Roll No. ...........................

# BCA–102(N)

## B. C. A. (First Semester)
## EXAMINATION, Dec., 2013

(New Course)

Paper Second

PROGRAMMING PRINCIPLE AND ALGORITHM

Time : Three Hours ]                    [ Maximum Marks : 75

Note : Section A is compulsory. Attempt any *eight* questions from Section B and *one* question from Section C.

### Section—A                                      15

(Numerical/Analytical/Problematic Questions)

1. (a) Indicate the most appropriate answer.

   (i) The library function exit() causes an exit from :

   (a) the loop in which it occurs

   (b) the block in which it occurs

   (c) the function in which occurs

   (d) None of the above

   (ii) A pointer is :

   (a) address of a variable

   (b) an indication of the variable to the accessed next

(c) a variable for storing addresses

(d) None of the above

(iii) A relational operator :

(a) assigns one operand to another

(b) yields a Boolean result

(c) logically combines two operands

(d) None of the above

(iv) Arrays cannot be initialized if they are :

(a) Automatic

(b) External

(c) Static

(d) None of the above

(v) A collection of recursive function is executed in a :

(a) Last in first out order

(b) First in first out order

(c) Parallel fashion

(d) None of the above

(vi) When a multidimensional array is accessed each array index is :

(a) Separated by commas

(b) Surrounded by brackets and separated by commas

(c) Surrounded by brackets

(d) None of the above

(b) Draw a flowchart that generates the Fibonacci series. The first two numbers should be 0 and 1, and last number should be 89.

(c) What is a header file ? What are the advantages of using header file ?

(d) Distinguish between call-by-value and call-by-reference.

(e) Explain the following :

(i) Time complexity

(ii) Big-oh notation

## Section—B

### (Short Answer Type Questions)

6 each

2. What is Recursion ? What are the advantages and disadvantages of recursion ?

3. What do you understand by Algorithm ? Write down the important features of an algorithm.

4. Write a C program which will find and print all three digit numbers which are equal to the sum of the cubes of their digits. For example $(153 = 1^3 + 5^3 + 3^3)$.

5. Draw a flowchart to depict the logic of finding the largest of three numbers.

6. Draw a flowchart and write a C program to calculate the factorial of a given number N.

7. Describe the data type in C. Differentiate single precision real data type and character data type.

8. What is Operators ? Explain the following operators :

(i) Arithmetic

(ii) Relational

(iii) Miscellaneous

(iv) Bitwise

9. What are functions ? Write the syntax rules of specifying a function in C.

10. What do you understand by Array ? Distinguish between single and multidimensional array.

11. What are the advantages of writing the Pseudo-code before writing a program. Explain with the help of a suitable example.

12. Shown below is a Floyd's triangle :

```
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
16 17 18 19 20 21
```

Write a program in C to print this triangle.

13. Explain the following :

　(i)　C character set

　(ii)　Keywords in C

　(iii)　Identifiers

14. Explain the following :

　(i)　Switch statement

　(ii)　Nested IF statement

　(iii)　Do while statement

## Section—C

## (Long Answer Type Questions)　　12 each

15. (a)　The sine of X can be calculated approximately by summing the first $n$ terms of the following infinite series :

$$\sin x = X - \frac{x^3}{|3} + \frac{x^5}{|5} - \frac{x^7}{|7} + \frac{x^9}{|9} - \dots \dots$$

(b)　Write a C program with nested if else, that will print different messages at different times of the day. The message to be printed are :

| 12 Midnight | 12 Noon | Good Morning |
| 12 Noon | 4 p.m. | Good Afternoon |
| 4 p.m. | 7 p.m. | Good Evening |
| 7 p.m. | 12 Midnight | Good Night |

else

"Time Invalid"

(c)　Write a C program to read 12 integers from keyboard and print the sum of even and odd numbers.

16. (a)　What is meant by Pointer ? Write down the use of Pointer. Explain the following :

　(i)　Pointer and function

　(ii)　Pointer and array

　(iii)　Pointer and string

(b)　Describe the variable. Distinguish between global and local variable.

(c)　What is the concept of problem solving ? Explain the following problem solving techniques :

　(i)　Trial and error

　(ii)　Brain storming

　(iii)　Divide and conquer