BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

Computer Science & Engineering-AI&ML

B. Tech. Sem - IV :SUMMER : 2023

SUBJECT : ALGORITHMS ANALYSIS & DESIGN

Day : Monday

Time : 10:00 AM-01:00 PM

Date : 29-05-2023

S-23948-2023

Max. Marks : 60

N.B.

1. All questions are **COMPULSORY**.
2. Figures to the right indicate **FULL** marks.
3. Neat diagrams must be drawn **WHEREVER** necessary.
4. Assume suitable data, if necessary.

Q.1 **a)** Derive the complexity of quick sort for best case and worst case. **(05)**

b) Define master theorem. Solve the following using master method. **(05)**

$T(n) = 8T(n/2)+n^2$

OR

Write an algorithm to solve N Queens problem. Show its working for N = 4. **(10)**

Q.2 Sort the list of the elements 10,5,7,6,1,4,8,3,2,9 using merge sort algorithm and show its computing time is O(n log n). **(10)**

OR

Write algorithm for quick sort and sort the following elements [40,11,4,72,17,2,49]. **(10)**

Q.3 Explain Dijkstra's Single source shortest path algorithm. Explain how it is different from Bellman Ford algorithm. Explain 15-puzzle problem using LC search technique. **(10)**

OR

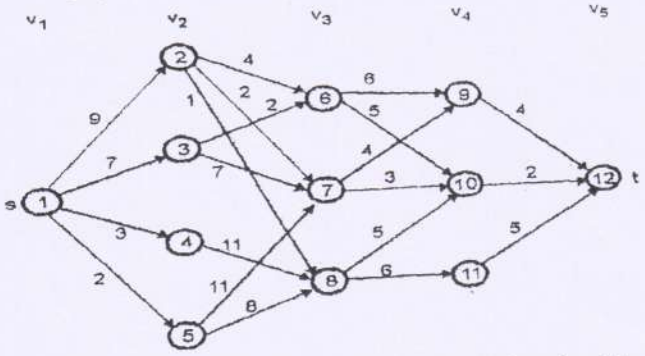
Differentiate between Prims and Kruskals algorithm. Explain Dynamic programming with example. **(10)**

Q.4 Explain Multistage graph with example. **(10)**

P.T.O.

OR

Write multistage graph algorithm and solve following example. (10)



Q.5 Define chromatic number of graph. Explain Graph coloring algorithm. (10)

OR

Rewrite KMP algorithm and explain with example. (10)

Q.6 Write a short note on following: (10)

i) Steps for NP Completeness proofs.

ii) Differentiate between P and NP.

OR

Discuss the P, NP and NPC Classes. (10)

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