Course Code: MCA-102	Course Name: Data and File Structures

Class Test - II

Time: 1 Hour   Max Marks: 20

A. *State true or false.*   *(0.5×5 = 2.5)*

(1)   A data structure refers to an arrangement of data in a computer's disk. [True] [False]

(2)   In max priority queue, elements are inserted in the order in which they arrive into the queue and always maximum value is removed first from the queue. [True] [False]

(3)   B-tree is a self-balancing tree. [True] [False]

(4)   Binary search algorithm works on the principle of divide and conquer. [True] [False].

(5)   The records of a sequential file can also be accessed at random. [True] [False]

B. *Fill in the blanks with appropriate answer.*   *(0.5×5 = 2.5)*

(1)   For real-time applications, we prefer … …. … … case analysis of an algorithm.

(2)   A tree which makes use of NULL pointer to improve its traversal processes is called … … … … … … …

(3)   The idea of threaded binary tree is to make … …. … … … traversal faster and do it without recursion.

(4)   … … … … … algorithm is used to find all pair shortest path in a graph.

(5)   In cyclic redundancy check, the dataword is augmented by adding … … … 0's to right hand side of word.

C. *Choose the correct option.*   *(0.5×10 = 5)*

(1)   How many pointers need to be modified in deleting an element from a specific location of a doubly linked list?
   a)   1
   b)   2
   c)   3
   d)   4

(2) In how many ways a tree could be traversed?
   a) 1
   b) 2
   c) 3
   d) 4

(3) If a tree becomes unbalanced, when a node is inserted into the right subtree of the right subtree, then we perform
   a) single right rotation
   b) double right rotation
   c) single left rotation
   d) double right rotation

(4) What is a hash function?
   a) A function has allocated memory to keys
   b) A function that computes the location of the key in the array
   c) A function that creates an array
   d) None of the mentioned

(5) The activities of the critical path are termed as critical activities, because they
   a) represent the maximum project completion time
   b) represent the most expense in terms of resource
   c) cannot tolerate any delay in completion
   d) represent the most complex activities of the project

(6) Which of the following data structures is implemented to traverse a graph using depth first search?
   a) Queue
   b) Stack
   c) Heap
   d) None of the above

(7) Which of the following graph traversal starts at the root (selecting some arbitrary node as the root) and explores as far as possible along each branch before backtracking?
   a) Breadth first search
   b) Depth first search
   c) In-order
   d) Pre-order

(8) Which of the following algorithms is used to find the minimum cost spanning tree?
   a) Dijkstra
   b) Prim
   c) Warshall
   d) None of the above

(9) Which of the following is an external sorting?
    a) Insertion sort
    b) Bubble sort
    c) Merge sort
    d) Tree sort

(10) Which of the following sorting algorithms follows divide and conquer principle?
    a) Bubble sort
    b) Insertion sort
    c) Quick sort
    d) Merge sort

D. *Answer the following questions.*   *(2×5 = 10)*

(1) Discuss the characteristics of an algorithm. List common growth rate functions.

(2) Identify the limitations of a linear queue? How these limitations are resolved.

(3) Compare B-tree with binary search tree.

(4) Apply Prim's algorithm to construct the minimum cost spanning tree for the following graph:
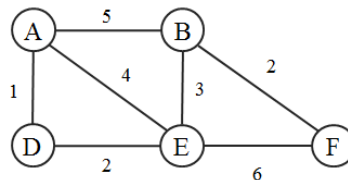
(5) Determine the codeword for following data using cyclic redundancy check approach:
    Dataword: 1 0 0 1 0 0
    Divisor: 1 1 0 1