# UBCAT403 - Paper-III : Algorithm and Data Structures

P. Pages : 2                                                                 **GUG/S/23/11977**

Time : Three Hours                 ‖‖‖‖‖‖‖‖‖‖ *2023*                 Max. Marks : 40

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Notes :  1.   All questions are compulsory and carry equal marks.
2.   Draw neat and labelled diagram and use supporting data wherever necessary.
3.   Avoid vague answer and write specific answer related to question.

**Either:**

**1.** a)  Write an algorithm to find factorial of a number using recursion.          **4**

b)  Give the advantages and disadvantages of recursion.                      **4**

**OR**

c)  Explain row major form and column major form in two dimensional array.   **4**

d)  Write an algorithm to find power of a number using recursion.            **4**

**Either:**

**2.** a)  Explain the concept of circular queue in detail.                          **4**

b)  Write an algorithm to push an element in a stack at $K^{th}$ position.    **4**

**OR**

c)  Write a note on following with example.                                   **4**

  i)   Prefix notation.

  ii)  Postfix notation.

d)  Write an algorithm to remove element from a queue.                        **4**

**Either:**

**3.** a)  Give the memory representation of linked list.                            **4**

b)  List and explain various operations on linked list in short.             **4**

**OR**

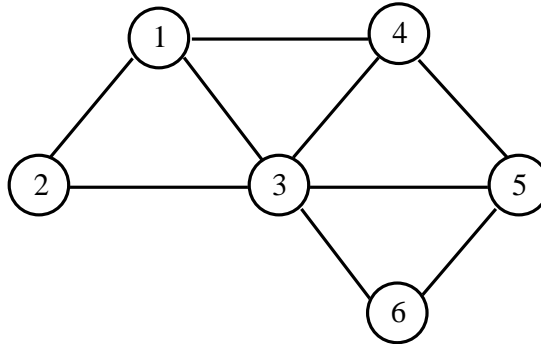c)  What is garbage collection? Explain.                                      **4**

d)  Write an algorithm to insert an item in a linked list.                    **4**

**Either:**

**4.** a) List and explain any eight terminology related to graph. **4**

b) Write a note on array representation of binary tree. **4**

**OR**

c) Write an algorithm to traverse a tree in In-order. **4**

d) What is spanning Tree? Find any three spanning tree for the following graph. **4**



**5.** Solve **all** the questions.

a) List & explain various operations on data structure. **2**

b) Explain the concept of Deque in detail. **2**

c) Define linked list. **2**

d) What is digraph. Define path also. **2**

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