[Nov-23]

GITAM (Deemed to be University)

[CSEN3001]

GST/GSS/GSB/GSHS Degree Examination

V SEMESTER

DESIGN AND ANALYSIS OF ALGORITHMS

(Effective for the admitted batch 2021-22)

Time: 2 Hours **Max. Marks: 30**

Instructions: All parts of the unit must be answered in one place only.

Section-A

1. Answer all Questions: **(5×1=5)**

a) Define the Control Abstraction of Divide and Conquer.

b) State the Job – Sequencing Deadline Problem.

c) Define and explain the Principles of optimality.

d) What is Chromatic number? Draw the state space tree for 4 – coloring problem.

e) Describe the Least Cost – Search.

Section-B

Answer the following: **(5×5=25)**

UNIT-I

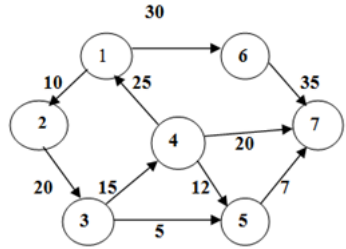
2. Illustrate the Quick sort algorithm with Divide and conquer strategy for the following example. 35,26,12,04,05,16,28,54,24,16,9,65,72.

OR

3. Explain in detail about asymptotic notations with relevant diagrams and examples.

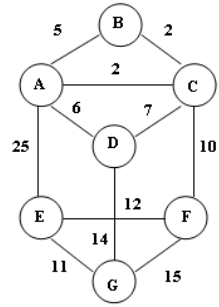
UNIT-II

4. Apply the Dijkstra's algorithm on the graph given below to find single source shortest paths. [source: vertex 1]



OR

5. Solve the following graph using Kruskal's algorithm to find the Minimum cost spanning tree.



UNIT-III

6. Design a reliable three stage system with device types D1, D2 and D3. The costs are $30, $15 and $10 respectively. The maximum cost of the system is not to exceed $150. The reliability of each device D1, D2 and D3 are 0.8, 0.9 and 0.7 respectively.

OR

7. Discuss the All-pairs shortest path problem for the given adjacent matrix using Dynamic Programming.

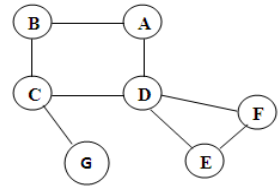
$$D^0 = \begin{bmatrix} 0 & 2 & \infty & 1 & 8 \\ 6 & 0 & 3 & 2 & \infty \\ \infty & \infty & 0 & 4 & \infty \\ \infty & \infty & 2 & 0 & 3 \\ 3 & \infty & \infty & \infty & 0 \end{bmatrix}$$

UNIT-IV

8. Define the sum –of subsets problem. Find all sum of subsets for n=4, (w1, w2, w3, w4) = (11, 13, 24, 7) and M=31.Draw the portion of the state space tree.

OR

9. Analyze whether the given graph is bi-connected or not using the relevant procedure.



UNIT-V

10. Outline the procedure for solving the Travelling Salesperson problem using Branch and bound technique.

OR

11. Illustrate the Branch and Bound solution for the 0/1 knapsack problem instance, n=4; capacity, m=15;
Profit(p1,p2,p3,p4)=(10,10,12,18);
weight(w1,w2,w3,w4) =(2, 4, 6, 9).
Draw the portion of the state space tree and find optimal solution.