2C8123

Roll No. _____ Total No. of Pages: 3

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MCA II - Sem. (Main) Exam., - 2022

MCA – 203 Data Structures

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. All five questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 List some common data structures.

Q.2 What is Circular Queues and how it is different from Normal Queue?

Q.3 What is an array? How it is represented in memory?

Q.4 What is the advantage of constructors?

Q.5 How to you test for an empty stack?

Q.6 What are the ways of implementing linked list?

Q.7 Define AVL tree.

Q.8 Give one application of hashing.

Q.9 What is complexity of linear and binary search?

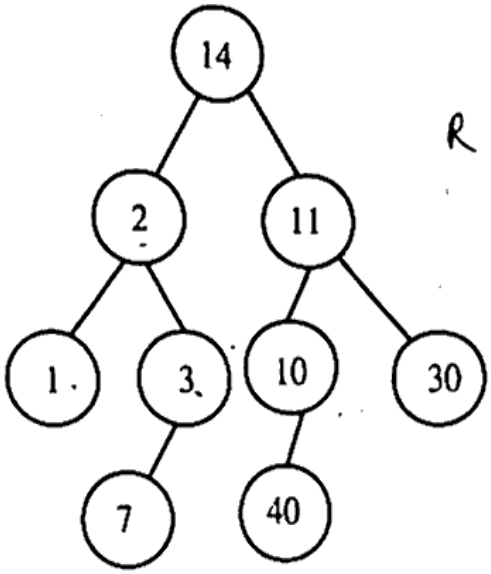
Q.10 Write a C/C++ program to reverse a linked list by traversing it only once.

PART – B

(Analytical/Problem solving questions) **[5×4=20]**

Attempt all five questions (Word limit 100)

Q.1 Here is the small binary tree -



What is the output obtained after pre-order, in-order and post-order traversal of the given tree?

Q.2 How can you represent multiple stack using array?

Q.3 Illustrate the insertion sort algorithm and bubble sort algorithm on input [30, 20, 10, 60, 70, 40]. https://www.rtuonline.com

Q.4 Give any two representation of graph. What do you mean by in-degree and out -degree of a graph?

Q.5 Trace the step involved in converting the given infix expression -

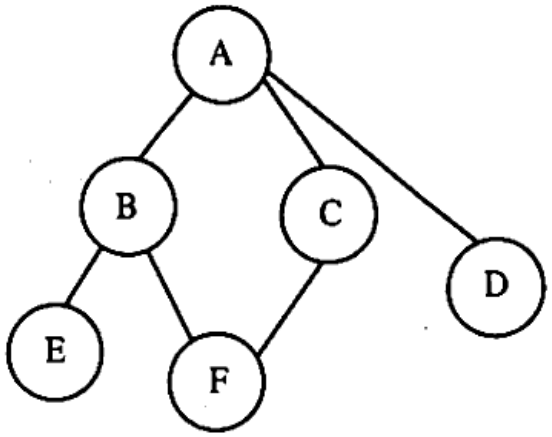
((A + B) ^ C) – ((C D* C)/F) to postfix expression.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 (a) Apply BFS and DFS on below graph.



(b) Explain adjacency matrix with the help of suitable example.

Q.2 Discuss various collision resolution techniques with suitable example.

Q.3 Write an algorithm for merge sort techniques? Illustrate with an example. Give its complexity.

Q.4 Give an algorithm to perform binary search, using the algorithm search for element 23 and 47 in the given sets of element [12, 23, 27, 35, 39, 42, 50].

Q.5 Using array to implement the Queue structure, write algorithm program to –

(a) Insert an element in the Queue

(b) Delete an element in the Queue
