Meerut Institute of Engineering & Technology, Meerut
First Sessional Examination Even Semester, 2020-2021
(December– 2020)

Course:	**M.Tech**	**Branch:**	**CSE**
Subject:	**Foundation of Computer Science**	**Subject Code:**	**MTCS101**
M.M.	**60**	**Time:**	**2:00hrs**

Section A

Q.1 Attempt any TWO from the following. (2X 4 = 8)

Q. No.	Question	Level of Taxonomy	CO
a.	Define Data Structures. What are the applications of data structures in computer Science? What are the factors that influence the choice of a particular Data structure	Understand	CO 1
b.	Write an algorithm to evaluate postfix expression using stacks	Understand	CO 1
c.	Write an algorithm to search elements using Binary search	Understand	CO 1

Q.2 Attempt any TWO from the following. (2X 4 = 8)

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	*A Binary tree* **T** *has 9 nodes the inorder and preorder traversal of T yield the following sequences of nodes:* inorder: Z A C K F H D B G Preorder: F A Z K C D H G B Draw the Binary tree T and perform Post order traversal.	Understand	CO 1
b.	Convert the following infix expression to the postfix equivalents ((A-B)+D/((E+F)*G))	Understand	CO 1
c.	Explain Tower of Hanoi .Write a recursive "C" function for Solving Towers of Hanoi Problem.	Understand	CO 1

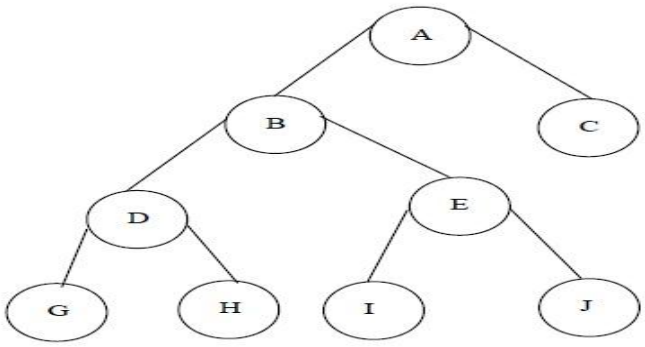
Section B

Q.3 Attempt any TWO from the following. (2 X 6 = 12)

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	Explain the term infix expression, prefix expression and postfix expression. Convert the following infix expressions to their postfix equivalents	Understand	CO 1
b.	Explain the concept of a circular queue? How is it better	Understand	CO 1

	than a linear queue?		
c.	Draw the queue structure in each case when the following operations are performed on an empty queue. • Add A, B, C, D, E, F • Delete two letters • Add G • Add H • Delete four letters • Add I	Understand	CO 1

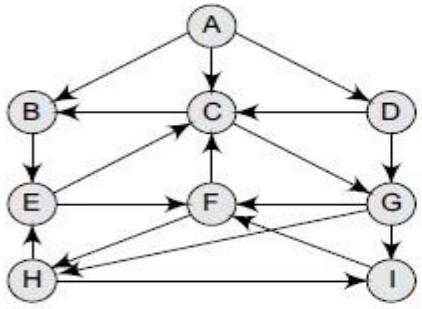
Q.4 Attempt any TWO from the following. **(2 X 6 = 12)**

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	Write a function to print the memory location which are used to store the data in a single linked list?	Understand	CO 2
b.	 **Figure 1: A binary tree** Draw the memory representation of the binary tree of Figure 1.	Understand	CO 2
c.	Explain the differences between multi-programming, multi-user, and multitasking operating systems.	Understand	CO 2

Section C

Q.5 Attempt any ONE from the following. **(1 X 10 = 10)**

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	Consider the graph given below. Find out its depth-first and breadth-first traversal scheme.	Apply	CO2

	 **Figure 2:** Graph G and its adjacency list		
b.	What is the need of system call? Explain how it is executed.	Apply	CO1

Q.6 Attempt any ONE from the following. **(1 X 10 = 10)**

Q. No.	Question	Level of Taxonomy	Course Outcome
a.	1. Five batch jobs, A through E, arrive at a computer center at essentially the same time. They have an estimated running time of 15,9,3,6 and 12 minutes, respectively. Their (externally defined) priorities are 6,3,7,9, and 4 respectively, with a lower value on responding to a higher priority. For each of the following scheduling algorithm be termine the turnaround time for each process and the average turnaround for all jobs. Ignore process switching overhead. Explain how you arrived at your answers in the last three cases assume that only one job at a time runs until it finishes and that a jobs are completely processor bound. a. Round robin with a time quantum of 1 minute b. Priority scheduling c. FCFS (run in order 15,9,3,6, and 12) d. Shortest job first	Understand	CO 2
b.	2. Consider the following set process, with the length of the CPU burst given in milliseconds: **Process** **Burst Time** **Priority** P_1 10 3	Understand	CO 2

	p_2 1 1 p_3 2 3 p_4 1 4 p_5 5 2 a. Draw four Gantt that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority number implies a higher priority), and RR (quantum = 1). b. What is the turnaround time of each process for each of the scheduling algorithms in part a? c. What is the waiting time of each process for each of these scheduling algorithms? d. Which of the algorithms result in the minimum average waiting time (over all processes)?		