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3E1463

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B. Tech. (Sem. III) (Reback) Examination, January - 2013
Data Structures & Algorithms
(Common for Comp. Engg., IT & EX)

Time : 3 Hours] [Total Marks : 80
[Min. Passing Marks : 24

Attempt overall five questions in all. Selecting one question from each unit. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

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

1. Nil 2. Nil

UNIT - I

1 (a) What do you understand by complexity of a algorithm ? Explain space-time complexity with example. 6

(b) A 3 dimentional array INFO is declared using INFO (2:8, –4:1, 6:10) and the no. of words per memory cell is 4. Find the address of element INFO [5, –1, 8] when :
(i) Elements are stored in Row-major order.
(ii) Elements are stored in colomn - major order.
Assume base address is 200. 10

OR

2 (a) Write a algorithm which removes first element of a list and add it to the end of linked list without changing information part. 8

(b) Explain grounded and circular Header linked lists with example. 4

(c) How does linked lists are used in functional programming ? 4

UNIT - II

3 (a) Write the algorithm for converting a Infix expression into Postfix expression. Explain your algorithm with example. 10

(b) Write all the movements involved in the solution of Tower of Hanoi Problem for 4 disks. 6

OR

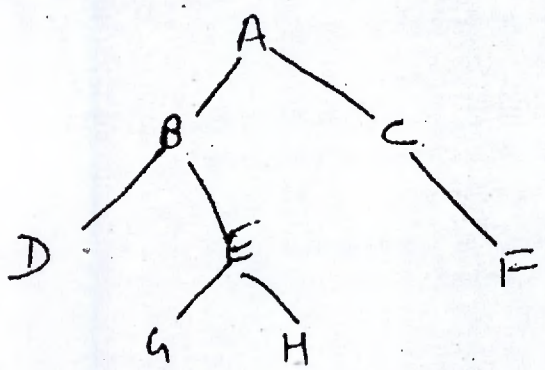
4 (a) Explain priority queues and its application. What are various ways to represent priority queue in memory ? 10

(b) Differentiate deque, enque and bounded queue with example. 6

UNIT - III

5 (a) Compare full and complete Binary trees and also explain the formula for calculation of depth in both cases. 8

(b) Consider following tree :



Find the preorder, inorder and postorder traversals of tree. 8

OR

6 (a) How does B+ trees are different from B trees ? What are various applications of these trees ? 8

(b) Explain in detail :

(i) Forest

(ii) Trie

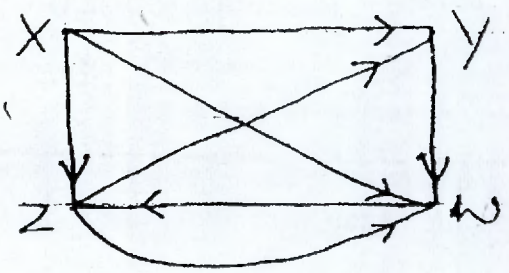
(iii) Dictionary

(iv) Pruning.

2×4=8

UNIT - IV

7 (a) Consider following graph :



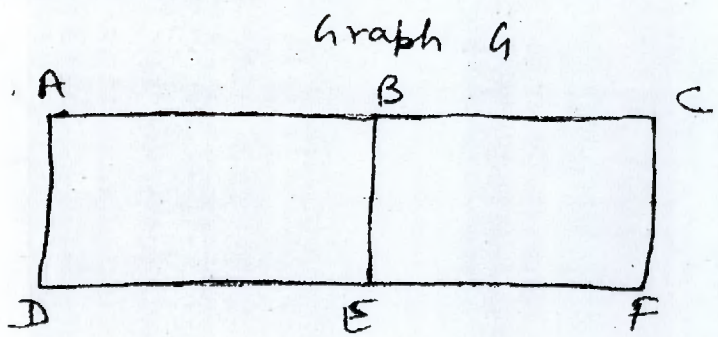
(i) Find the adjacency matrix A of graph.

(ii) Find the path matrix P of graph using powers of the adjacency matrix A.

(iii) Is G strongly connected ?

2+6+2=10

(b) Consider the graph G given below and find various spanning trees of this graph G :



6

OR

8 Write Dijkstra's algorithm. Explain it with example.

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UNIT - V

9 (a) Suppose the array A contains 14 elements as :
66, 33, 40, 22, 55, 88, 60, 11, 80, 20, 50, 44, 77, 30
Sort the above array A using Quick sort write the values of array A after each and energy step. 10

(b) What is the need of symbol table and how does it is stored ? 6

OR

10 (a) How does hashing improves the performance of searching ? Explain various methods of collision Resolution with example. 8

(b) Construct a heap H from given list of numbers :
44, 30, 50, 22, 60, 55, 77, 55
Also sort the above list using heap sort algorithm. 8