



**NAVRACHANA
UNIVERSITY**
a UGC recognized University

School: School of Engineering and Technology
Program/s: Computer Science & Engineering
Year: 2nd **Semester:** 3rd
Examination: End Semester Examination
Examination year: December - 2021

Course Code: CS229 **Course Name:** Data Structures
Date: 02/12/2021
Time: 08:30 am to 10:30 am

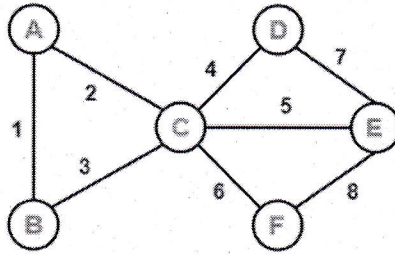
Total Marks: 40
Total Pages: 3

Instructions:

- Write each answer on a new page.
- All questions are mandatory.
- Attempt the questions wisely.

Q. No.	Details	Marks	COs*	BTL#
Q.1	Multiple Choice Questions - All are compulsory (1 Mark for each)	10		
	1. One can convert a binary tree to its mirror image by traversing it in a) Inorder b) Preorder c) Postorder d) None of the above		CO2	BT1, BT2
	2. What does it mean if the malloc function returns a NULL pointer? a) The requested amount of memory is not allocated. b) If the required amount of memory is not available in the auxiliary memory. c) If the required amount of memory is not available in the heap. d) Header files alloc.h or stdlib.h not included in the program.		CO1	BT2
	3. The data-type which prevent the computer from memory fragmentation is: a) Structure b) Union c) a) & b) both d) None		CO1	BT1
	4. If the value of TOP = N-1. What does it mean? a) Stack is Full b) Overflow state of Stack c) Underflow state of Stack d) Only one element in the stack		CO3	BT2
	5. To replace recursive functions to avoid stack overflow problems in advance, we use a) Heap Stack b) Recursive Simulation Function c) Both a) and b) d) Iterative Function		CO3	BT1, BT2
	6. The order in which the members of the queues are selected for the service is known as		CO3	BT1

	<ul style="list-style-type: none"> a) Queue Discipline b) FIFO c) LIFO d) First-Come First-Serve (FCFS) 			
	<p>7. Given an array of element 5, 7, 9, 1, 3, 10, 8, 4. Which of the following is the correct sequence of elements after inserting all the elements in a min-heap?</p> <ul style="list-style-type: none"> a) 1,3,4,5,7,8,9,10 b) 1,4,3,9,8,5,7,10 c) 1,3,4,5,8,7,9,10 d) 1,3,7,4,8,5,9,10 		C04	BT3
	<p>8. In a singly linked list which operation depends on the length of the list?</p> <ul style="list-style-type: none"> a) Delete the last element of the list b) Insert an element in the beginning of the list c) Delete an element from the beginning of the list d) Insert an element in the specified position of the list 		C03	BT4
	<p>9. Maximum number of nodes in a binary tree of height 5 is</p> <ul style="list-style-type: none"> a) 63 nodes b) 64 nodes c) 32 nodes d) 31 nodes 		C03	BT3
	<p>10. Choose the correct statement about C structures.</p> <ul style="list-style-type: none"> a) Structure elements can be initialized at the time of declaration. b) Structure members cannot be initialized at the time of declaration c) Only integer members of the structure can be initialized at the time of declaration. d) None of these. 		C01	BT1
Q.2	Fill in the Blanks - All are compulsory (1 Mark for each)	5		
	<p>1. A binary tree T has 40 leaves. The number of nodes in T having 2 children is _____.</p>		C03	BT3
	<p>2. Consider the following array implementation of stack:</p> <pre>#define MAX 10 struct STACK { int arr [MAX]; int top = -1; }</pre> <p>If the array index starts with 0, the maximum value of top which does not cause stack overflow is _____.</p>		C02, C03	BT3, BT4
	<p>3. "Any recursive algorithm can always be expressed by using a stack." Is it true or false? _____.</p>		C02	BT1
	<p>4. Playing the Josephus Game with the value of n=14 and k=3. At the end who is the last survivor? Person No. _____.</p>		C05	BT3, BT4
	<p>5. Consider the given graph:</p>		C03, C05	BT3



What is total cost of minimum spanning tree? _____.

Q.3	Short Answer Type Questions - Attempt any 5 questions. (3 Mark for each)	15		
	1. What do you mean by marking phase and collection phase?		C03	BT1
	2. Differentiate between a singly linked list and doubly linked list.		C04	BT1
	3. Give Postfix form for: $A + (B * C - (D / E \wedge F)) * G * H$		C03	BT3, BT6
	4. What will be the Pre-order, In-order, Post-order traversal of the given binary tree:			
			C03, C05	BT4, BT6
	5. Explain Quick Sort with the help of suitable example.		C04	BT1, BT2
	6. Define Following Terms: a) Binary Search Tree b) Job Scheduling		C03	BT1
	7. How polynomial equation can be represented with linked list?		C03	BT1
	8. Explain Circular Queue and its operations.		C03	BT1
Q.4	Long Answer Type Questions - Attempt any 2 questions. (5 Mark for each)	10		
	1. What is Stack? Why it is known as LIFO? Write an algorithm using PUSH and POP.		C03, C04	BT1, BT2, BT3,
	2. Evaluate Postfix form: $5\ 9\ 8\ +\ 46\ *\ +\ 7\ -\ *$ using stack method.		C03	BT1, BT6
	3. Explain the following terms in brief: a) Shortest Path Algorithm b) Concept of Bubble Sort c) Advantages of Circular Queue d) Concept of Binary Search e) Decision Tree		C03, C04, C05	BT1, BT2