Roll No. | | | | | | | | | |

(105) 2

COER University

END SEMESTER EXAMINATION, EVEN SEM 2022-23

Time : 3 hours
Program Name : MCA
Course Name : Advanced Data Structure

Total Marks : 100
Semester : II
Course Code : MCA201

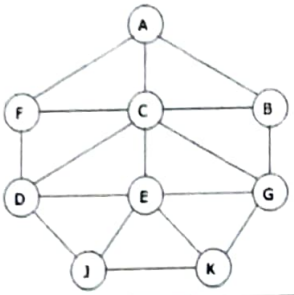
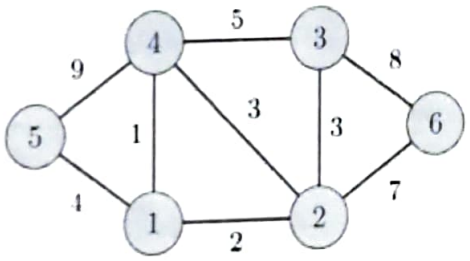
Note: All questions are compulsory. No student is allowed to leave the examination hall before the completion of the time.

Q. No 1	Attempt Any Four Parts. Each Question Carries 5 Marks.	CO	BL
(a)	Explain the difference between time complexity and space complexity. How are they	CO1	2
(b)	Identify the suitable data structure to solve the given problem and write the algorithm. Given a string s containing just the characters '(', ')', '{', '}', '[' and ']', task is to determine if the input string is valid. An input string is valid if: Open brackets must be closed by the same type of brackets. Open brackets must be closed in the correct order. Every close bracket has a corresponding open bracket of the same type.	CO1	5
(c)	A height balanced binary tree is a binary tree in which the height of the left subtree and right subtree of any node does not differ by more than 1 and both the left and right subtree are also height balanced. Write an algorithm to check that the given binary tree is height balanced or not.Illustrate your algorithm using an example.	CO1	5
(d)	Write an algorithm to check a number Armstrong or not and find the complexity for the same?	CO1	6
(e)	Describe the role of Data Structure? How many types of data structure used to access the data?	CO1	2

Q. No 2	Attempt Any Four Parts. Each Question Carries 5 Marks.	CO	BL
(a)	What is data structure? Discuss different type of data structures.	CO2	2
(b)	Create a function in C code to perform to delete a node at last in a singly linked list?	CO2	6
(c)	Convert the infix expression "a+b*c+d" into postfix using stack. Also discuss the time complexity of infix to postfix conversion using stack.	CO2	4
(d)	Write the steps required to merge two sorted link lists into third sorted link list. Discuss its time complexity. Also illustrate the process using an example.	CO2	4
(e)	Define the term array and explain the process how an array allocates the memory, find the address of 5th element of array of integer with the base address 1102…	CO2	5

Q. No 3	Attempt Any Four Parts. Each Question Carries 5 Marks.	CO	BL
(a)	What is the divide and conquer technique of solving a problem? List various problems that can be solved by divide and conquer technique.	CO3	3
(b)	Evaluate the following postfix expression using stack.324 * + 42 ^ - 162 / +, show the contents of each step?	CO3	6
(c)	Differentiate Circular and Priority Queue with the help of example?	CO3	4
(d)	Explain how Quick Sort works by taking an example of array: 10,15,1,2,6,12,5,7. Also discuss the significance of pivot element.	CO3	3
(e)	What is Strassen's Matrix Multiplication algorithm? Explain.	CO3	3

Q. No 4	Attempt Any Two Parts. Each Question Carries 10 Marks.	CO	BL
(a)	Explain followings with an example (i) Complete Graph (ii) Regular Graph (iii) Connected and Disconnected Graph	CO4	2

(b)	What is DFS and BFS? Traverse the graph shown below in DFS and BFS order starting from node A.  	**CO4**	**2**
(c)	Find the minimum spanning tree from given graph G(V,E) using Kruskal's and Prim's Algorithm, do the comparative for them?  	**CO4**	**5**

Q. No 5	**Attempt Any Two Parts. Each Question Carries 10 Marks.**	**CO**	**BL**
(a)	Apply the Heap Sort Technique on the following element of array 43, 22, 32, 1, 2, 12, 4, 8, 33	**CO5**	**3**
(b)	In the context of hash tables, explain what collisions are and how they can be handled?	**CO5**	**2**
(c)	What is Huffman coding? How Huffman tree is created? Write the algorithm of Huffman coding and discuss its time complexity.	**CO5**	**3**

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