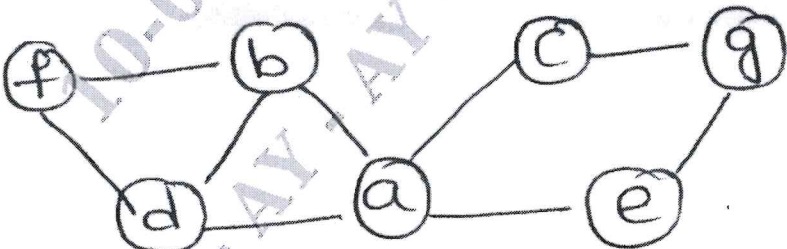


Seventh Semester B.E./B.Tech. Degree Examination, June /July 2026 Introduction to Algorithms

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Describe Fundamentals of Algorithmic problem solving with a neat diagram.	10	L2	CO1
	b.	Explain Fundamental Data Structure.	10	L2	CO1
OR					
Q.2	a.	Describe the asymptotic notations with suitable example.	10	L2	CO1
	b.	Explain important problem types.	10	L2	CO1
Module – 2					
Q.3	a.	Explain the general plan for analyzing the efficiency of a recursive algorithm. Suggest a recursive algorithm to find factorial a number derive its efficiency.	10	L3	CO2
	b.	Develop an algorithm to search an element in an array using sequential search. Calculate Best case, Worst case, Average case efficiency of this algorithm.	10	L3	CO2
OR					
Q.4	a.	Explain the general plan for analyzing the efficiency of a Non – recursive algorithm, suggest a Non – recursive algorithm to find maximum of element in the list of n number derive its efficiency.	10	L3	CO2
	b.	With the algorithm derive the worst case efficiency for Bobble sort.	10	L3	CO2
Module – 3					
Q.5	a.	Design an algorithm to traverse a graph using depth first search (DFS). Apply DFS for the graph given below Fig.Q.5(a).	10	L3	CO3
		 Fig. Q.5(a)			
	b.	Design the algorithm for insertion sort and explain the purpose of each for this elements 89, 45, 68, 90, 29, 34, 17 Analysis (average case) time complexity of insertion sort.	10	L3	CO3

OR

- Q.6** a. Design algorithm for pre-order, post-order and in-order traversal of a tree. Write pre-order, in-order and post-order for the given tree in Fig. Q.6.(b). **10** **L3** **CO3**

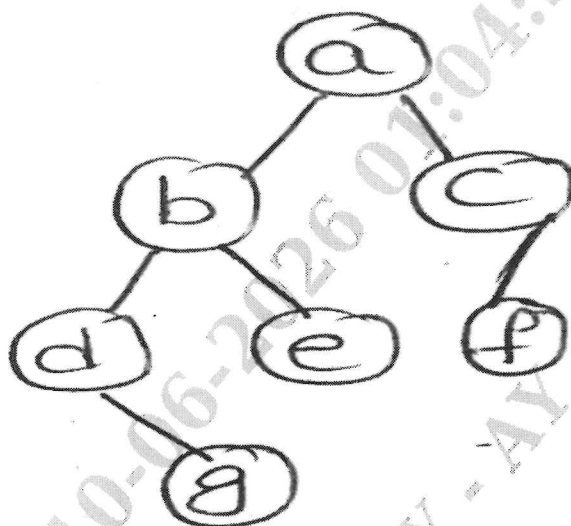


Fig. Q.6.(b)

- b. Explain the concept divide and conquer design an algorithm for merge sort And Apply merge sort for elements 70, 20, 30, 40, 10, 50, 60. **10** **L3** **CO3**

Module – 4

- Q.7** a. Define balanced search tree and Illustrate AVL tree with its four rotation types. **10** **L3** **CO4**
- b. Define Heap, explain the bottom – up heap construction algorithm. Apply heap sort to the list of number 2, 9, 7, 6, 5, 8 in ascending order using array representation. **10** **L3** **CO4**

OR

- Q.8** a. Design an algorithm for comparison counting sort. Demonstrate the process of sorting with suitable example. **10** **L3** **CO4**
- b. Develop Horspool algorithm for string matching. Apply Horspool algorithm to find the pattern BARBER in the text: JIM_SAW_ME_IN_A_BARBERSHOP **10** **L3** **CO4**

Module – 5

- Q.9** a. Demonstrate change – making problem by using dynamic programming. **10** **L3** **CO5**
- b. Illustrate the knapsack problem by considering the following data : **10** **L3** **CO5**

Item	Weight	Value
1	2	\$12
2	1	\$10
3	3	\$20
4	2	\$15

Table Q. 9(b)

Given capacity $w = 5$.

OR

- Q.10 a.** Illustrate the Kruskal algorithm to find minimum spanning tree for the graph given in Fig. Q.10(a). **10 L3 CO5**

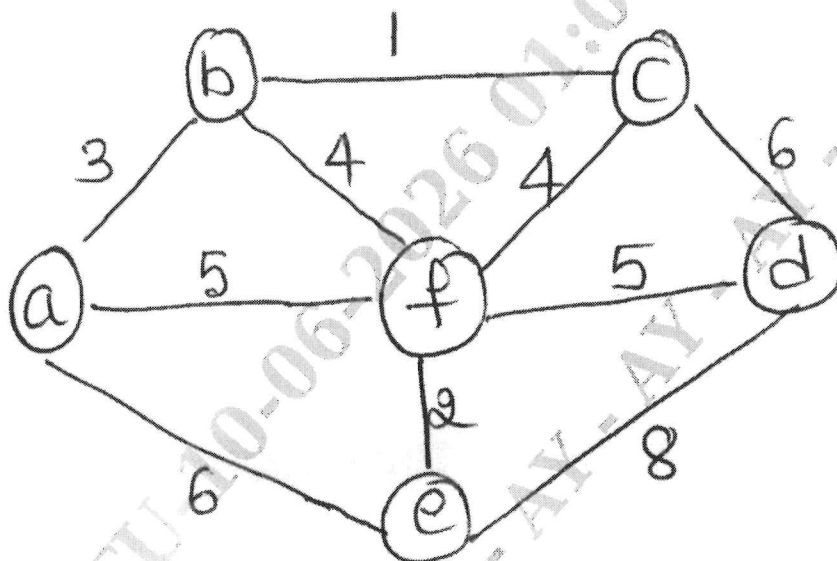


Fig. Q.10(a)

- b.** Solve the following instance of single – source shortest – path problem with vertex a as the source Fig. Q.10(b). **10 L3 CO5**

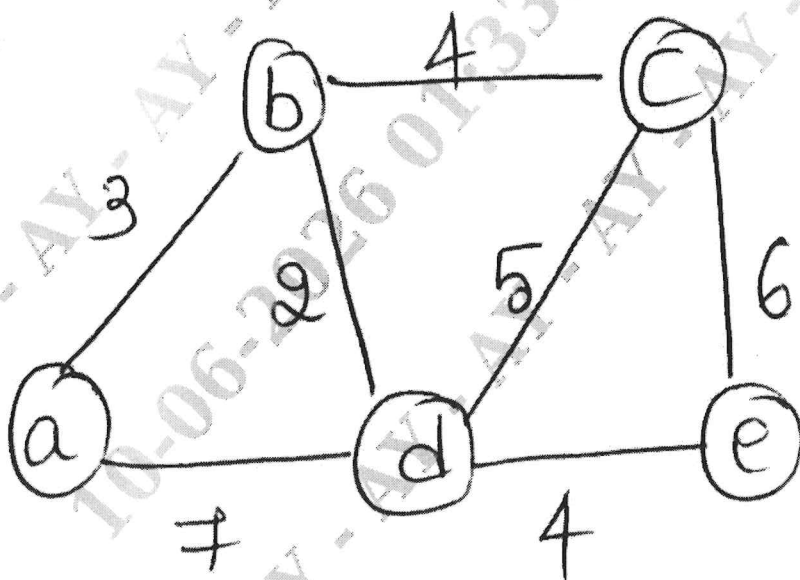


Fig. Q.10(b)
