Code: CS11   **Subject: COMP. PROG. & PROBLEM SOLVING THROUGH C**

ALCCS – OLD SCHEME

Time: 3 Hours   **AUGUST 2013**   **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:
- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

Q.1   a. Consider the C program shown below:
#include <stdio.h>

main()
{

  int sum = 50;
  float modulus;
  modulus = sum % 10;
  printf("The %% of %d by 10 is %f\n", sum, modulus);
}
Write the output of the above program.

 b. Differentiate between Interpreted and Compiled Languages. Which category C language belongs to?

 c. The array DATA [10, 15] is stored in memory in 'Row - Major order'. If base address is 200 and element size is 1. Calculate the address of element DATA [7, 12].

 d. Differentiate between Depth-first search and Breadth-first search of a graph.

 e. Write a module to find the height of Binary Tree.

 f. Differentiate between recursion and iteration giving suitable example for each.

 g. Differentiate between Run-time and Logical errors giving suitable example.   **(7×4)**

Q.2   a. Write a C program to calculate the standard deviation of an array of values. The array elements are read from the terminal.   **(9)**

 b. Write a program to copy input to output, replacing each string of one or more blanks by a single blank.   **(9)**

Q.3   a. Differentiate between local and global variable. Write a C program to illustrate the effect of global variable on the output of a program.   **(6)**

b. Write a C program that reverses a number that is entered by the user by making use of Do-while loop. How is this looping technique different from while loop?   **(7)**

c. Explain with the help of a suitable example the use of structures with pointers.   **(5)**

Q.4   a. Consider a linked list to store a polynomial, that is, every node of the linked list has coefficient, exponent and pointer to the next node in the list.
(i) Define a structure for node of such a list.
(ii)Write a function to subtract two such polynomials. The function should accept pointers to the two polynomials as arguments and return the pointer to the resultant polynomial. Assume that the polynomials passed to the function are in decreasing order on the exponents.   **(12)**

b. Differentiate between White Box and Black Box Testing and also explain Path testing.   **(6)**

Q.5   a. Explain the following operators with the help of examples:
(i)   Conditional operator   (ii) Sizeof operator
(iii) Increment operator   (iv) Cast operator   **(12)**

b. What is the output of the following programs? Explain the output.   **(6)**
(i) *#include <stdio.h>*
```
main()
{
        int  value1 = 2, value2 = 4;

        value1 ^= value2;
        value2 ^= value1;
        value1 ^= value2;
        printf("Value1 = %d, Value2 = %d\n", value1, value2);
}
```

(ii) *#include <stdio.h>*
```
main()
{
        int  n1 = 10, n2 = 20, i = 0;

        i = n2 << 4;  /* n2 shifted left four times */
        printf("%d\n", i);
        i = n1 >> 5;  /* n1 shifted right five times */
        printf("%d\n", i);
}
```

Q.6   a. Write a program that accepts the source and destination filenames from the command line and copy the file from source to destination. . Include a check on the number of arguments passed.   **(8)**

b. What are preprocessor directives? List three types of them. What is the difference between the following directives: #include <filename> and #include "filename"?   **(6)**

c. How does an 'enum' statement differ from a 'typedef' statement?   **(4)**

Q.7   a. What is bubble sort? Write a program to sort a list of n elements in an array using bubble sort. Calculate the best and worst case efficiency of bubble sort.   **(10)**

b. List any eight commonly found programming errors in a C program.   **(8)**