Computer Department

Bachelor Of Engineering

Question Papers May - June 2018

Sem – III & VIII

Q. P. Code: 21236

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 $e^{-2t}\, t\cos t$ (05)

b) Find the inverse Laplace transform of $\dfrac{3s+7}{s^2-2s-3}$ (05)

c) Determine whether the function $f(z) = (x^3 + 3xy^2 - 3x) + i(3x^2 y - y^3 + 3y)$

is analytic and if so find its derivative.   (05)

d) Find the Fourier series for $f(x) = x^2$ in the interval $(-\pi, \pi)$.   (05)

Q.2 a) Evaluate $\int_0^\infty \left(\dfrac{sin2t + sin3t}{t\, e^t} \right) dt = \dfrac{3\pi}{4}$ (06)

b) Find the Z- Transform of $\left\{ (\tfrac{1}{4})^{|k|} \right\}$ (06)

c) Show that the function $v = e^x (x\, siny + y\, cosy)$ is a harmonic function.
Find its harmonic conjugate and corresponding analytic function.   (08)

Q.3 a) From 8 observations the following results were obtained.   (06)

$$\sum x = 59;\ \sum y = 40;\ \sum x^2 = 524;\ \sum y^2 = 256;\ \sum xy = 364.$$

Find the equation of the line of regression of x on y and the coefficient of correlation.

b) Find the bilinear transformation which maps the points z = -1 , 0 , 1 onto the points

w = -1, -i, 1.   (06)

c) Obtain half-range sine series for $f(x) = (x-1)^2$ in $0 < x < 1$.
Hence find $\sum_{n=1}^{\infty} \dfrac{1}{n^2}$ (08)

Q.4 a) Find the inverse Laplace Transform by using convolution theorem $\dfrac{1}{(s^2+a^2)(s^2+b^2)}$ (06)

b) Compute Spearman's Rank correlation coefficient for the following data: (06)

X	85	74	85	50	65	78	74	60	74	90
Y	78	91	78	58	60	72	80	55	68	70

Page **1** of 2

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

i) $\frac{1}{(z-5)^2}$, $|z| < 5$ ii) $\frac{z}{(z-2)(z-3)}$, $|z| > 3$

Q.5 a) Using Laplace Transform evaluate $\int_0^\infty e^{-t} (1 + 3t + t^2) H(t-2)\, dt$ (06)

b) Prove that $f_1(x) = 1$; $f_2(x) = x$; $f_3(x) = (\frac{3x^2 - 1}{2})$ are orthogonal over (-1, 1). (06)

c) Solve using Laplace transform $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = 2 e^{3x}$, $y = 2$, $y' = 3$ at $x = 0$. (08)

Q.6 a) Find the complex form of Fourier series for $f(x) = e^x$, $(-\pi, \pi)$. (06)

b) If u , v are harmonic conjugate functions, show that uv is a harmonic function. (06)

c) Fit a straight line of the form $y = a + bx$ to the following data and estimate the value of y for $x = 3.5$ (08)

x	0	1	2	3	4
Y	1	1.8	3.3	4.5	6.3

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Q. P. Code: 35366

Duration:3 hours   **Total marks:80**

N.S.: (1) Question No.1 is compulsory.
(2) Solve any three from remaining five questions.
(3) Figures to the right indicate full marks

Q. 1 Answer the following questions: (20)
(a)Write the entity declaration in VHDL for NOR gate.
(b) Add $(22)_{10}$ to $(56)_{10}$ in BCD.
(c) Convert decimal 57 into binary, base 7and Hexadecimal.
(d) Construct Hamming code for 1010.
(e) Perform subtraction using 2's complement for $(10)_{10}-(7)_{10}$
(f) State and prove De Morgan's law.
(g) Convert $(77)_{10}$ into Excess-3 code.
(h) Perform addition of $(34)_8$ and $(62)_8$
(i)Find 8's complement of the numbers $(37)_8$ and $(301)_8$
(j)Explain ASCII code in brief.

Q. 2(a) Simplify the following equation using K map to obtain SOP equation and realize the
minimum equation using only NAND gates.
$F(A,B,C,D)=\sum m(1,2,4,6,9,10,12,14) +d(3,7,13)$ (10)
(b)Implement full adder using 8:1 mux.   (10)

Q. 3(a)Obtain the minimal expression using QuineMc-Cluskey method
$F(A,B,C,D)=\sum m(1,2,3,5,6,10,11,13,14) +d(4,7)$ (10)
(b) What is race around condition? How to overcome it?   (10)

Q. 4(a)Design 3 bit asynchronous counter and draw the timing diagram.   (10)
(b)Convert JK flipflop to SR flipflop and D flipflop.   (10)

Q. 5(a)Compare TTL and CMOS with respect to different parameters.   (10)
(b)Explain the features of VHDL and its modeling styles.   (10)

Q. 6 Write short notes on(any four)   (20)
        a) Moore and Mealy machine
        b) Sequence generator
        c) Universal shift register
        d) Priority encoder
        e) Carry look ahead adder

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Q.P. Code: 25227

Duration: 3hrs

[Total Marks: 80]

22/05/18

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 by induction that the sum of the cubes of three consecutive numbers is divisible by 9.

(05M)

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

   i) 2,2,2,2,2,2   ii) 1,1,1,1,1,1

c) A box contains 6 white balls and 5 red balls. In how many ways 4 balls can be drawn from the box if, i) they are to be of any color ii) all the balls to be of the same color.   (05M)
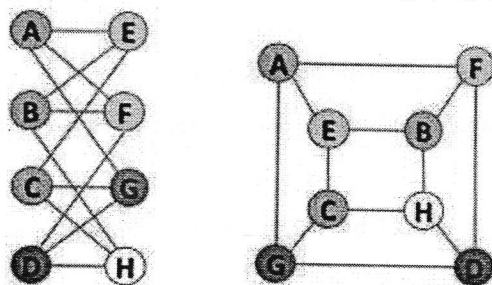
d) Find the complement of each element in D_{30}.

(05M)

Q.2 a) Define Isomorphism of graphs. Find if the following two graphs are isomorphic. If yes, find the one-to-one correspondence between the vertices.

(08M)

b) In a certain college 4% of the boys and 1% of the girls are taller than 1.8 mts. Furthermore 60% of the students are girls. If a student selected at random is taller than 1.8 mts, what is the probability that the student was a boy? Justify your answer   (08M)

c) Prove $\neg(p \vee (\neg p \wedge q))$ and $\neg p \wedge \neg q$ are logically equivalent by developing a series of logical equivalences.

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

b) Let A={1,2,3,4,5}, let R={(1,1),(1,2),(2,1),(2,2),(3,3),(3,4),(4,3),(4,4),(5,5)} and S={(1,1),(2,2),(3,3), (4,4),(4,5),(5,4),(4,5)} be the relations on A. Find the smallest equivalence relation containing the relation R and S.   (08M)

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c) Test whether the following function is one-to-one, onto or both. (04M)

f: $Z \to Z$, $f(x)=x^2+x+1$

Q.4 a) Show that the (2,5) encoding function e:$B^2 \to B^5$ defined by (08M)

e(00)=00000 e(01)=01110

e(10)=10101 e(11)=11011 is a group code.

How many errors will it detect and correct?

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 $e_H:B^3 \to B^6$ (08M)

c) How many friends must you have to guarantee that at least five of them will have birthdays in the same month? (04M)

Q.5 a) Let G be a set of rational numbers other than 1. Let * be an operation on G defined by a*b=a+b-ab for all a,b €G. Prove that (G,*) is a group.

b) Solve $a_r - 7a_{r-1} + 10a_{r-2} = 6+8r$ given $a_0 = 1$, $a_1 = 2$ (08M)

c) Let A={a,b,c,d,e,f,g,h}. Consider the following subsets of A (04M)
A1={a,b,c,d}   A2={a,c,e,g,h}
A3={a,c,e,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}

Q.6 a) Draw the Hasse Diagram of the following sets under the partial order relation divides and indicate which are chains. Justify your answers. (08M)

I.   A={2,4,,12,24}
II.   A={1,3,5,15,30}

b) Let the functions f,g, and h defined as follows: (08M)
f:$R \to R$, f(x)=2x+3
g: $R \to R$, g(x)=3x+4
h: $R \to R$, h(x)=4x
Find gof, fog, foh, , gofoh

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c) Determine Euler Cycle and path in graph shown below (04M)
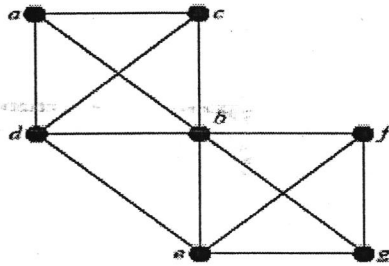
Q.P.Code:36288

Time: 3 Hours

Marks: 80

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 different types of data structures with example **(05)**
(b) What is a graph? Explain methods to represent graph. **(05)**
(c) Write a program in 'C' to implement Merge sort. **(10)**

Q.2 (a) Write a program in 'C' to implement QUEUE ADT using Linked-List. Perform the following operations: **(10)**
(i) Insert a node in the Queue.
(ii) Delete a node from the Queue
(iii) Display Queue elements

(b) Using Linear probing and Quadratic probing, insert the following values in the hash table of size 10. Show how many collisions occur in each iteration:
28, 55,71,67,11,10,90,44 **(10)**

Q.3 (a) Write a program in 'C' to evaluate postfix expression using STACK ADT **(10)**
(b) Explain different types of tree traversals techniques with example. Also write recursive function for each traversal technique. **(10)**

Q.4 (a) State advantages of Linked-List over arrays. Explain different applications of Linked-list **(10)**

(b) Write a program in 'C' to implement Circular queue using arrays. **(10)**

Q.5 (a) Write a program to implement Singly Linked List. Provide the following operations: **(10)**
(i) Insert a node at the specified location.
(ii) Delete a node from end
(iii) Display the list

(b) Insert the following elements in AVL tree: 44, 17, 32, 78, 50, 88, 48, 62, 54. Explain different rotations that can be used. **(10)**

Q.6 Explain the following (any two) **(20)**
(a) Splay Tree and Trie
(b) Graph Traversal Techniques
(c) Huffman Encoding
(d) Double Ended Queue

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Page **1** of **1**

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N.S.: (1) Question No.1 is compulsory.
(2) Solve any three from remaining five questions.
(3) Figures to the right indicate full marks—

Q1. A. Draw input & output characteristics of BJT. State significance of DC load line.   5
B. For an AM DSBFC modulator with carrier frequency fc = 100kHz and a maximum
modulating signal frequency fm=5kHz, determine   5
       i) Frequency limits for the upper and lower side bands
       ii) Bandwidth
       iii) Draw the frequency spectrum
C. Write a note on zero crossing detector using op-amp with waveforms   5
D. Compare Class A and Class C Amplifiers   5

Q2. A. Explain Superheterodyne receiver with suitable diagram   5
B. Implement summing Operational Amplifier using inverting configuration of Op-amp   5
C. For the emitter bias network of figure below, determine: 10
(a) I_b. (b) I_c. (c) V_{ce}. (d) V_c. (e) E_{th} (f) R_{th}
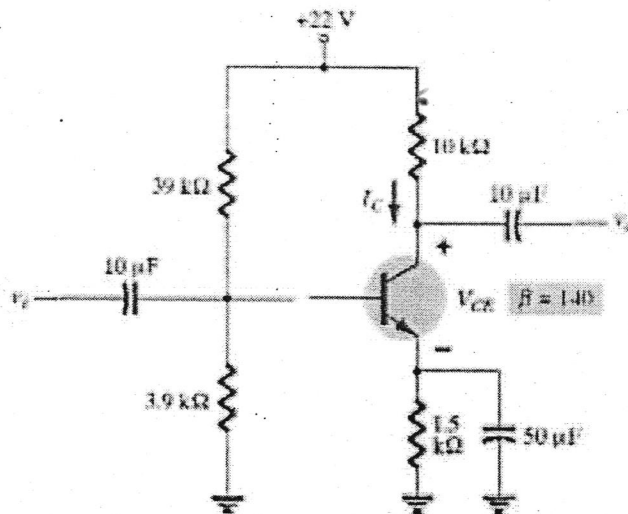
Q3. A. Explain generation of DSBSC using balanced Modulator along with its frequency
and power spectrum   10
B. With suitable waveforms explain how Op-amp can be used as Differentiator   10

Q4. A. For an AM DSBFC envelope with V_{max}= 20V and V_{min}= 4V; determine: 10
     i. Peak amplitude of USF AND LSF
     ii. Peak amplitude of carrier
     iii. Peak change in the amplitude of envelope
     iv. Modulation coefficient
     v. Draw the AM Envelope

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B. Differentiate between TDM and FDM   5

C. State Shannon's Theorem and explain its significance   5

Q5.   A. Draw PAM, PWM and PPM waveforms in time domain using a sinusoidal signal and explain in brief.   10

B. Define and explain in brief Amount of information, average information, information rate and Channel capacity of a communication system   10

Q6.   A. State significance of modulation in Communication   5

B. Write a note on Pulse Code Modulation with waveforms   5

C. Explain and give ideal values of following parameters of an Op-Amp: 10
  i. CMRR
  ii. Slew rate
  iii. Offset voltage
  iv. Input Resistance
  v. Output Impedance

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QP CODE: 40557

(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 the basic solutions to the following problem:

Maximise $\quad z = x_1 + 3x_2 + 3x_3$

subject to $\quad x_1 + 2x_2 + 3x_3 = 4$

$\qquad\qquad\quad 2x_1 + 3x_2 + 5x_3 = 7$

$\qquad\qquad\quad x_1, x_2, x_3 \geq 0$

05

(b) Evaluate $\int_0^{1+2i} z^2\, dz$, along the curve $x^2 = y$.

05

(c) A random sample of size 16 from a normal population showed a mean of 103.75 cm & sum of squares of deviations from the mean 843.75 cm^2. Can we say that the population has a mean of 108.75?

05

(d) If $A = \begin{bmatrix} \pi/2 & \pi \\ 0 & 3\pi/2 \end{bmatrix}$, find $\sin A$

05

Q.2 **(a)** Evaluate $\int_c \dfrac{dz}{z^3(z+4)}$, where c is the circle $|z| = 2$

06

(b) Memory capacity of 9 students was tested before & after a course of mediation for a month. State whether the course was effective or not from the data below

06

Before	10	15	9	3	7	12	16	17	4
After	12	17	8	5	6	11	18	20	3

(c) Solve the following LPP using Simplex Method

Maximise $\quad z = 6x_1 - 2x_2 + 3x_3$

subject to $\quad 2x_1 - x_2 + 2x_3 \leq 2$

$\qquad\qquad\quad x_1 + 4x_3 \leq 4$

$\qquad\qquad\quad x_1, x_2, x_3 \geq 0$

08

Q.3 **(a)** Find the Eigen values and Eigen vectors of the following matrix.

$A = \begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -4 & -3 \end{bmatrix}$

06

(b) For a normal distribution 30% items are below 45% & 8% are above 64. Find the mean & variance of the normal distribution.

06

(c) Obtain Laurent's series for $f(z) = \dfrac{1}{z(z+2)(z+1)}$ about $z = -2$

08

[Turn over

- 1 -

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Q.4 **(a)** An ambulance service claims that it takes on an average 8.9 min to reach the destination in emergency calls. To check this the Licensing Agency has then timed on 50 emergency calls, getting a mean of 9.3 min with a S.D. 1.6 min. Is the claim acceptable at 5% LOS? **06**

(b) Using the Residue theorem, Evaluate $\int_0^{2\pi} \frac{\cos 2\theta}{5 + 4\cos\theta} d\theta$ **06**

(c) (i) If 10% 0f the rivets produced by a machine are defective, find the probability that out of 5 randomly chosen rivets at the most two will be defective.
(ii) If x denotes the outcome when a fair die is tossed, find M.G.F. of x and hence, find the mean and variance of x. **04+04**

Q.5 **(a)** Check whether the following matrix is Derogatory or Non-Derogatory:
$$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$
06

(b) Justify, if there is any relationship between sex and color for the following data. **06**

Color	Male	Female
Red	10	40
White	70	30
Green	30	20

(c) Use the dual simplex method to solve the following L.P.P.

Minimise $z = 2x_1 + x_2$

subject to $3x_1 + x_2 \geq 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 3$

$x_1, x_2 \geq 0$ **08**

Q.6 **(a)** Show that the matrix A satisfies Cayley-Hamilton theorem and hence find A^{-1}.
Where $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$
06

(b) The Probability Distribution of a random variable X is given by

X :	-2	-1	0	1	2	3
P(X = x):	0.1	k	0.2	2k	0.3	k

Find k, mean and variance. **06**

(c) Using Kuhn-Tucker conditions, solve the following NLPP

Maximise $z = 2x_1^2 - 7x_2^2 + 12x_1x_2$

subject to $2x_1 + 5x_2 \leq 98$

$x_1, x_2 \geq 0$ **08**

S.E. (Comp. Engg.) / SEM IV / Choice Base / Analysis of Algorithms

Q.P.Code: 38841

17/05/18

(3 Hours)   [Total Marks:80]

1. Question No. 1 is compulsory.
2. Attempt any three out of remaining five questions.
3. Make suitable assumptions wherever necessary and justify it.
4. Figures to right indicate full marks.

Q.1   Answer the following
  a.   Write the difference between greedy method and dynamic programming.   5M
  b.   Explain the general procedure of divide and conquer method.   5M
  c.   Determine the frequency counts for all statements in the following algorithm   5M
       segment.
       I=1;
       While(I<=n)
           {
             X=X+I;
             I=I+1;
           }

  d.   What is backtracking Approach? Explain how it is used in Graph Coloring   5M

Q.2.a. Explain with example how divide and conquer strategy is used in binary   10M
        search?
  b.   Solve sum of subsets problem for following   10M
        N=6 W={3,5,7,8,9,15} & M =20 Also write the Algorithm for it.

Q.3 a. Obtain the solution to knapsack problem by Greedy method n=7,m=15 (p1,   10M
        p2,...p7)=(10,5,15,7,6,18,3),   (w1,w2,...w7)=(2,3,5,7,1,4,1)
  b.   Sort the list of the elements 10,5,7,6,1,4,8,3,2,9 using merge sort algorithm and   10M
        show its computing time is O(n log n).

Q. 4.a. Explain different string matching algorithms.   10 M
  b.   What do you understand by NP Complete? Explain Is Subset sum problem NP   10M
         complete? If so explain.

Q. 5.a. Write a detailednote on Hamiltonian cycles.   10 M
  b.   Explain how backtracking is used for solving n- queens problem. Show the state   10M
         space tree.

Q.6   Write Short Note on (any 2)   20 M
  a.   Job sequencing with deadlines
  b.   8 queens problem
  c.   Longest common subsequence

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Q. P. Code: 39078

(3 Hours)   Total Marks: 80

28/05/18

N.B.

1. Question No.1 is compulsory
2. Solve any three questions from the remaining questions
3. Assume suitable data if required

1a.	Compare Von Neumann architecture and Harvard Architecture	10
1b.	Explain IEEE 754 floating point representation formats and represent $(34.25)_{10}$ to single precision format.	10
1c	Explain memory hierarchy in the computer system.	
1d	Explain the requirements of the I/O modules.	
2a.	Draw the flowchart of Booth's algorithm. Perform following multiplication using Booth's algorithm $M = (-9)_{10}$ $Q = (6)_{10}$	10
2b.	Explain the restoring method of binary division with algorithm. Divide $(7)_{10}$ by $(4)_{10}$ using restoring method of binary division.	10
3a.	What is the necessity of cache memory? Explain set associative cache mapping	10
3b.	Explain the page address translation in case of virtual memory and explain TLB	10
4a.	Explain interrupt driven I/O method of data transfer.	10
4b.	Explain DMA method of I/O data transfer	10
5a.	Explain the superscalar architecture.	10
5b.	State the functions of control unit. Explain Micro-programmed control unit	10
6	Write short notes on (any two) :-	20
a.	Principle of locality of reference	
b.	Instruction Pipelining and its hazards	
c.	Flynn's Classification	
d.	Bus arbitration	

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SE (CM) choiced based sem-IV
Computer graphics

29/5/2018

Q.P.Code: 21848

[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) Explain CSG method for solid modeling.
     b) What is aliasing and Explain any one antialiasing method.   5
     c) Compare Raster Scan and Random Scan displays.   5
     d) Prove that two successive rotations are additive i.e. $R1(\theta_1) * R2(\theta_2) = R(\theta_1 + \theta_2)$ 5

Q 2 a) Explain Bresenham line drawing algorithm with proper mathematical analysis
        and identify the pixel positions along a line between A(10,10) and B(18,16) using
        it.   10
     b) Explain the steps for 2D rotation about arbitrary point and provide a composite
        transformation for the same.   10

Q 3 a) Explain Liang Barsky line clipping algorithm. Apply the algorithm to clip the
        line with coordinates (30,60) and (60,20) against window(xmin,ymin)=(10,10)
        and (xmax,ymax)=(50,50).   10
     b) Explain Sutherland Hodgman polygon clipping algorithm with suitable
        example and comment on its shortcoming.   10

Q 4 a) What is window and viewport? Derive the window to viewport transformation
        and also identify the geometric transformation involved.   10
     b) Explain what is meant by Bezier curve? State the various properties of Bezier
        curve.   10

Q 5 a) What is meant by parallel and perspective projection? Derive matrix for
        oblique 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 and Octree representation
     c) Gouraud and phong shading   20
     d) Halftoning and Dithering.

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B.E.(Comp)/Sem IV/Choice Base/Operating Systems

Duration: 3hours   **Marks: 80**

04/06/18

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   Explain the difference between monolithic kernel and micro kernel.   5
   b   What is mutual exclusion? Explain its significance.   5
   c   Discuss various scheduling criteria.   5
   d   Explain various file allocation techniques   5
   e   Explain the disk cache.   5

2-a   What is operating system? Explain various functions and objectives.   10
   b   What is deadlock? Explain the necessary and sufficient condition for deadlock. What is the   10
       difference between deadlock avoidance and prevention?

3-a   Explain the following in brief: 10
          (a) Process synchronization   (b)Inter-Process Communication
   b   Consider the following set of processes, assuming all are arriving at time 0.   10

process	Burst time	Priority
P1	2	2
P2	1	1
P3	8	4
P4	4	5
P5	5	3

Calculate average waiting time and turn-around time for FCFS, SJF (Non-Pre-emptive),
Priority and RR (Quantum=2).

4-a   What is paging? Explain LRU, FIFO and Optimal page replacement policy for the following   10
      string. Page frame size is 4.
      1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2
   b   Explain banker's algorithms in detail.   10

5-a   What is system call? Explain any five system call in details.   10
   b   Explain paging hardware with TLB along with protection bits in page table.   10

Q-6   Write short notes on: **(any two):**   20
          (a) Linux Virtual file system
          (b) Process control block
          (c) Readers and writer problem using Semaphore
          (d) Explain disk scheduling algorithms.

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Q. P. Code: 21318

(Time: 3Hrs)   **Max Marks: 80**

21/05/18

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.		Solve any FOUR.	
	(A)	Explain Memory banks for 8086 Processor	(5)
	(B)	Draw and Explain Floating Point Pipeline for Pentium Processor.	(5)
	(C)	Explain Multitasking and Protection for 80386 processor	(5)
	(D)	Explain Flag Register bits of 8086.	(5)
	(E)	Explain Virtual Mode (VM86) 80386 Processor.	(5)
Q2.	(A)	Explain Interrupt Structure of 8086 Processor.	(10)
	(B)	Explain PPI 8255 with block diagram.	(10)
Q3.	(A)	Draw and Explain write operation timing diagram for maximum mode.	(10)
	(B)	Explain Operating Modes of PIC 8259.	(10)
Q4.	(A)	Explain following instructions. DAA, AAA, XLAT, LAHF	(10)
	(B)	Explain Segment Descriptor of 80386 Processor.	(10)
Q5.	(A)	Explain Gate type of descriptors.	(10)
	(B)	Explain Data Cache architecture for Pentium Processor.	(10)
Q6.	(A)	Explain SPARC Processor with block diagram.	(10)
	(B)	Explain with block diagram PIT 8254	(10)

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Operating Systems (Comp. Engg.) CBSGS / Sem - IV th

Date- 15/05/2018

Q. P. Code: 39373

(Time: 3hrs)   (Marks: 80)

N.B.   1. Question 1 is compulsory.
       2. Attempt any three from remaining five questions.
       3. Figure in right indicate full marks

Q 1	Attempt the following (any four)	
	a. Define Operating System? What are its objectives?	5
	b. Explain system call and enlist its types.	5
	c. Differentiate short and medium-term scheduler.	5
	d. What are advantages of multiprogramming?	5
	e. State characteristics of good process scheduler.	5
Q2. A	What is deadlock? Explain necessary and sufficient conditions for a deadlock to occur.	10
B	Explain in detail page table structures.	10
Q3. A	Explain LINUX operating system with kernel, memory management and IO management.	10
B		10

	R1	R2	R3
P1	3	2	2
P2	6	1	3
P3	3	1	4
P4	4	2	2

Claim matrix C

	R1	R2	R3
P1	1	0	0
P2	6	1	2
P3	2	1	1
P4	0	0	2

Allocation matrix A

R1	R2	R3
9	3	6

Resource vector R

Consider above snap shot of the system
1. Calculate available vector 2. Calculate need matrix 3. Calculate safe sequence 4. Is system in safe state?

Q4. A	Explain the different allocation methods with reference to file system.	10
B	Explain algorithm to avoid deadlock in dinning philosopher's problem.	10
Q5. A	Compare the following disk scheduling algorithms using appropriate example – SSTF,FCFS,SCAN,C-SCAN,LOOK	10
B	What is mutual exclusion? Give software approaches for mutual exclusion.	10
Q6. A	Explain need of page replacement. Explain optimal page replacement policy with example.	10
B	Explain UNIX file system	10

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Q. P. Code: 24646

Duration – 3 hours

Maximum Marks – 80

25/05/18

Note:

1. Question No 1 is compulsory.
2. Attempt any 3 questions from the remaining 5 questions.
3. Draw neat diagrams wherever necessary.

Q.No. 1   Explain in Brief: 20

    a.   Explain the method to find number check bits required to correct single bit error for a 10 bit message and compute the check bits for 11100 00101.

    b.   Encode the message 101111100001 using binary encoding, Manchester encoding and differential Manchester encoding

    c.   Find the shortest path between A and D using Dijkstra Algorithm.
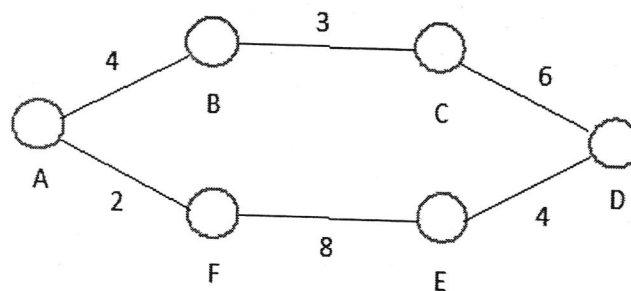
    d.   What are the different world wide unique identifiers? Explain the components of Uniform Resource Locators.

Q.No. 2(a)   Explain how a strong Generator Polynomial is formed. Give the Algorithm for computing the checksum.   10

Q.No. 2(b)   Explain any two collision free protocols   10

Q.No. 3(a)   Explain the reasons for congestion in a network. Explain open loop congestion control methods.   10

Q.No. 3(b)   Explain TCP IP reference model and compare it with OSI reference model.   10

Q.No. 4(a)   Explain how the value of 'n' is decided in an n bit sliding window protocol. Explain the advantages of Selective repeat over go-back n protocol.   10

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Q.No. 4(b)   Prove that the slotted ALOHA performs better than Pure ALOHA.   10

Q.No. 5(a)   Compare Guided media w.r.t unguided media   10

Q.No. 5(b)   Compare Routing   protocols RIP, OSPF and BGP   10

Q.No. 6   Give Short notes on any two   20
         a. DNS
         b. SNMP
         c. Sockets and Socket Programming

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

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(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) Differentiate between system software & application software?   [05]
       (b) Explain the role of finite automata in compiler theory.   [05]
       (c) Explain the various functions of a loader.   [05]
       (d) Compare compilers and interpreters.   [05]

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

Q3.   (a) Explain the different issues in code genetrations.   [10]
       (b) Explain working of direct linking loader with example, showing entries in
           different databases built by DLL.   [10]

Q4.   (a) Construct a predictive parsing table for the grammar : -   [10]
           $E \rightarrow TE\,'$
           $E' \rightarrow +TE\,' / E$
           $T \rightarrow FT\,'$
           $T' \rightarrow *FT\,' / \epsilon$
           $F \rightarrow (E) / id$
       (b) Explain the different error recovery techniques   [10]

Q5.   (a) Explain the different storage allocation strategies in detail.   [10]
       (b) Differentiate Top-down and Bottom-up parsing techniques. Explain shift
           reduce parser in detail.   [10]

Q6.   (a) Explain the different phases of compiler. Illustrate all these phases for the
           following statement:
           $a = b + c * 5$ [10]
       (b) Write short note on: [10]
           (i) Parameterized Macros
           (ii) YACC

-------------x--------------

Q.P. Code :11614

[Time: 3 Hours]

[Marks:80]

18/05/18

Please check whether you have got the right question paper.

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

Q.1 Develop the SRS for Hospital Management System. 20
Hospital Management System is a process of implementing all the activities of the hospital in a computerized automated way to fasten the performance.
This system is to maintain the patient details, lab reports and to calculate the bill of the patient. You can also manually edit any patient details and issue bill receipt to patient within few seconds.
SRS for the hospital Management system should include the following:
a) Product perspective
b) Scope and objective
c) Functional requirements
d) Non-functional requirements

Q.2 a) Explain cohesion and Coupling. Explain different types with detailed example. 10
b) Explain in detail Service-Oriented Software Engineering. 10

Q.3 a) Explain what is cyclomatic complexity and different methods to calculate it. Find the cyclomatic 10
complexity of following code

```
int x, y, power;
float z;
input (x, y );
if (y<0)
    power = - y;
else
power = y;
z = 1;
while (power ! = 0 ){
z =z * x;
power = power – 1;
}
if (y<0)
    z = 1/z;
output (z);
end
```

b) Explain Risk and its types? Explain the steps involved in setting up or generating RMMM plan. 10

Q.4 a) Consider a software project using Semi-detached mode with 30,000 lines of code. Obtain effort 10
estimation, Duration estimation and person estimation.

b) Explain steps in version and change control. 10

(P.T.O)

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Q.5. a) Explain software reverse engineering in detail. 10
    b) What is FTR? Explain the Review guidelines considered during FTR. 10

Q.6.   Write short notes on **any two**:-
        (a) Software Configuration Management
        (b) Test Driven Development
        (c) Agile Process Models
        (d) User interface design

20

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Q. P. Code: 38884

24/05/18

(3 Hours)

Total marks : 80

Note:
- Question No. 1 is compulsory.
- Attempt any Three questions out of remaining questions.
- Make suitable assumptions whenever necessary.

Q 1:   [5 X 4]
- a) What do you mean by Distributed Serializability?
- b) What are the objectives of distributed query processing ?
- c) Explain state transition diagram for 3PC.
- d) What are the different types of Fragmentation in distributed databases?

Q 2:
a) Explain Two-phase Commit Protocol..   [10]
b) Explain the reference Architecture of tightly coupled Federated MDBS.   [10]

Q 3:
a) Explain locking-based concurrency control protocols.   [10]
b) Explain the following transparencies in distributed database design. Data distribution
transparency, transaction transparency performance transparency, DBMS transparency [10]

Q 4:   [20]
Consider the global schema:
BOOKS(Book#, Primary_author, Topic, Total_stock, $price)
BOOKSTORE(Store#, City, State, Zip, Inventory_value)
STOCK(Store#, Book#, Qty)
1) Show 2 example of horizontal fragmentation.
2) Show 2 example of Vertical fragmentation.
3) Show 2 example of Derived fragmentation.

Q 5:
a) Explain distributed Deadlock Prevention..   [10]
b) Give the DTD or XML schema for an xml representation of the following
   nested-relational schema: [05]
   Emp = (ename, ChildrenSet **setof**(Children), SkillSet **setof**(Skills))
   Children = (name, Birthday)
   Birthday = (day, month, year)
   Skills = (type, ExamsSet setoff(Exams))
   Exams = (year, city).
c) Write a query in XPath on the schema of (Q5 b) to list all skill types in Emp.   [05]

Q 6:
Write notes on the following. **(any two)**   [10 X 2]
   a) Component Architecture of Distributed DBMS.
   b) Phases of query processing.
   c) 2PC recovery protocols.
   d) Querying and transformation of XML data.

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30/5/2018

Q.P. Code: 36774

[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 questions out of the remaining questions.**
3. **Make suitable assumptions wherever necessary.**

Q.1.	A)	Discuss multiplexing in wireless communication.	10
	B)	Explain the need of specialized MAC in wireless communication.	10
Q.2.	A)	Explain in detail Bluetooth protocol architecture.	10
	B)	Explain HIPERLAN 1 MAC sublayer.	10
Q.3.	A)	Explain agent advertisement and discovery registration in mobile networks.	10
	B)	Why and how can optimization in mobile IP be achieved.	10
Q.4.	A)	Explain GSM architecture in detail.	10
	B)	Explain types of handoffs in mobility management.	10
Q.5.	A)	Explain any two TCP for mobile communication.	10
	B)	Explain wireless local loop architecture	10
Q.6.		Write short notes on (any 02)	20
	a)	Cryptographic tools for Security in mobile computing.	
	b)	GPRS network nodes.	
	c)	Android layers.	
	d)	Satellites (GEO and LEO)	

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B.E. Comp. Sem-VII R-2012 CBSGS ~~EE~~ 11/05/2018.

DSP

QP CODE : 22975

(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   Evaluate DFT of x(n)=cos(0.25∏n).   05

    B   Determine the energy and power of signal given by $x(n) = (1/3)^n u(n)$.   05

    C   Find the circular Convolution of the following causal signals   05
        $x_1(n)$= { 3, 2, 4, 1} and $x_2(n)$={ 2, 1, 3 }

    D   Define BIBO Stable system.   05

Q2 A   State the following DFT properties: 10
            1.Linearity
            2.Periodicity
            3.Scaling
            4.Convolution
            5.Time Reversal

    B   Consider the following analog signal   10
        x(t)=5 cos 2∏ (1000 t) + 10 cos 2∏(5000t) to be sampled.
        I) Evaluate the Nyquist rate for this signal.
        II) If the signal is sampled at 4 kHz , will the signal be recovered from its
        samples?

Q3 A   For the causal LTI digital filter with impulse response given by   10
        h(n) = δ(n) – 2δ(n-1) + δ(n-2) +2δ(n-3) sketch the magnitude response of the
        filter.

    B   Design radix 2FFT flow graph for x(n)={2, 1, 3, 1}   10

Q4 A   Check whether the system y[n] = x[n] + 2x[n-2] is: 10
         i)Static or Dynamic
        ii)Linear or Non-linear
        iii)Causal or Non-Casual
        iv) Shift variant or Shift Invariant

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

[TURN OVER]

1

Q5 A For x(n) = {3, 2, 1, 6, 4, 5}, plot the following Discrete Time signals: 10

　　　　1.) x(n+1)　　　　2.) x(-n)u(-n)　　　　3.) x(n-1)u(-n-1)

　　　　4.) x(n-1)u(n)　　　　5.) x(n-2)

　　B Perform Cross correlation of the causal sequences   10
　　　　x(n)= {3, 3, 1, 1 } y(n) = { 1, 2, 1}

Q6 A Write a detailed note on TMS 320   10

　　B Explain the significance of Carl's Correlation Coefficient Algorithm in digital   10
　　　　signal processing. Evaluate Carl's Coefficient for two causal sequences
　　　　x[n]={1, 3, 4, 2} and y[n]={1, 2, 2, 1}.

Q. P. Code: 24612

(3 Hours)   [Total Marks: 80]

23/05/18

Note:

(i) Each question carries 20 marks
(ii) Question 1 is compulsory
(iii) Attempt any three (3) from the remaining questions
(iv) Assume suitable data wherever required

Q.1. Attempt any four (4) questions from the following.   [20]
   a) Define Intelligent Agent. What are the characteristics of Intelligent Agent?
   b) Give State space representation for 8 puzzle Problem. What are possible Heuristic functions for it?
   c) What is FOPL? Represent the following sentences using FOPL
      i) John has at least two friends
      ii) If two people are friends then they are not enemies.
   d) Differentiate between forward and backward chaining.
   e) Define Belief Network. Explain conditional Independence relation in Belief Network with example.

Q.2 a) Draw and Describe the Architecture of Utility based agent. How is it different from Model based agent?   [10]

     b) Explain A* Algorithm with example.   [10]

Q.3 a) Explain Resolution by Refutation with suitable example.   [10]

     b) Give the partial order plan for the following blocks-world-problem   [10]

Start State   Goal State
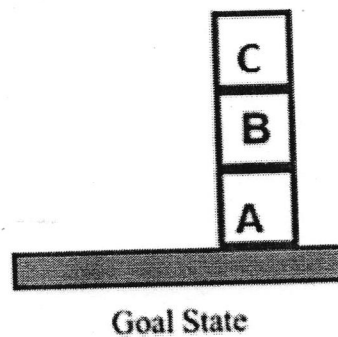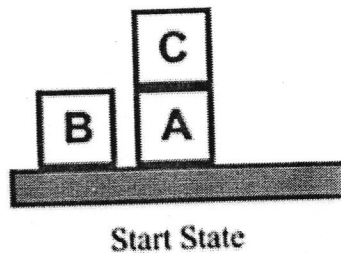
Q.4 a) Apply Alpha-Beta pruning on following example considering first node as MAX [10]
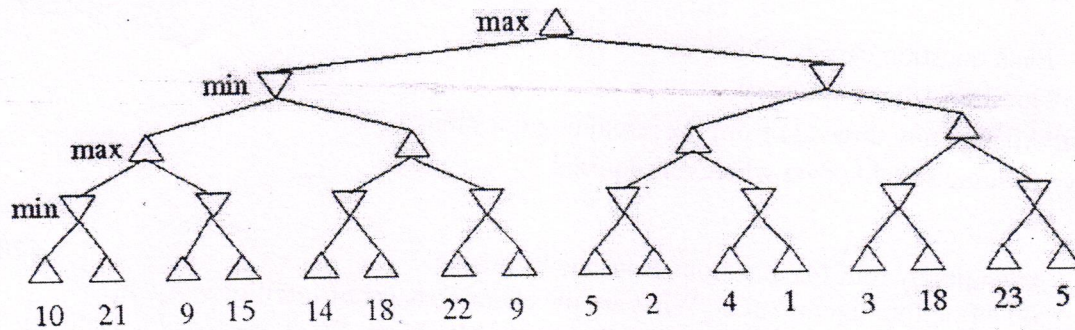
b) Explain different inference Rules for First Order Predicate Logic. [10]

Q.5 a) Define the terms chromosome, fitness function, crossover and mutation as used in Genetic algorithms. Explain how Genetic algorithms work. [10]

b) What are steps involved in natural language processing (NLP) of an English sentence? Explain with an example sentence. [10]

Q. 6 Write short note on any two of the following [20]
   a) Expert System Architecture and Applications
   b) Local Search Algorithms
   c) Decision Tree learning

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Time: 03 Hours   **Marks: 80**

Note: 1. Question 1 is compulsory

2. Answer any three out of remaining questions.

Q1 A) i. Design star & snowflake schema for "Hotel Occupancy" considering [10] dimensions like Time, Hotel, Room, etc.

ii. Calculate the maximum number of base fact table records for the values given below:

Time period: 5 years

Hotels: 150

Rooms: 750 rooms in each Hotel (about 400 occupied in each hotel daily).

B) Explain Data mining as a step in KDD. Give the architecture of typical data mining [10] System.

Q2 A) The college wants to record the marks for the courses completed by students using [10] the dimensions: a) Course, b) Student, c) Time & a measure d) Aggregate marks. Create a Cube and describe following OLAP operations:

i) Rollup   ii) Drill down   iii) Slice   iv) Dice   v) Pivot.

B) A simple example from the stock market involving only discrete ranges has profit [10] as categorical attribute, with values {up, down} and the training data is:

Age	Competition	Type	Profit
Old	Yes	Software	Down
Old	No	Software	Down
Old	No	Hardware	Down
Mid	Yes	Software	Down
Mid	Yes	Hardware	Down
Mid	No	Hardware	Up
Mid	No	Software	Up
New	Yes	Software	Up
New	No	Hardware	Up
New	No	Software	Up

Apply decision tree algorithm and show the generated rules.

Q3 A) Why naive Bayesian classification is called "naive"? Briefly outline the major ideas [10] of Naive Bayesian classification.

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

Q4 A) Explain ETL of data warehousing in detail.   [10]

B) Find clusters using k-means clustering algorithm if we have several objects [10] (4 types of medicines) and each object have two attributes or features as shown in the table below. The goal is to group these objects into $k=2$ group of medicine

based on the two features (pH and weight index).

Object	Attribute 1(X) Weight Index	Attribute 2 (Y) pH
Medicine A	1	1
Medicine B	2	1
Medicine C	4	3
Medicine D	5	4

Q5 A) Explain Data Warehouse Architecture in detail. [10]

B) A database has five transactions. Let minimum support = 30% and minimum [10] Confidence = 70%

   i.   Find all frequent patterns using Apriori Algorithm.

   ii.   List strong association rules.

Transaction _Id	Items
A	1,3,4,6
B	2,3,5,7
C	1,2,3,5,8
D	2,5,9,10
E	1,4

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

a) Data warehouse design strategies

b) Applications of Data Mining

c) Role of metadata

d) Multidimensional and multilevel association mining

e) Hierarchical clustering

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Q.P. Code: 27190

Time: 3 Hours

(Total Marks 80)

22/05/18.

Question no 1 is compulsory
solve any 3 from Q2 to Q6
Indicate your answers with neat sketch wherever necessary

Q1 . ATTEMPT ANY FOUR   20

    a) What do you mean by response time? Explain.
    b) Explain three levels of processing in detail.
    c) State and explain different interview techniques.
    d) Explain steps in constructing persona.
    e) How one can create a dialogue with interface user? Explain with appropriate
       example.

Q2 a) What are various type of windows? Explain.   10
    b) What are three levels of users? Explain how to accommodate them in user interface.
                                                                          10

Q3 a) What are various factors to be considered for User Interface Design? Also give
      suitable example for the same.   10
    b) Differentiate between Qualitative and Quantitative Research   10

Q4 a) What are various methodologies adopted for Feedback and Guidance? Explain in
      detail.   10
    b) Explain Various Menus in Human Machine Interface?   10

Q5 a) What do you mean by Keyboard Accelerators? Explain   10
    b) Explain Goal Directed Design Process in Detail.   10

Q6 Write Short Note on following   20

    a) Device Based Control
    b) Screen Based Control
    c) Statistical Graphics
    d) Graphics Icons and Images

3Hrs 80 Marks

Note: 1) Question no 1 is compulsory

2) Solve any three from remaining

Q1   a) Explain Flynn's classification scheme   (05)

     b) Explain Data mapping and memory in array processor   (05)

     c) Explain desirable features of global scheduling algorithm   (05)

     d) Explain Berkeley physical clock algorithm   (05)

Q2   a) Explain different types of Hazards in Parallel System   (10)

     b) Explain Ricart-Agrawala algorithm for Mutual Exclusion   (10)

Q3   a) Give an example that can be solved effectively with SIMD architecture   (10)

     b) What are the different Architectural Model of Distributed System?

      Explain with suitable diagram   (10)

Q4   a) Explain Hadoop Distributed File System (HDFS).   (10)

     b) Explain Software models supported by the distributed system   (10)

Q5   a) What is Remote Procedure Call? Explain the working of RPC in detail.   (10)

     b) What are different data centric consistency model?   (10)

Q6   a) Explain different load estimation policies and process transfer policies used by

      Load balancing algorithm   (10)

     b) Explain Bully Election Algorithm   (10)

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B.E. Comp. Engg. Sem–VIII R-2012 CBSGS May-2018
Big Data Analysis

Q.P.Code: 40458

(3 Hours)   [Total Marks 80]

i.   Q. 1. is Compulsory.
ii.   Attempt any three from the remaining.
iii.   Assume suitable data.

Q. 1   (a)   Explain what characteristics of Social Networks make it Big Data.   (5)

      (b)   What do you mean by Jaccard Similarity? Illustrate with an example.   (5)
            Describe any two applications that can use Jaccard Similarity.

      (c)   Define concept of a **Link Farm** using a diagram. How does it lead to   (5)
            Link Spam?

      (d)   What are the challenges of querying on large Data Streams?   (5)

Q. 2   (a)   What do you understand by BASE properties in NOSQL Database? (10)
            Explain in detail any one NOSQL architecture pattern. Identify two
            applications that can use this pattern.

      (b)   Write Map Reduce Pseudocode to multiply two matrices.   (10)
            Illustrate the procedure on the following matrices. Clearly show all the
            steps.

$$A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \\ 3 & 4 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$$

Q. 3   (a)   For the graph given below show the page ranks of all the nodes after (10)
            running the PageRank algorithm for two iterations with teleportation
            factor with Beta (β) value = 0.8
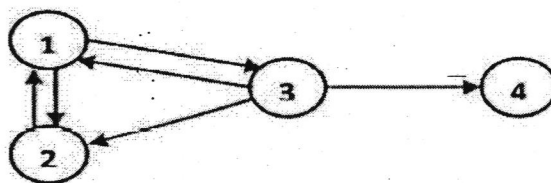
      (b)   Give two applications for counting the number of 1's in a long stream of (10)
            binary values. Using a stream of binary digits, illustrate how the DGIM
            algorithm will find the number of 1's.

1

Q. 4 (a) What do you mean by the Hadoop Ecosystem? Describe any three **(10)**
components of a typical Hadoop Ecosystem.

(b) Explain the following concepts with respect to world wide web **(10)**
   A. Topic Specific Page Rank
   B. Bowtie structure of the Web

Q. 5 (a) Explain the design of a recommender system used to recommend movies **(10)**
to users. The recommender system should use Collaborative filtering.

(b) Explain the CURE algorithm for clustering large datasets. Please **(10)**
illustrate the algorithm using appropriate figures.

Q. 6 (a) Explain the SON algorithm for Frequent Pattern mining. Illustrate how **(10)**
Map Reduce can be used for implementing this algorithm

(b) What is a "Community" in a Social Network Graph? For the following **(10)**
graph show how the Girvan Newman algorithm finds the different
communities.

****