



**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023**

Semester : Semester III - 2021

Course Code : CSE2007

Course Name : Sem III - CSE2007 - Design and Analysis of Algorithms

Program : B.Tech. - ISR

Date : 17-JAN-2023

Time : 1.00PM - 4.00PM

Max Marks : 100

Weightage : 50%

Instructions:

- (i) Read all questions carefully and answer accordingly.*
 - (ii) Question paper consists of 3 parts.*
 - (iii) Scientific and non-programmable calculator are permitted.*
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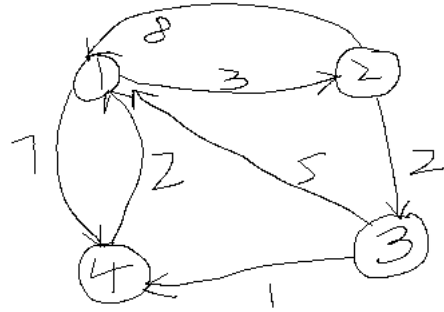
PART A

ANSWER ALL THE TEN QUESTIONS

10 X 2 = 20M

1. Define an algorithm and write the steps to design an algorithm for a given problem?
(CO1) [Knowledge]
2. What is the Average Case , Best Case and Worst Case of Insertion Sort Algorithm?
(CO1) [Knowledge]
3. Define the various asymptotic notations used to define the running time of an algorithm with an example for each.?
(CO1) [Knowledge]
4. Write Algorithm / Pseudo code for Linear Search Algorithm?
(CO2) [Knowledge]
5. Write the Max Heap and Min Heap tree for the below elements?
[12 , 6 , 10 , 15 , 17 , 7]
(CO2) [Knowledge]
6. Name the algorithm design technique that is used in Huffman coding?
(CO3) [Knowledge]
7. Name the appropriate Algorithm Design Technique used for solving Fractional and 0/1 Knapsack problems?
(CO3) [Knowledge]

8. For the Below Given Graph ,Construct Weighted Matrix?



(CO4) [Knowledge]

9. Identify which are P and NP problems from the below list?

- Vertex cover
- Bubble Sorting
- Prims Algorithm for Shortest Path
- Travelling Salesman Problem

(CO4) [Knowledge]

10. Which Algorithm Technique is used to solve N Queens Problem?

(CO5) [Knowledge]

PART B

ANSWER ALL THE FIVE QUESTIONS

5 X 10 = 50M

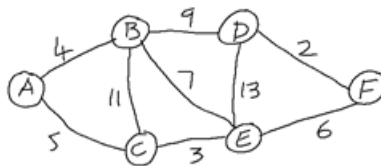
11. A) Write the algorithm steps or pseudo code of Quick Sort. ?
 B) Apply the same to sort the following set of numbers?
 50 , 30 , 10 , 90 , 80 , 20 , 40 , 70
 (Hint : Take First element has Pivot Element.)

(CO2) [Comprehension]

12. Define Greedy Algorithm and Find an optimal Solution to the knapsack instance
 $n = 7, m = 15$
 ($P_1, P_2, P_3, P_4, P_5, P_6, P_7$) = (10 , 5 , 15 , 7 , 6 , 18 , 3) and
 ($W_1, W_2, W_3, W_4, W_5, W_6, W_7$) = (2 , 3 , 5 , 7 , 1 , 4 , 1)

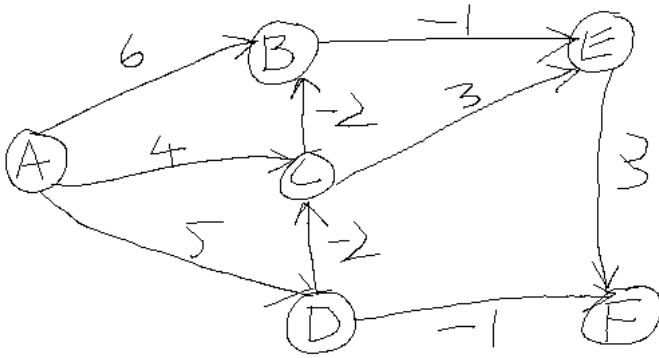
(CO3) [Comprehension]

13. What is the Shortest Path from Node A to Node F and Total Cost from the below graph using Dijkstra's Algorithm?



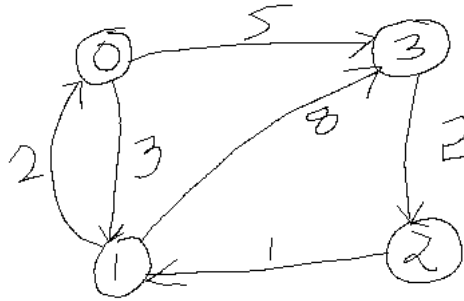
(CO3) [Comprehension]

14. Using Bellman–Ford Algorithm , Solve the problem to get Single source shortest Path to all nodes from Node A?



(CO4) [Comprehension]

15. Using Floyd Warshall Algorithm, Find the All pair shortest path for the below graph?



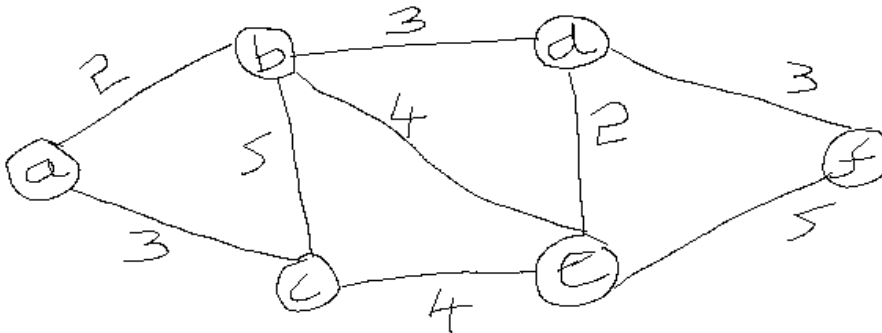
(CO5) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS

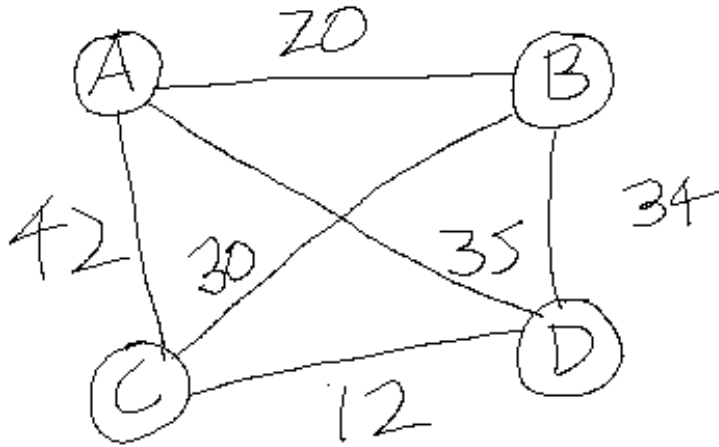
2 X 15 = 30M

16. Explain Kruskal's algorithm to solve the minimal Spanning Tree Problem?
Find the Minimal Spanning Tree for the below graph using Prims Algorithm?
(Pick the starting vertex as vertex a)



(CO4) [Application]

17. Define Travelling Salesman Problem?
Solve Travelling Salesman Problem from the below graph?
(Consider the Source node as A)



(CO5) [Application]
