

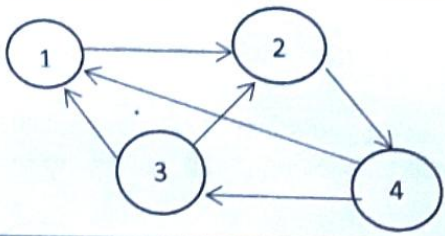
Course: B. Tech. CSE(AI/ML)
Subject: Design and Analysis of Algorithms,
Subject Code: ETCS-207
Semester: III

Time: 03 Hours

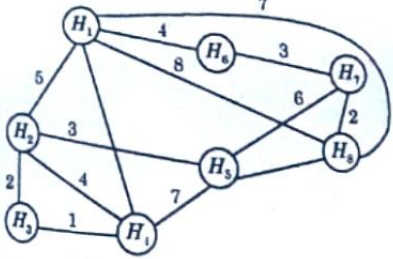
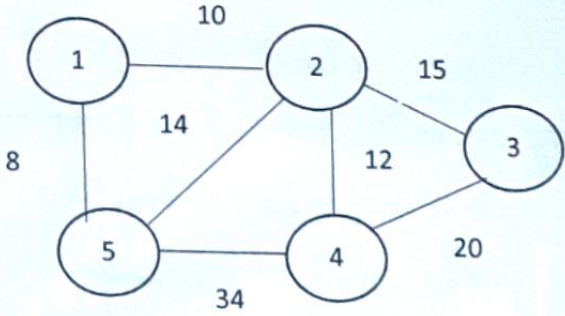
Max Marks: 70

Instructions to the Students:

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of short answer type. All questions are compulsory. Each question carries 2 marks.
3. Section B comprises 8 long answer type questions out of which students must attempt any 5. Each question carries 10 marks.
4. Do not write anything on the question paper.

Q.No.	SECTION –A (SHORT ANSWER TYPE QUESTIONS)	Marks
1. a.	List out the applications of Hamiltonian Graph.	(2)
b.	Find out the DFS for the below graph: 	(2)
c.	Differentiate between Backtracking and branch and bound.	(2)
d.	What are deterministic and non- deterministic algorithms?	(2)
e.	Find out the Time Complexity of Merge Sort.	(2)
f.	What are greedy algorithms? What are their characteristics?	(2)
g.	Describe the Hamiltonian Cycle.	(2)
h.	What are Algorithms? What are its Characteristics?	(2)
i.	What are sets and disjoint sets?	(2)
j.	What do you mean by time and space complexity?	(2)

SECTION -B (LONG ANSWER TYPE QUESTIONS)

2.	Discuss the Strassen's matrix multiplication algorithm in detail. Also, give illustrative example to explain the efficiency achieved through this algorithm.	(10)
3.	Consider five items along with their respective weights and values: $I = \{I_1, I_2, I_3, I_4, I_5\}$ $w = \{5, 10, 20, 30, 40\}$ $v = \{30, 20, 100, 90, 160\}$ The Knapsack has capacity, $W=60$, Find the solution with the Fractional Knapsack. Write the algorithm for fractional knapsack also.	(10)
4.	Explain how Backtracking is used for solving N-Queen's problem. Show all the possible arrangements of 4 Queens in 4×4 matrix.	(10)
5.	A newspaper agent daily drops the newspaper to the area assigned in such a manner that he has to cover all the houses in the respective area with minimum travel cost. Given below is the area assigned to the agent where he has to drop the newspaper. <div style="text-align: center;">  </div> Compute the minimum travel cost using TSP.	(10)
6.	a. State and prove Cook's Theorem. b. Explain NP Scheduling problems.	(6)
7.	Describe the Quick sort technique with an Algorithm.	(4)
8.	What do you mean by minimum spanning trees? Find the minimum spanning tree for the following graph using Kruskal's algorithm. <div style="text-align: center;">  </div>	(10)
9.	a. Give the relationship between P, NP, NP-hard, NP-complete classes. b. What do you mean by Branch and Bound? Give one example that explains the concept of Branch and Bound.	(4)
		(6)

==END OF PAPER==