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10MT65

**Sixth Semester B.E. Degree Examination, June/July 2019**  
**Advanced Computer Programming**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting atleast TWO questions from each part.**

**PART – A**

- 1 a. With examples, explain the concept of dynamic memory allocation and de-allocation in C++. (07 Marks)
- b. For the formula based representation of linear list, write the member function for the following operations:  
i) Search an element in the linear list    ii) Insert an element into the linear list (06 Marks)
- c. What is a recursive function? Write a C++ program to display the factorial of a given number using recursive function. (07 Marks)
- 2 a. Write a C++ class to represent a  $n \times n$  diagonal matrix consisting of constructor, destructor, member function to store a value 'x' in  $(i, j)^{\text{th}}$  location and a member function to retrieve an  $(i, j)^{\text{th}}$  value. (10 Marks)
- b. What is a sparse matrix? Write a C++ function to find the transpose of a sparse matrix. (10 Marks)
- 3 a. What is a stack? Define a class for the customized version of stack. (10 Marks)
- b. Develop a C++ code to match the left and right parentheses in a character string using stack. (10 Marks)
- 4 a. What is queue? List the different types of queues. Write code for push and pop for queue. (10 Marks)
- b. Explain detail railroad car rearrangement application of queue. (10 Marks)

**PART – B**

- 5 a. What is dictionary? What are the operations of dictionary? (04 Marks)
- b. Write code for converting a 3 character string to a long integer. (06 Marks)
- c. Write note on hash table representation. (10 Marks)
- 6 a. Draw the tree expressions :  
i)  $((-a) + (x + y)) / ((+b) * (c * a))$     ii)  $((a + b) + c) + d$     iii)  $(a * b) + (c / d)$ . (06 Marks)
- b. Construct the preorder and post order for the expression :  
i)  $a * b + c / d$     ii)  $a + b + c + d$     iii)  $-a + x + y / + b * c * a$ . (06 Marks)
- c. Write code for height of binary tree. (08 Marks)
- 7 a. Write a program for implementation of a binary tree (10 Marks)
- b. Construct binary expression trees for the following expressions :  
 $((p + q) + r) + s$     ii)  $\frac{((+p) + (x - y))}{((-q) * (r * p))}$  (06 Marks)
- c. State the Abstract data types binary tree. (04 Marks)
- 8 a. Define and explain priority queue and its functioning. (06 Marks)
- b. Define heap. Explain insertion and deletion on a max heap. (08 Marks)
- c. Give the Abstract Data type specification of binary search tree. (06 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg,  $42+8 = 50$ , will be treated as malpractice.