SSB

Seat No. [ ]

MIT ACADEMY OF ENGINEERING

Course Code : CS201 July 2017

S. Y. B. Tech Examination
Semester – III
In Course Examination
Cycle - I
DATA AND FILE STRUCTURES

Time: 2 Hours **Max. Marks : 50**

Total No. of Questions: 5 ***Total No. of Printed Pages: 2***

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 the frequency count of the following code and derive the time complexity. **[4]** **CO-1** **L3**

```
for (i = n-1; i>0; i--)
  for(j=0; j<i; j++)
   if (a[i] < a[i+1])
   {
      temp = a[i];
      a[i] = a[i+1];
      a[i+1] = temp;
   }
```

(b) Change the following infix to postfix using stack. Clearly indicate the contents of stack: **[6]** **CO-1** **L3**

i) (A + B) * C - D * F + C

ii) (A - 2) * (B + C - D * E) * F

2 (a) A single linked list is given containing any type of data, Write an algorithm to obtain reverse ordering of the data. **[6]** **CO-1** **L3**

(b) Specify which of the following application would be suitable for a First-in-First-out queue and justify your answer: **[4]** **CO-1** **L3**

i) A program to keep track of patients as they check into a clinic, assigning them to doctors on First come First basis.

ii) An inventory of parts is to be processed by part number.

iii) A dictionary of words used by spelling checker is to be created.

3 **(a)** Consider parts a singly linked list having n nodes. The data items d1, d2, ..., dn are stored in the n nodes. Let Y be a pointer to the jth node ($1 \leq j \leq n$) in which dj is stored. A new data item d stored in a node with address Y is to be inserted. Give an algorithm to **insert** d into the list to obtain a list having items d1, d2, ..., dj-1, d, dj, ...dn in that order without using the header. **[10] CO-2 L3**

4 **(a)** A multiplication table is matrix of order m × n where an entry in i-th row and j-th column is the product x × y, where x and y are numbers in i-th row and j-th column respectively. Figure shows a multiplication table from 3 to 6. **[10] CO-2 L3**

	3	4	5	6
3	9	12	15	18
4	12	16	20	24
5	15	20	25	30
6	18	24	30	36

Write an algorithm to display multiplication table from x to y.

5 **(a)** Suppose a queue is maintained by circular array CQUEUE with N = 10 memory cells. Find the number of elements in CQUEUE if **[4] CO-1 L3**

(a) FRONT = 4, REAR = 8;

(b) FRONT = 9, REAR = 3 (c) FRONT = 5, REAR = 6 and then 2 elements are deleted.

(b) Write a function in C++ to insert an element into a dynamically allocated Queue where each node contains a name (of type string) as data. **[6] CO-3 L3**