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10CS43

Fourth Semester B.E. Degree Examination, June/July 2017
Design and Analysis of Algorithms

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Algorithm X (int N)
- ```
{
 int P = N ;
 for i ← 1 to N
 {
 print (“\n % d\t =\t % d = % d”, N, i, P) ;
 P = P + N ;
 }
}
```
- i) What does this algorithm compute?  
ii) What is the basic operation?  
iii) How many times the basic operation is executed?  
iv) What is the efficiency class of this algorithm? **(04 Marks)**
- b. Define the following and give one example for each :  
i)  $O$  – notation    ii)  $\Omega$  – notation    iii)  $\theta$  – notation. **(06 Marks)**
- c. Explain Brute Force method. Write a algorithm for selection sort method and apply it to the following list :  
66, 11, 35, 55, 44, 22. Compute time efficiency for average case. **(10 Marks)**
- 2 a. Explain Divide and conquer technique. **(04 Marks)**  
b. What is stable algorithm? Is quick sort stable? Explain with example. **(06 Marks)**  
c. Explain with example a sorting algorithm that uses divide and conquer technique which divides the problem size by considering position. Give the corresponding algorithm and analyze the worst case time complexity. **(10 Marks)**
- 3 a. Explain Greedy Method. What is knapsack problem? Write the algorithm to obtain optimal solution for the knapsack problem using Greedy method, Apply the algorithm for  $n = 3$ , capacity  $m = 20$ , values: 25, 24, 15 and weights: 18, 15, 10 respectively. **(10 Marks)**  
b. What is job sequencing with deadlines problem? Find the solution generated by job sequencing with deadlines problem for 7 jobs given profits: 3, 5, 20, 18, 1, 6, 30 and deadlines: 1, 3, 4, 3, 2, 1, 2 respectively. **(06 Marks)**  
c. Write an algorithm to find the minimum cost spanning tree using Kruskal’s method. Find minimum cost spanning tree using Kruskal’s method for the graph shown in Fig. Q3(c).

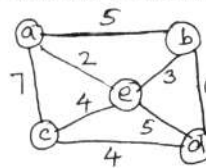


Fig. Q3(c)

**(04 Marks)**

