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Question Paper Code : 23497

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third Semester

Electrical and Electronics Engineering

EE 2204 — DATA STRUCTURES AND ALGORITHMS

(Common to Electronics and Instrumentation Engineering and
Instrumentation and Control Engineering)

(Regulations 2008)

(Also common to PTEE 2204 – Data Structures and Algorithms for B.E. (Part-Time)
– Second Semester – Electrical and Electronics Engineering – Regulations 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define an Abstract Data Type. Give an example.
2. What is the postfix form of the expression $A + B * (C - D) / (P - R)$?
3. What is a complete binary tree? Give an example.
4. Represent the infix expression $A + (B - C) * D / E$ as a binary tree.
5. What is the need for height balanced trees?
6. What is meant by collisions while hashing the data structures?
7. Define big O notation.
8. Differentiate between NP hard and NP complete problem.
9. What is dynamic programming? Give two examples.
10. Write down the significance of backtracking.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the different types of linked lists and its implementation.

Or

- (b) What are the different operations that can be performed in a queue? Explain in detail.

12. (a) (i) Discuss how a node could be inserted in a binary tree. (8)
(ii) Write a procedure in C to find, the K^{th} element in binary tree. (8)

Or

- (b) (i) Derive the expression tree for the expression $(a + b + c) + ((d * e + f) * g)$. Briefly explain the construction procedure for the above. (6)
(ii) Write routines to implement the basic binary search tree operations. (10)

13. (a) Develop an algorithm for constructing an AVL tree. Include routines for insertion and deletion. Illustrate the same with an example. (16)

Or

- (b) (i) What is a binary heap? Explain with an example. (4)
(ii) Explain closed hashing with an example. (12)

14. (a) (i) Explain how to find shortest path using Dijkstra's algorithm with an example. (10)
(ii) Explain the application of DFS. (6)

Or

- (b) (i) Write short notes on Biconnectivity. (8)
(ii) With an example explain the algorithm for Topological Sort of a graph. (8)

15. (a) Write an algorithm for basic operations on stack. Formulate an algorithm to check for balanced parenthesis.

Or

- (b) What is a max heap? Explain the steps involved in inserting elements into a heap with an example. Write an algorithm to insert an element into max heap.