6E3202

B. Tech. VI Sem. (Main & Back) Exam., May/June-2014
Computer Engg.
6CS2: Design and Analysis of Algorithm

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:-

*Attempt any **five questions,** selecting **one question** from **each unit.** All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

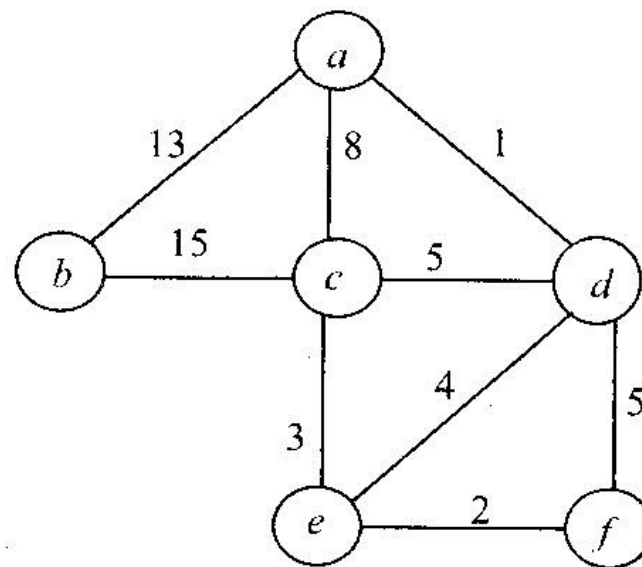1._____   2._____

UNIT-I

Q.1 (a) Explain best-case, average-case, worst-case running time of Merge sort algorithm.

(b) Solve the recurrence relation for time complexity:

$$T(n) = 2 \qquad \text{if } n = 2$$

$$= 2\,T\,(n/2) + 3*n \qquad \text{if } n > 2$$

(c) Find minimum cost spanning tree by implementing prim's algorithm for given weighted graph. [4+6+6]

OR

Q.1 (a) Write an algorithm to search an element from a given array by binary search method. Discuss the time complexity of the algorithm. [6]

(b) One file has ten characters (a, b, c, '\n', e, f, g, h, i, ' ') whose frequencies are 27, 31, 11, 5, 72, 51, 89, 33, 2 and 10 respectively.

(i) Find optimal binary merge pattern tree for above file.

(ii) Generate Huffman code for string "fge\nah".

(iii) Translate given Huffman code 1111011101111110000110 into text format by above pattern. [4+2+4]

UNIT-II

Q2 (a) What is the difference between Divide & Conquer and Dynamic Programming method? Explain with example.

(b) Find the optimal parenthesization of matrix-chain product whose sequence of dimensions is (4,10,4,40,5) [4+12]

OR

Q.2 a) Explain Backtracking method by using the example of 4-Queen Problem with flow diagram. [6]

(b) For given Traveling Salesman Problem matrix:

∞	6	0	2
5	∞	7	0
0	4	∞	14
8	0	0	∞

(i) What is the reduced cost matrix?

(ii) Find the optimal tour of given Traveling Salesman Problem. [3+7]

UNIT-III

Q3 (a) Explain both the heuristics of Boyer-Moore Algorithm with suitable examples.

(b) Solve the given assignment problem by branch and bound method: [8+8]

| Tasks ⇒ Agents ⇓	1	2	3
A	14	17	13
B	12	16	11
C	13	19	14

OR

Q.3 a) Explain and construct the KMP flow chart for pattern P= "ABABCB" and also show the Actions perform of KMP flow chart with given text T = "ACABAABABA'"

(b) Explain the quadratic assignment problem with suitable example. [10+6]

UNIT-IV

Q.4 (a) What are the randomized algorithms? Explain two randomized algorithms - Las Vegas algorithm and Monte Carlo algorithm by giving suitable examples. [2+4]

(b) What do you mean by Multi - commodity flow in the network? Find the max flow path by Ford-Fulkerson method for given network: [3+7]
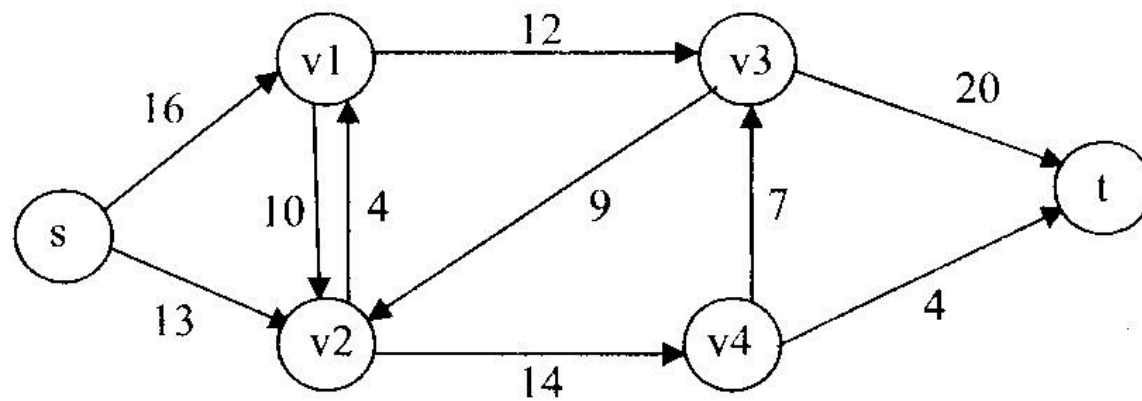
OR

Q.4 (a) State the Randomized min cut theorem.

(b) Show Randomized min cut operation for the following given graph:
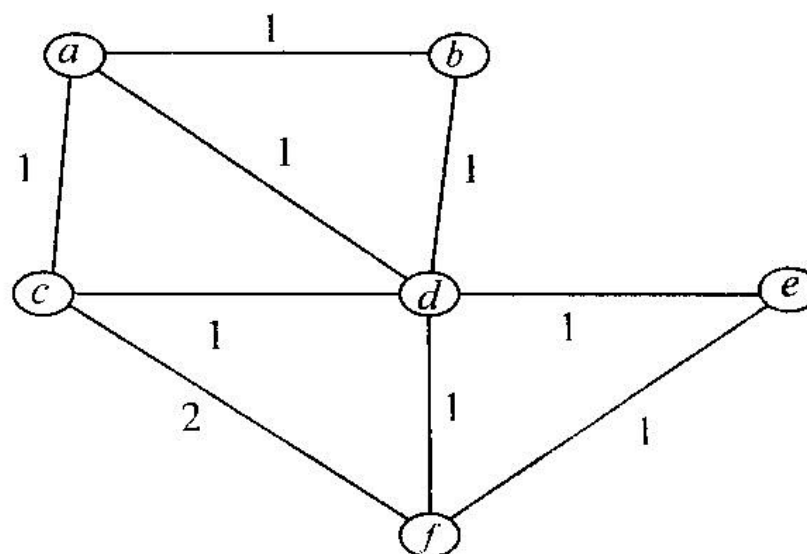
(c) Write Flow shop Scheduling algorithm. [3+8+5]

UNIT-V

Q5 (a) Explain the terms P, NP, NP-Hard. NP-COMPLETE with suitable example. Also give relationship between them.

(b) Write algorithm for approximation for vertex cover problem with suitable example.

(c) Show that the Hamilton cycle problem is NP- Complete. [4+6+6]

OR

(a) State the Cooks theorem. What is significance of this algorithm?

(b) Prove that the Circuit Satisfiability problem is NP complete.

(c) Write algorithm for approximation for set cover problem with suitable example.

--- [4+6+6]