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

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(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.

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(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 6 each

(Short Answer Type Questions)

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 algorithms.
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 12 each

(Long Answer Type Questions)

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

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

(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