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Reg. No. :

**Question Paper Code : 75730**

5 Year M.Sc. DEGREE EXAMINATION, JANUARY 2014.

First Semester

Software Engineering

ESE 013 – PROBLEM SOLVING TECHNIQUES

(Regulation 2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name the important factors that affect the efficiency of algorithms.
2. What is redundant computation? Give an example code segment.
3. For comparing two adjacent elements in an array having 1 to n elements, the following two different logics can be used. State which one is better and why?
  - (a)  $\{i = 1; A[i] <> A[i + 1]\}$
  - (b)  $\{i = 2; A[i - 1] <> A[i]\}$
4. Give an algorithm for finding the GCD of two integers.
5. What is the disadvantage of Shell Sort? Which algorithm overcomes the disadvantage?
6. What is a Hash Search? Mention its advantage over binary search.
7. Distinguish between a static data structure and a dynamic data structure.
8. What is the difference between a stack and a queue?
9. State the important application of tree traversal algorithms.
10. What do you understand by "Binary Recursion"?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the various steps to be deployed in a top down design. (10)  
(ii) What is program verification? Discuss its salient features. (6)

Or

- (b) (i) Explain the impact of "Late Termination" with a suitable example. (5)  
(ii) List down the various characteristics that make a Good algorithm. (5)  
(iii) What do you understand by "Time and Space Complexity"? Explain in detail. (6)
12. (a) (i) Give an algorithm for histogramming and write a pseudo code for the same. (7)  
(ii) Design an algorithm to find the  $K^{\text{th}}$  smallest element in an unordered array and explain. (9)

Or

- (b) (i) Give an algorithm for partitioning a randomly ordered array into two arrays of ordered elements and explain briefly. (8)  
(ii) Give a recursive algorithm and an iterative algorithm for computing the fibonacci number and give a brief comparison of the two algorithms. (8)
13. (a) (i) Explain the two-way merge sort technique for merging two ordered arrays in ascending order. Also develop the corresponding algorithm. (8)  
(ii) Explain in detail the binary search. (8)

Or

- (b) (i) Explain the selection sort algorithm in detail with an example. (8)  
(ii) Design a procedure for "Right and left justifying" of a text without splitting the words and briefly explain. (8)
14. (a) (i) Design an algorithm for the push operation in a stack and explain. (8)  
(ii) Describe an algorithm for addition and deletion operations in a queue. (8)

Or

- (b) (i) Design a procedure for performing insertion and deletion on a linked list. (8)  
(ii) Develop a procedure for insertion of elements in a Binary tree (8)



15. (a) (i) Explain in detail the "In Order" Binary tree traversal algorithm. (9)
- (ii) Describe the main features of the recursive quick sort algorithm. (7)

Or

- (b) Describe the towers of Hanoi problem in detail. (16)
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