H-126

Total No. of Printed Pages:2

SUBJECT CODE NO: H-126
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (CSE/IT)
Design & Analysis of Algorithms
(OLD)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i) Q.1 & Q.6 are compulsory.
ii) Solve any two questions from the remaining each section.

SECTION A

Q.1 Solve any five questions: 10
a) Define an algorithm & write an algorithm for linear search.
b) What is performance measurement of an algorithm?
c) Explain any one tree traversal technique with an example.
d) Write any two characteristics of greedy method.
e) Explain space complexity.
f) What is job sequencing with deadline?

Q.2 a) Explain quick sort using the given data and comment on its time complexity 08
{50, 50, 60, 60, 40, 40, 30, 30, 20, 20}

b) Explain time complexity of binary search method in best, worst and average case for successful and unsuccessful search. 07

Q.3 a) Find an optimal placement for 13 programs on three tapes To, T1 & T2 where the programs are of lengths : {12, 5, 8, 32, 7, 5, 18, 26, 4, 3, 11, 10, 6} 08

b) Construct heap tree for following list of numbers. 07
20, 10, 30, 50, 60, 20, 35, 40, 50, 25, 80 & perform heap sort.

Q.4 a) Explain Strassen's matrix multiplications. 08
b) Explain optimal merge patterns. 07

Q.5 a) Explain Huffman coding with suitable example. 08
b) Write an algorithm to find smallest & largest number in an array. 07

SECTION B

Q.6 Solve <u>any five</u> questions: 10

a) Define multistage graph.
b) Define implicit & explain constraints.
c) What is branch & bound method?
d) State 8-queens problem.
e) Define chromatic number of a graph.
f) Explain dead-node and live-node.

Q.7 a) Determine optimal binary search tree for n=4, (a1, a2, a3, a4) = (do, if, int, while) 10
P(1:4) = (3,3,1,1) q(0:4) = (2,3,1,1,1)

b) Write an algorithm for all pairs shortest path problem. 05

Q.8 a) Solve 4-queries problem using backtracking method. 08

b) Write algorithm for single source shortest path. 07

Q.9 a) Explain multistage graph problem and write steps to solve it using dynamic programming. 08

b) Explain FIFO branch & bound with suitable example. 07

Q.10 a) Solve 15-puzzle problem using branch & bound. Initial arrangement is: 09

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & & 8 \\ 9 & 10 & 7 & 11 \\ 13 & 14 & 15 & 12 \end{bmatrix}$$

b) Explain graph coloring problem and its application. 06