Total No. of Questions: 10] [Total no. of pages: 02

II/IV B. Tech. DEGREE EXAMINATIONS, JULY/AUGUST-2023

Second Semester

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

DESIGN & ANALYSIS OF ALGORITHMS

Time: Three Hours **Maximum: 70 Marks**

Answer ONE Question from each unit. **5 x 14 = 70 M**

All Questions carry equal marks.

UNIT-I

1. a) Define the term Algorithm? Explain how to calculate the time and space complexities with an example.

   b) Write an algorithm for finding maximum element in an array. Give best, worst and average case complexities.

(OR)

2. a) Write an algorithm to find factorial of a number and find the time complexity of the algorithm.

   b) Define set? Explain storage on tapes with an example.

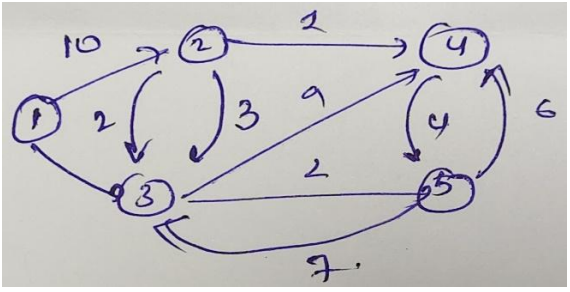
UNIT-II

3. a) Let n=5, $(p_1 \ldots p_5) = (20,15,10,5,1)$ and $(d_1 \ldots .d_5) = (2,2,1,3,3)$. Find the optimal solution for given job sequence with deadlines problem using greedy method.

   b) Explain optimal storage on tapes with an example.

(OR)

4. a) Find the single source shortest path using Dijkstars algorithm for the given graph



   b) Discuss general characteristics of greedy method. Mention any two examples of greedy method that we are using in real life.

UNIT-III

5. a) Solve the following instances of 0/1 KNAPSACK problem using dynamic programming n=3, $(w_1, w_2, w_3) = (2,3,4)$, $(p_1,p_2,p_3) = (1,2,3)$ and m=6

   b) Write the general method for dynamic programming and give one example problem that can be solved with dynamic programming concept.

(OR)

6. Compute OBST w(i, j), r(i, j), c(i, j) 0<i<=j<=d for set (a_1,a_2,a_3) = (for, if , else, while) with $p_1=1$, $p_2=4$, $p_3=2$, $p_4=1$, $q_0=4$,$q_1=2$,$q_3=1$ and $q_4=1$ using r(i, j) construct OBST.

UNIT-IV

7. a) Write an algorithm for N-queen problem using Backtracking.

   b) Use Backtracking technique, solve the following instance for the subset sum problem s= (6,5,3,7) and d=15

(OR)

8. a) Define Back tracking? Explain its general structure with an example.

   b) Explain about sum of subjects problem with an example.

UNIT-V

9. Take any example of travelling person problem using least cost branch bound.

(OR)

10. Explain P, Np, Np-hard and Np amplete problems.