

G. S. Mandal's

Maharashtra Institute of Technology, Aurangabad

(An Autonomous Institute)

END SEMESTER EXAMINATION

Second Year B.Tech (AIDS) – Feb/Mar-2023

Course Code : AID201

Course Name : Data Structure and Algorithms

Duration : 2 Hrs

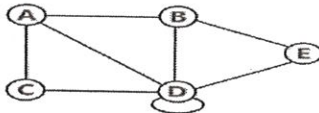
Max. Marks : 50

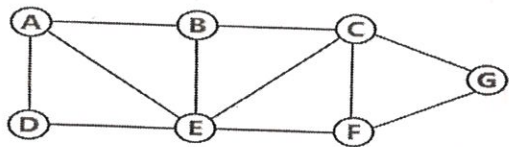
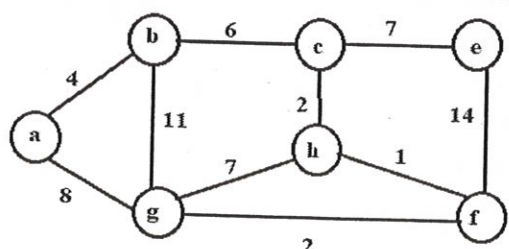
Date :

03 FEB 2023

Instructions :

- All questions are compulsory
- Assume suitable data wherever necessary and clearly state it
- Figures to right indicate full marks

Q. 1	Answer any five(Marks:10)	Ma rks	CO	BL	PI
a)	Define structure data type with syntax.	2	1	1	1.3.1
b)	Define following terminologies. Complete Binary tree, Binary search tree	2	4	1	1.3.1
c)	Define algorithm and complexity of algorithm.	2	1	2	1.3.1
d)	The following sequence of operation is performed on stack : push(1), push(2), pop(), push(1), push(2), pop(), pop(), pop(), push(2), pop(). The sequence of popped out values is?	2	2	2	1.3.1
e)	Show the following graphs using adjacency matrix representation. 	2	4	3	1.3.1
f)	State the advantages of linked list?	2	3	2	1.3.1
g)	Write best case, average case and worst case complexity of merge sort and quick sort.	2	6	2	1.3.1
h)	Write short note on hash table.	2	5	2	1.3.1
Q.2	Solve any two.				
a)	What are disadvantages of static memory location? Explain realloc and free function with example.	4	1	2	2.1.3
b)	Convert following infix expression to postfix expression using stack: $(A + B / C * (D + E) - F)$	4	2	3	2.1.3
c)	Evaluate following postfix expression using stack: $5\ 2\ \$\ 6\ 2\ /\ *\ 4\ 5\ *\ +\ 5\ +$	4	2	3	2.1.3

Q.3	Solve any one.				
a)	Define queue, write applications of queue and write a program to implement queue using single linked list in C language.	8	3	3	2.1.3
b)	What is linked list? Write following functions in C to implement doubly linked list. 1) Insert node at specific position 2) Insert node at end of list 3) Delete node at beginning of list	8	3	3	2.1.3
Q.4	Solve any two.				
a)	Suppose the following list of letters is inserted in order into an empty binary search tree 25,15,10,22,50,35,70,31,44,90,66,12,4,18,24 (i) Draw the final BST Tree. (ii) Find the preorder, inorder and post order traversal of above BST	4	4	3	2.1.3
b)	Consider following graph perform DFS traversal. Show Step by step solution. 	4	4	3	2.1.3
c)	Explain graph representation methods with example.	4	4	2	1.3.1
Q.5	Solve any one.				
a)	Explain selection sort algorithm. Sort following elements using selection sort. Show all passes. 50, 20, 30, 55, 12, 8, 99, 89 Write best, average, worst case time complexity for selection sort.	8	5	3	2.2.3
b)	Explain binary search with following example. Element to be search is 50. 8, 12, 20, 25, 30, 40,45, 48, 50, 100 Write algorithm for binary search.	8	5	3	2.2.3
Q.6	Solve any two.				
a)	What is mean by divide and conquer? Explain merge sort with example.	4	6	3	2.2.3
b)	Discuss Kruskal algorithm with example.	4	6	3	2.2.3
c)	Discuss Prims algorithm and Find MST for following graph using Prims algorithm. Consider "a" as source vertex. 	4	6	3	2.2.3