

Seat No:

MIT ACADEMY OF ENGINEERING

Course Code : CS201

August- 2017

S. Y. B. Tech Examination

Semester – III

Cycle – I

End Course Examination

COMPUTER ENGINEERING

DATA AND FILE STRUCTURES

Time: 3 Hours

Max. Marks : 100

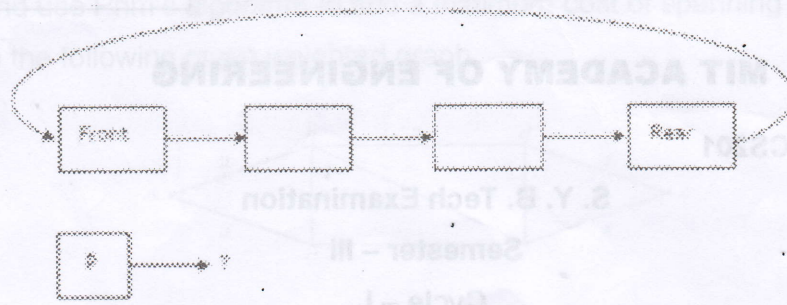
Total No. of Questions: 07

Total No. of Printed Pages: 04

Instruction to Candidates:

1. Assume suitable data wherever necessary
2. Non programmable scientific calculators are allowed
3. Black figures to the right indicate full marks

- 1 (a) Write pseudo-code to find the largest element in a matrix of order $N \times N$ and analyze its time complexity. [5] CO-1 L2
- (b) In a post office, postal worker alone serves a single queue of customers. Every customer receives a token as soon as he/she enters a queue. After the service the token is returned to the postal worker and customer leaves the queue. Suggest an abstract data type solution to him for arrival and departure of customers after the service completion. [5] CO-1 L3
- 2 (a) A circularly linked list is used to represent a Queue. A single variable p is used to access the Queue. To which node should p point such that both the operations $enQueue$ and $deQueue$ can be performed in constant time? [2] CO-1 L2



- (b) Write an algorithm to insert a new node at end of the circular singly linked list. [6] CO-2 L2
- (c) Ozone Row housing society has started ozone health club. Owners of the society can be granted membership on request. Write C++ program to accept and display club member's information using singly linked list. [6] CO-3 L3
- 3 (a) Consider following operations performed on a stack of size 5. [3] CO-1 L3
- ```

Push(1);
Pop();
Push(2);
Push(3);
Pop();
Push(4);
Pop();
Pop();
Push(5);

```
- Draw pictorial representation of the operations and how many number of elements are present on stack after completion of all operations?
- (b) Develop an algorithm for deleting first N elements from the given linked queue named as P. [6] CO-2 L2
- (c) Evaluate the following given postfix expression using stack and [7] CO-3 L3



represent pictorially the content of stack at each step of evaluation.  $10\ 2\ 8\ * + 3 -$

- 4 (a) Specify which of the following order the tree should be traversed [3] CO-1 L3  
In order to get the information stored in a Binary Search Tree in the descending order.

- (i) left, root, right
- (ii) root, left, right
- (iii) right, root, left
- (iv) right, left, root

- (b) Show pictorially the building of AVL tree for the following [6] CO-2 L2  
sequence of data keys, the balancing factor of all the nodes and name the type of rotation used for balancing the tree.

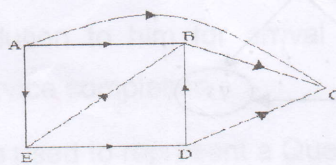
A, W, B, X, C, Y, D, Z

- (c) Make a BST for the following sequence of elements and traverse [7] CO-3 L3  
the tree in Preorder, In-order and Post-order.

55, 46, 66, 33, 79, 105, 98, 39

- 5 (a) Show with an example, in any undirected graph, the sum of the [2] CO-1 L2  
degrees of all nodes is twice the number of edges.

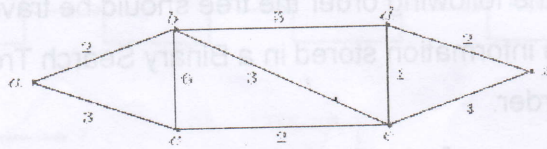
- (b) Represent the following graph using adjacency matrix and [5] CO-2 L2  
adjacency list.



- (c) Write pseudo-code for finding the minimum cost of spanning tree [7] CO-3 L3



and use Prim's algorithm to find a minimum cost of spanning tree in the following given weighted graph



- 6 (a) Classify the file organization with an example for each. [4] CO-4 L3
- (b) Sort the following sequence of elements using quick sort. [4] CO-4 L3  
34, 14, 41, 2, 68, 8, 31, 21
- (c) Given the input as sequence of elements 5381, 1323, 5173, 5199, 8344, 9999 and hash function as  $h(X) = X \bmod 10$ , show the result for the following. [7] CO-4 L3
- i) Open addressing hash table using linear probing
- ii) Open addressing hash table using quadratic probing
- 7 (a) Sort the following sequence of elements using selection sort and show the content of array after every pass. [6] CO-2 L2  
46, 57, 82, 38, 90, 64
- (b) Justify how garbage collection helps in memory management. [4] CO-3 L2
- (c) Find the topological sorting order for the following given graph. [5] CO-4 L2

