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(d) Write short notes on :

(a) Cooks theorem 4

(b) L. C. search 3

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Roll No. 3142214082

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B. E. (Fifth Semester) Examination, Nov.-Dec. 2016

(New Scheme)

(CSE Engg. Branch)

ANALYSIS & DESIGN of ALGORITHMS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) is compulsory from each unit. Attempt any two parts from (b), (c) & (d).

Unit-I

1. (a) Explain BigO notation.

(b) Explain selection sort technique with example.

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(c) State master theorem for solving recurrence equations. Use the master method to give light a symptotic bonds for the following recurrences?

(i) $T(n) = 3T\left(\frac{n}{4}\right) + n\log n$ 3

(ii) $T(n) = 27T\left(\frac{n}{3}\right) + cn^2$ 4

(d) Solve the following recurrence by substitution method :

(i) $T(n) = T\left(\frac{n}{2}\right) + T\left(\frac{n}{4}\right) + T\left(\frac{n}{8}\right) + n$ 4

(ii) $T(n) = T\left[\left(\frac{n}{2}\right)\right] + 1$ 3

Unit-II

(a) Write best and worst case time complexity of merge sort. 2

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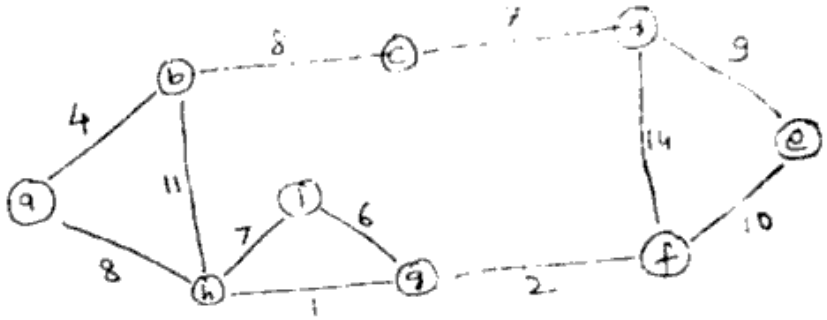
(b) Use strassen's algorithm to compute matrix product :

$[A] \times [B]$ and find matrix $[C]$ 7

$$\begin{bmatrix} 11 & 32 \\ 14 & 8 \end{bmatrix} \times \begin{bmatrix} 23 & 17 \\ 7 & 5 \end{bmatrix}$$

(c) Find the minium spanning tree of the following graph using Prim's algorithm. 7



(d) Explain huffman code with example. 7

Unit-III

3. (a) What is AND/OR graph? 2

(b) Find the M matrix of matrix chain product whose sequence of dimension is

$\{30, 35, 15, 5, 10, 20\}$ i.e. $P_1, P_2, \ldots \ldots P_6$ matrix. 7

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PTO

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(c) Find longest common subsequence for the following two sequence : 7

x :	A	B	C	B	D	A	B
y :	B	D	C	A	B	A	

(d) Explain breadth first search with example. 7

Unit-IV

4. (a) Write any two application of back tracking paradigm. 2

(b) Given a set $S = \langle 3, 4, 5, 6 \rangle$ and $X = 9$. Obtain the subset sum using back tracking approach. 7

(c) Explain 4 queens problem in detail. 7

(d) Consider a graph $G = (V, E)$ shown in fig. find a Hamiltonian circuit using back tracking method. (assume 'a' is root node) 7

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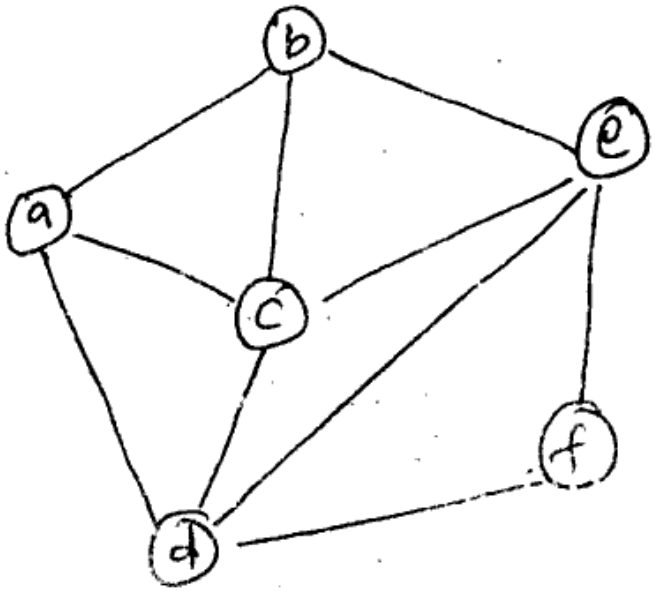

Unit-V

5. (a) Write two example for NP-complete problem. 2

(b) Solve 15-puzzle problem with an example of your own. 7

(c) Consider three items along with their respective weights and values as

$$I = \langle I_1, I_2, I_3 \rangle ; W = \langle 5, 4, 3 \rangle ; V \langle 6, 5, 4 \rangle$$

the Knapsack has the maximum capacity $W = 7$, using branch and bound technique, find out maximum possible value. 7

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