B.Sc. (Part-II) (CBCS Pattern) Semester - IV
USCST07 - Computer Science Paper-I (Algorithm & Data Structures)

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Notes : 1. All questions are compulsory and carry equal marks.
2. Draw neat & clean diagram wherever necessary.
3. Avoid vague answers and write answer relevant and specific to questions only.

Either:

1. a) Write an algorithm for bubble sort. **5**

b) Convert following infix expression into prefix expression. **5**

   i) $((A*B)/(C*D))\uparrow(E+F*G)$

   ii) $A*(B\uparrow C)/(D\uparrow(E*F)/G)$

OR

c) Write an algorithm for selection sort. **5**

d) Convert following infix notation into postfix notation. **5**

   i) $(A+B*C-D)/((E\uparrow F)+G)$

   ii) $(A+B+(C/D))/(E+F-G)$

Either:

2. a) Explain the concept of Queue with suitable example. **5**

b) Write a recursive function to calculate power of a given number. **5**

OR

c) Define circular queue and priority queue. Also explain overflow and underflow conditions in queue. **5**

d) Write an algorithm to insert an element into a queue. **5**

Either:

3. a) What is linked list? Give representation of linked list also explain any two operation on linked list. **5**

b) Write an algorithm to insert node in a linked list at first position. **5**

OR

c) How will you remove a node from a linked list. Explain with suitable example. **5**

d) Write a note on- **5**

    i) Double link list

    ii) Available or free list

Either:

4. a) Write an algorithm for inorder traversal of binary tree. **5**

b) Explain the terms- **5**
    i) Directed graph   ii) Complete graph
    iii) Indegree   iv) Source
    v) Sink

OR

c) Write a note on- **5**
    i) Binary tree   ii) Binary search tree

d) Write an algorithm for preorder traversal of binary tree. **5**

5. Attempt all the questions.

    a) List the application of stack. **2½**

    b) Write recursive algorithm to find factorial of given number. **2½**

    c) Discuss advantages and disadvantages of linked list over array. **2½**

    d) Write about sequential Representation of graph. **2½**

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