

**SE, SEM IV,
COMPUTER
(CBCS), MAY
JUNE 2018**

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

(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 search? 10M

- 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 $n=7, m=15$ (p_1, p_2, \dots, p_7)=(10,5,15,7,6,18,3), (w_1, w_2, \dots, w_7)=(2,3,5,7,1,4,1) 10M

- b. Sort the list of the elements 10,5,7,6,1,4,8,3,2,9 using merge sort algorithm and show its computing time is $O(n \log n)$. 10M

Q. 4.a. Explain different string matching algorithms. 10 M

- b. What do you understand by NP Complete? Explain Is Subset sum problem NP complete? If so explain. 10M

Q. 5.a. Write a detailed note on Hamiltonian cycles. 10 M

- b. Explain how backtracking is used for solving n- queens problem. Show the state space tree. 10M

Q.6 Write Short Note on (any 2) 20 M

- a. Job sequencing with deadlines
- b. 8 queens problem
- c. Longest common subsequence

- 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 difference between deadlock avoidance and prevention? 10

- 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 string. Page frame size is 4. 10
 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.

[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. 5
 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 20
 c) Gouraud and phong shading
 d) Halftoning and Dithering.