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18/105-C

B.C.A. (Fourth Semester) Examination, 2018

Paper : First

Design and Analysis of Algorithm

(BCA-401)

Time : Three Hours] [Maximum Marks : 70

Note : Attempt all sections as per instructions.

Section-A

Note : Attempt all questions. Give answer of each question in about 50 words.

1.5 × 10 = 15

1. (i) Describe about properties of algorithm.
- (ii) Define complexity.
- (iii) Describe about Asymptotic notation.
- (iv) Define Graph.
- (v) Define Tree.
- (vi) Define Back Tracking.
- (vii) Define Brach and bound.
- (viii) Define dynamic programing.

P.T.O.

(2)

- (ix) Define Searching.
- (x) Define Sorting.

Section-B

Note : Attempt all questions. Give answer of each question in about 200 words. 7 × 5 = 35

2. Differentiate between Big oh (O) Big theta(θ) and Big omg (Ω) notations.

OR

Define Recurrences. Describe about Master Method.

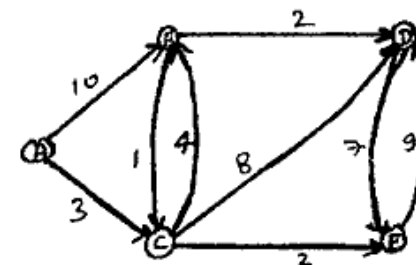
3. Solve the recurrence using Mater method.

$$T(n) = 9T\left(\frac{n}{3}\right) + n$$

OR

Describe about 0-1 Knapsack problem.

4. Find shortest path using dij. Kastr's algorithm when source is A



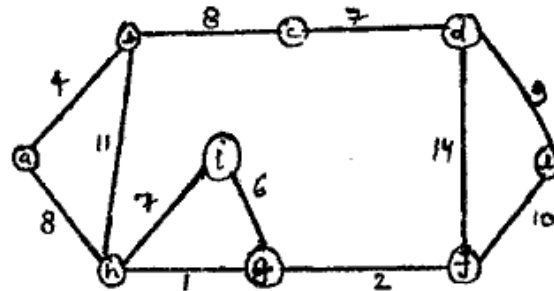
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(3)

OR

Describe about optimal storage on tape.

5. Find cost of minimum spanning tree of the following graph using Kruskal's algorithm.



OR

Define graph coloring. Describe about four color problem.

6. Define coloring of tree. Prove that Every tree with $n \geq 2$ vertices is 2-chromatic.

OR

Write the algorithm of binary search tree.

Section-C

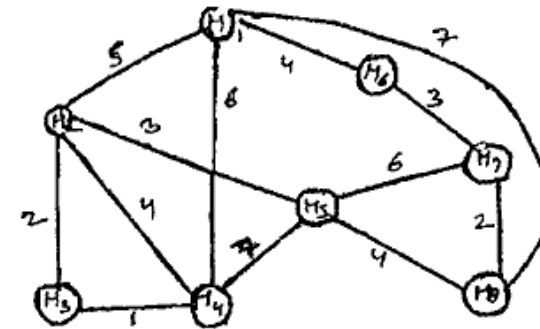
Note : Attempt any **two** questions. Give answer of each question in about 500 words.

10×2=20

7. Explain about 8 queen problem.

(4)

8. A newspaper agent daily drops the newspaper to the area in such a manner that has cover all the houses in the respective area with minimum travel cost. Compute the travel cost. The area assigned to the agent where he has to drop the newspaper is shown in figure.



9. Write selection sort algorithm.
10. Sort the following array A using heap sort techniques.
 $A = \langle 5, 8, 3, 9, 2, 10, 1, 45, 32 \rangle$
11. Consider 5 items along their respective weights and values.

$$I = \langle I_1, I_2, I_3, I_4, I_5 \rangle$$

$$W = \langle 5, 10, 20, 30, 40 \rangle$$

$$V = \langle 30, 20, 100, 90, 160 \rangle$$

The capacity of Knapsack $W=60$ Find the solution to the fractional Knapsack problem.