compute the dissimilarity between objects **[10]** described by the following:
   i. Nominal attributes
   ii. Asymmetric binary attributes

Q5 a) Frequent pattern mining algorithms considers only distinct items in a transaction. **[10]** However, multiple occurrences of an item in the same shopping basket, such as four cakes and three jugs of milk, can be important in transactional data analysis. How can one mine frequent itemsets efficiently considering multiple occurrences of items? Generate Frequent Pattern Tree for the following transaction with 30% minimum support:

Transaction ID	Items
T1	E, A, D, B
T2	D, A, C, E, B
T3	C, A, B, E
T4	B, A, D
T5	D
T6	D, B
T7	A, D, E
T8	B, C

b) Differentiate between simple linkage, average linkage and complete linkage algorithms. **[10]** Use complete linkage algorithm to find the clusters from the following dataset.

X	4	8	15	24	24
Y	4	4	8	4	12

Q6 a) *Data quality* can be assessed in terms of several issues, including accuracy, **[10]** completeness, and consistency. For each of the above three issues, discuss how data quality assessment can depend on the *intended use* of the data, giving examples. Propose two other dimensions of data quality.

b) Present an example where data mining is crucial to the success of a business. What *data* **[10]** *mining functionalities* does this business need (e.g., think of the kinds of patterns that could be mined)? Can such patterns be generated alternatively by data query processing or simple statistical analysis?

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T.E (comp) sem-VI choice based. 28/05/2019

[3 Hours] [Total Marks 80]

N. B: 1. Question No. 1 is Compulsory.
     2. Solve any THREE from Question No. 2 to 6.
     3. Draw neat well labeled diagram wherever necessary.

Q.1 a) Enlist security goals. Discuss their significance. (05)

    b) Compare AES and DES. Which one is bit oriented? Which one is byte oriented? (05)

    c) What is authentication header(AH)? How does it protect against replay attacks? (05)

    d) List various Software Vulnerabilities. How vulnerabilities are exploited to launch an attack. (05)

Q.2 a) Encrypt the plaintext message "SECURITY" using affine cipher with the key pair (3, 7). Decrypt to get back original plaintext. (10)

    b) Explain different types of Denial of Service attacks. (10)

Q.3 a) Users A and B use the Diffie-Hellman key exchange technique with a common prime 71 and primitive root 7. Show that 7 is primitive root of 71. If user A has private key x=5, what is A's Public Key R_1? If user B has private key y=12, what is B's public key R_2? What is the shared secret key? (10)

    b) What are traditional ciphers? Discuss any one substitution and transposition cipher with example. List their merits and demerits. (10)

Q.4 a) Alice chooses public key as (7, 33) and B chooses public key as (13, 221). Calculate their private keys. A wishes to send message m=5 to B. Show the message signing and verification using RSA digital signature. (10)

    b) Discuss in detail block cipher modes of operation. (10)

Q.5 a) What is the need of SSL? Explain all phases of SSL Handshake protocol in detail. (10)

    b) What are the requirements of the cryptographic hash functions? Compare MD5 and SHA Hash functions. State real world applications of hash functions. (10)

Q. 6 Write short notes on any FOUR: (20)
    a. Kerberos
    b. Buffer Overflow
    c. 3DES
    d. X.509
    e. IDS

------X-----

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T.E. Sem-VI, Computer Engg. Choice Base   03/05/2019

(3 Hours)   Total Marks: 80

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

1 (a) What is Machine Learning? How is it different than Data Mining?   [05]

   (b) Why Dimensionality Reduction is very Important step in Machine Learning?   [05]

   (c) Determine weights and threshold for the given data using McCulloch-Pitts neuron model. Plot   [05]
        all data points and show separating hyper-plane.

X1	X2	D
0	0	0
0	1	0
1	0	1
1	1	0

   (d) Describe Down Hill Simplex method. Why is it called Derivative Free method?   [05]

2. (a) Explain the steps of developing Machine Learning applications   [10]

   (b) Consider Markov chain model for 'Rain' and 'Dry' is shown in following figure.   [10]
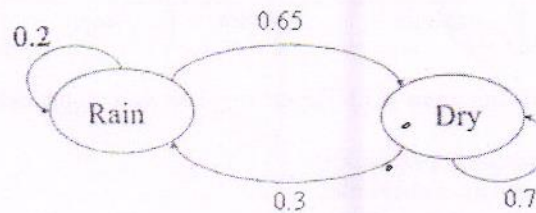
Two states: 'Rain' and 'Dry'. Transition probabilities: P('Rain'|'Rain') = 0.2, P('Dry'|'Rain')
= 0.65, P('Rain'|'Dry') = 0.3, P('Dry'|'Dry') = 0.7, Initial probabilities: say P('Rain') = 0.4,
P('Dry') = 0.6.

Calculate a probability of a sequence of states {'Dry', 'Rain', 'Rain', 'Dry'}.

3 (a) Minimize $f(x_1, x_2) = 4x_1 - 2x_2 + 2x_1^2 + 2x_1 x_2 + x_2^2$ [10]

        With starting point $X_1 = \begin{Bmatrix} 0 \\ 0 \end{Bmatrix}$ using the steepest descent method.

        (Perform two iterations).

3. (b) Explain following terms Initial hypothesis, Expectation step and Maximization step w.r.t E-M   [10]
        algorithm. Explain How Initial hypothesis converges to optimal solution?
        (You may explain it with an example)

4. (a) Why Dimensionality reduction is an important issue? Describe the steps to reduce   [10]
        dimensionality using Principal Component Analysis method by clearly stating mathematical
        formulas used.

69553   Page 1 of 2

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(b) For the following data, Calculate Gini indexes and determines which attribute is root attribute and generate two level deep decision tree. [10]

Sr. No.	Income	Defaulting	Credit Score	Location	Give Loan?
1	low	high	high	bad	no
2	low	high	high	good	no
3	high	high	high	bad	yes
4	medium	medium	high	bad	yes
5	medium	low	low	bad	no
6	medium	low	low	good	yes
7	high	low	low	good	yes
8	low	medium	high	bad	no
9	low	low	low	bad	no
10	medium	medium	low	bad	no
11	low	medium	low	good	yes
12	high	medium	high	good	yes
13	high	high	low	bad	no
14	medium	medium	high	good	yes

5. (a) Explain following terms w.r.t Bayes' theorem with proper examples. [10]

   (a) Independent probabilities
   (b) Dependent probabilities
   (c) Conditional Probability
   (d) Prior & Posterior probabilities
       Define Bays theorem based on these probabilities.

   (b) Draw and discuss the structure of Radial Basis Function Network. How RBFN can be used to solve non linearly separable pattern? [10]

6.   Attempt any **four** [20]
   (a) Illustrate Support Vector machine with neat labeled sketch and also show how to derive optimal hyper-plane?
   (b) Differentiate: Derivative Based and Derivative free optimization techniques.
   (c) Explain how regression problem can be solved using Steepest descent method. Write down the steps.
   (d) Write Short note on ISA and compare it with PCA
   (e) DownHill simplex method.

BE (VIII) (CBSGS) (CM) 8th May 2019

Time: 3 Hours

Total Marks: 80

N.B.   Question No: 1 is Compulsory
        Attempt any three from the remaining
        Assume suitable data wherever necessary

1   a   Find Manhattan distance for the points X1= (1,2,2) , X2 = (2,5,3)   5
    b   How finding plagiarism in documents is a nearest neighbor problem.   5
    c   Draw and Explain Bow-tie structure of web.   5
    d   How big data problems are handled by Hadoop system.   5

2   a   Explain how Hadoop goals are covered in hadoop distributed file system.   10
    b   Write pseudo code for Matrix vector Multiplication by MapReduce. Illustrate   10
        with an example showing all the steps.

3   a   The snapshot of 10 transactions is given below for online shopping that   10
        generates big data. Threshold value = 4 and Hash function= (i*j) mod 10
                T1 = {1, 2, 3}   T2 = {2, 3, 4}   T3 = {3, 4, 5}
                T4 = {4, 5, 6}   T5 = {1, 3, 5}   T6 = {2, 4, 6}
                T7 = {1, 3, 4}   T8 = {2, 4, 5}   T9 = {3, 4, 6} T10 = {1, 2, 4}
        Find the frequent item sets purchased for such big data by using suitable
        algorithm. Analyse the memory requirements for it.
    b   Explain DGIM algorithm for counting ones in stream with example.   10

4   a   How recommendation is done based on properties of product? Explain with   10
        suitable example.
    b   Explain how the CURE algorithm can be used to cluster big data sets.   10

5   a   What are the different architectural patterns in NoSQL? Explain Graph data   10
        store and Column Family Store patterns with relevant examples.
    b   Explain Girvan-Newman algorithm to mine Social Graphs.   10

6   a   List down the steps in modified Page Rank Algorithm to avoid spider trap with 10
        one example.
    b   Explain Park-Chen-Yu algorithm. How memory mapping is done in PCY.   10

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Date:- 14/05/19

B.E (COMP) CBSGS Sem VIII

Time: 03 Hours   **Marks: 80**

Note: 1. Question 1 is compulsory

   2. Answer any three out of remaining questions.

Q1 A) Consider following dimensions for a Supermarket chain: Product, Store, Time and [10]
    Promotion. With respect to this business scenario, answer the following questions.
    Clearly state any reasonable assumptions you make.

    (a) Design an information package diagram for this business scenario.

    (b) Design a snowflake schema for the data warehouse, clearly depicting the fact
    table(s), Dimension table(s), their attributes and measures.

    B) Consider the 5 transactions given below. If minimum support is 30% and minimum [10]
    confidence is 80%, determine the frequent itemsets and association rules using
    Apriori algorithm.

Transaction	Items
T1	Milk, Jam, Butter
T2	Milk, Butter
T3	Milk, Cheese, Butter
T4	Biscuit, Milk,
T5	Biscuit, Cheese

Q2 A) Consider a Data Warehouse for a sport manufacturing company storing sales details [10]
    of various sports equipments sold, and the time of the sale. Using this example
    describe the following OLAP operations:
    (i) Slice (ii) Dice (iii) Rollup (iv) Drill Down (v) Pivot

    B) What is data mining? Describe the steps involved in the data mining when viewed [10]
    as a process of knowledge discovery. Present an example where data mining is
    crucial to success of business.

Q3 A) What is Dimension Modeling? What is slowly changing dimensions? How this [10]
    problem is solved? Give example.

    B) Given is the training data for height classification, classify the **tuple t= <Arvish,** [10]
    M, 1.97 > using Bayesian classification.

Name	Gender	Height	Output
Reena	F	1.6 m	Short
Mahesh	M	2 m	Tall
Tina	F	1.9 m	Medium
Meeta	F	1.88 m	Medium

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Siya	F	1.7 m	Short
Vikram	M	1.85 m	Medium
Lakshmi	F	1.6 m	Short
Andrew	M	1.7 m	Short
Henry	M	2.2 m	Tall
Akhil	M	2.1 m	Tall
Lata	F	1.8 m	Medium
Siraj	M	1.95 m	Medium
Rita	F	1.9 m	Medium
Kriti	F	1.8 m	Medium
Srishti	F	1.75 m	Medium

Q4 A) Differentiate between top-down and bottom-up approaches for building data [10] warehouse. Discuss the merits and limitations of each approach. Also explain the practical approach for designing a data warehouse.

B) What is clustering? Explain K means clustering algorithm. [10] Suppose the data for clustering is {2, 4, 10, 12, 3, 20, 30, 11, 25, 5, 36, 41, 14}. Assuming number of clusters to be 2 i.e. K = 2, cluster the given data using above algorithm.

Q5 A) Describe different steps of ETL (Extraction, Transformation and Loading) cycle in [10] Data Warehousing for a pharmaceutical company.

B) What is Web Mining? Explain Web Usage Mining. [10]

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

    a) Hierarchical Clustering Algorithms

    b) Metadata in Data Warehouse

    c) Decision tree Classification Model

    d) Snapshot and Transaction tables

    e) Data Exploration

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Max.Marks:80

Time: 3 hours

Note: 1. Question 1 is compulsory.
2. Attempt any 3 from Q2 to Q6.
3. Indicate your answer with various sketches whenever necessary.

Q1. Attempt any **four**. [20]
(a) List pros and cons of any one modern device in design of a tutor for kids.
(b) List techniques in qualitative research.
(c) Differentiate between direct and indirect manipulation.
(d) Explain goal directed design in brief.
(e) What are keyboard accelerators? Explain.

Q2. (a) Provide all factors of UI design. Give an example for incorporating innovative technologies. [10]
(b) Explain in details Gestalts principal. [10]

Q3. (a) Give brief description of GUI and web papges. [10]
(b) Explain seven stages of action and three levels of processing. [10]

Q4 (a) Explain six behavioral patterns in details. [10]
(b) Differentiate between quantitative and qualitative research in knowing the users. [10]

Q5 (a) State and explain principles of Gestalts theory. Give example. [10]
(b) Provide suitable analysis and Interface design for state road transportation system. [10]

Q6 Write Short notes on following (Any Four). [20]
(a) Statistical Graphics
(b) Guidance and Feedback
(c) Interview Questions
(d) Goal directed Design
(e) Device based control
(f) Usability Design Principles

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B.E (Comp)   Sem - VIII   24/05/2019.

(3 hrs)   (CBSGS)   Marks: 80

N.B. (1) Question one is Compulsory.
(2) Attempt any 3 questions out of the remaining.
(3) Assume suitable data if required.

Q1. a) What are various issues of distributed system?   05
b) Suppose through experimentation it was verified that 70% of execution was   05
spent on parallelizable execution. What are the maximum speedup and
efficiency those can be achieved with 8 processors?
c) Justify how Ricart-Agrawala's algorithm optimized the Message overhead in   05
achieving mutual exclusion.
d) Give examples for the following message communication models   05
  • Transient Synchronous
  • Response based synchronous communication
  • Transient asynchronous
  • Persistent Asynchronous
  • Receipt based communications

Q2. a) Brief the different load estimation policies and process transfer policies used by   10
Load balancing algorithm.
b) Discuss the Structural and Data hazards in Pipeline architecture. Discuss any
one technique to control / mitigate them in detail.   10

Q3. a) Design and analyze 3-stage pipeline operations executing the following task: 10
$Xn + Yn * Zn$, for $n = 1, 2, 3, ..., 7$.
b) Describe any one method of Logical Clock synchronization.   10

Q4 a) Clearly explain how Monotonic Read consistency model is different from Read   10
your Write Consistency model. Support your answer with suitable example
application scenarios where each of them can be distinctly used.
b) Discuss the need for process migration and the role of resource to process and   10
process to resource binding in process migration

Q5 a) Apply quicksort parallel algorithm for the following example: 10
16, 08, 33, 45, 25, 19, 53, 06
b) Differentiate between Distributed OS, Network OS and Middleware based OS   10

Q6   Write a note on **any two** of the following   20
a) Hadoop Distributed File System
b) Systolic Architecture
c) RPC and RMI

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