

**BACHELOR OF COMPUTER APPLICATIONS  
(BCA) (Pre-Revised)**

**Term-End Examination**

00573

**December, 2018**

**CS-62 : 'C' PROGRAMMING AND DATA  
STRUCTURES**

*Time : 2 hours*

*Maximum Marks : 60*

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*Note : Question number 1 is compulsory. Answer any three questions from the rest. All algorithms should be written nearer to 'C' language syntax.*

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1. (a) What is a sparse matrix ? Explain row-major order and column-major order with an example. 8
- (b) Draw binary tree which denotes the following algebraic expression :  
$$[a + (b - d)] \times [(c - e) / (f + g - h)]$$
  
Also, convert it into prefix expression using traversal. 8
- (c) Differentiate between FIFO and LIFO. Also, write one application each of stack and queue data structures. 6

- (d) Write an algorithm which accepts two-dimensional array ( $m \times m$ ) as input and gives output as  $(2, m)$  array. The elements of 1<sup>st</sup> row should be the sum of elements of  $m$  rows and elements of 2<sup>nd</sup> row should be the sum of  $m$  columns. 8
2. (a) Write an algorithm which merges two sorted singly linked lists into a new sorted list. 6
- (b) Write a recursive function to calculate the 'GCD' of two numbers. 4
3. (a) Differentiate between internal and external sorting. Which sorting algorithm is preferred for external sorting? 4
- (b) How can array elements be accessed using pointers in C? Give example. 3
- (c) Write an algorithm for merge sort. 3
4. (a) Is there any difference between string and character array? If yes, write the differences. Write an algorithm to copy a string to another string at its end, without using library functions. 7
- (b) Explain indexed-sequential file organisation. 3

**5. Write short notes on the following :**

$$4 \times 2 \frac{1}{2} = 10$$

- (a) Bubble Sort
  - (b) Directed Graph
  - (c) Height Balanced Tree
  - (d) Circular Queue
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