

**CODE NO:- K-35**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**T.E.(CSE/IT) Examination Nov/Dec 2015**  
**Design & Analysis of Algorithms**  
**(Revised)**

[Time: Three Hours]

[Max. Marks: 80]

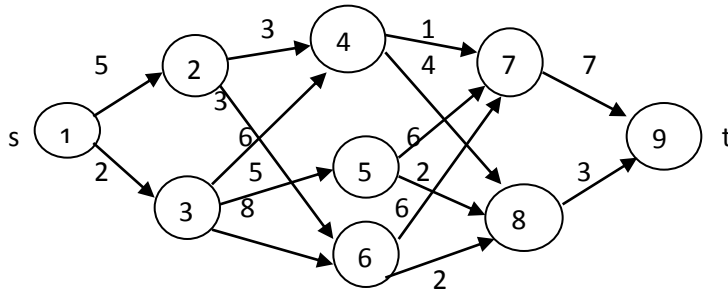
“Please check whether you have got the right question paper.”

N.B

- i) Q.No.1 and Q.No.6 are compulsory.  
 ii) Attempt any two questions from remaining questions

## SECTION-A

- |             |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |
|-------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Q.1         | Attempt <u>any five</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10 |
|             |                         | <ul style="list-style-type: none"> <li>a) Define an algorithm. Write characteristics of an algorithm.</li> <li>b) How is efficiency of an algorithm defined</li> <li>c) Explain greedy method.</li> <li>d) What is merge sort? Is insertion sort better than merge sort?</li> <li>e) Define feasible &amp; optimal solution</li> <li>f) What is minimum cost spanning tree</li> <li>g) What is job sequencing with deadline</li> </ul> |    |
| Q.2         |                         | <ul style="list-style-type: none"> <li>a) How to measure performance of an algorithm. Find time complexity of code;<br/>           For <math>i = 1</math> to <math>n</math> step 1 do<br/>             for <math>j = 1</math> to <math>n</math> step 1 do<br/>               <math>s(i, j) = a(i, j) + b(i, j)</math></li> </ul>                                                                                                       | 08 |
|             |                         | <ul style="list-style-type: none"> <li>b) What is searching? Explain binary search using divide &amp; conquer</li> </ul>                                                                                                                                                                                                                                                                                                               | 07 |
| Q.3         |                         | <ul style="list-style-type: none"> <li>a) Sort the given data using Quick sort<br/>35, 20, 25, 30, 15, 10, 40, 45</li> </ul>                                                                                                                                                                                                                                                                                                           | 08 |
|             |                         | <ul style="list-style-type: none"> <li>b) Write an algorithm to find maximum &amp; minimum item in a list using DNC</li> </ul>                                                                                                                                                                                                                                                                                                         | 07 |
| Q.4         |                         | <ul style="list-style-type: none"> <li>a) Write an algorithm to find single source shortest path</li> </ul>                                                                                                                                                                                                                                                                                                                            | 07 |
|             |                         | <ul style="list-style-type: none"> <li>b) Find optimal merge patterns for ten files whose lengths are: {28, 32, 12, 5, 84, 53, 91, 35, 3, 11}</li> </ul>                                                                                                                                                                                                                                                                               | 08 |
| Q.5         |                         | <ul style="list-style-type: none"> <li>a) Explain Huffman coding with an example</li> </ul>                                                                                                                                                                                                                                                                                                                                            | 07 |
|             |                         | <ul style="list-style-type: none"> <li>b) Find an optimal solution for knapsack instance <math>n = 7, m = 15</math><br/> <math>(P_1, P_2, P_3, P_4, P_5, P_6, P_7) = \{10, 5, 15, 7, 6, 18, 3\}</math><br/> <math>(w_1, w_2, w_3, w_4, w_5, w_6, w_7) = \{2, 3, 5, 7, 1, 4, 1\}</math></li> </ul>                                                                                                                                      | 08 |
| SECTION – B |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |
| Q.6         | Attempt <u>any five</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10 |
|             |                         | <ul style="list-style-type: none"> <li>a) What is difference between greedy method &amp; dynamic programming</li> <li>b) What is articulation point</li> <li>c) Explain implicit &amp; explicit constraints of backtracking</li> <li>d) What is Hamiltonian cycle</li> <li>e) Explain branch &amp; bound method.</li> <li>f) What are permutation &amp; subset problem</li> <li>g) Explain live, E &amp; dead node.</li> </ul>         |    |
| Q.7         |                         | <ul style="list-style-type: none"> <li>a) Find a minimum cost path from <math>s</math> to <math>t</math> in multistage graph given below.</li> </ul>                                                                                                                                                                                                                                                                                   | 10 |



b) Explain tree traversal methods 05

Q.8 a) Solve 4 – Queens problem using backtracking 08  
 b) Let  $w = \{5, 7, 10, 12, 15, 18, 20\}$   $m = 35$ . Solve sum of subsets & draw state space tree 07

Q.9 a) Determine optimal binary search tree for {char, int, float} where  $P(1:3) = (0.5, 0.1, 0.05)$   $q(0:4) = \{0.15, 0.1, .05, .05\}$  10

b) Explain graph coloring using backtracking 05

Q.10 a) Solve the travelling salesman problem defined by cost matrix: 10

$$\begin{bmatrix} \infty & 7 & 3 & 12 & 8 \\ 3 & \infty & 6 & 14 & 9 \\ 5 & 8 & \infty & 6 & 18 \\ 9 & 3 & 5 & \infty & 11 \\ 18 & 14 & 9 & 8 & \infty \end{bmatrix}$$

b) Explain Least cost branch & bound & search 05