Subject: C & DATA STRUCTURES

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

DECEMBER 2010

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after half an hour of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer FIVE Questions, selecting at least TWO questions from each part. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. The operators << and >> are

(A) Assignment operator **(B)** Relational operator
(C) Logical operator **(D)** Bitwise shift operator

b. In an undirected graph of 'n' vertices and 'e' edges, the sum of degree of all vertices is

(A) n+e **(B)** 2e
(C) 3e **(D)** e

c. What will be the value of strlen(s) and sizeof(s) after execution of following code segment?

```
main( ) {
    char    s[10];
    strcpy(s, "abc");
    }
```

(A) 3 11 **(B)** 4 10
(C) 3 10 **(D)** 4 11

d. What will be printed on calling CUBE(4+5) when macro CUBE is defined as
#define CUBE(x) (x * x * x)

(A) 64 **(B)** 49
(C) 729 **(D)** 169

e. What is printed on executing following instructions?

```
int  z,x=5,y=-10, a=4,b=2;
z=x++ - --y * b /a;
printf(z);
```

(A) 5 **(B)** 6
(C) 11 **(D)** 10

f. What value does a[2][1][0] contain if you have
int a[3][2][2]={1,2,3,4,5,6,7,8,9,10,11,12}

(A) 3 **(B)** 11
(C) 5 **(D)** 9

g. The statement used to terminate the control from the loop is

(A) goto **(B)** continue
(C) break **(D)** exit

h. What will be output of following code segment?
int x=0;
for(x=1;x<4;x++);
printf(x);
(A) 5 **(B)** 4
(C) 3 **(D)** 1

i. Which of the following data structure may give overflow error, even though the current number of elements in it, is less than its size

(A) simple queue **(B)** Circular queue
(C) Stack **(D)** none of these

j. Which of the following numerical value is an invalid constant?

(A) .75 **(B)** 9.3e2
(C) 27,512 **(D)** 12345

PART (A)
Answer at least any TWO Questions. Each question carries 16 marks.

Q.2 a. What are bitwise logical operators? **(4)**

b. Write a brief note on conditional expression giving suitable example. **(4)**

c. Write a function to display a binary number corresponding to an integer passed to it as an argument. **(8)**

Q.3 a. Write notes on the following giving suitable examples:
(i) While and Do-while (ii) Break and continue **(8)**

b. Write a program that uses **switch** statement. Write the same program using **if..else** statements in place of **switch** statement. **(8)**

Q.4 a. What is an array? Write a C program to multiply two matrices for 2-dimensional matrices multiplication. **(8)**

b. What is a function? Discuss various advantages of using functions in C language. **(4)**

c. What are various ways of passing parameters in C language?

Q.5 a. Differentiate between structure and union, using suitable examples. **(6)**

b. Write a C program to test whether a given string is palindrome. **(10)**

PART (B)

Answer at least any TWO Questions. Each question carries 16 marks.

Q.6 a. Write a C function for Bubble sort any dry run the code to sort the following data:
11 15 2 13 6 **(8)**

b. Write Binary search algorithm and list its advantages and disadvantages over sequential search. What is the best and the worst case time complexity of binary search? **(8)**

Q.7 a. Write a function to delete a specified node from linked list. **(6)**

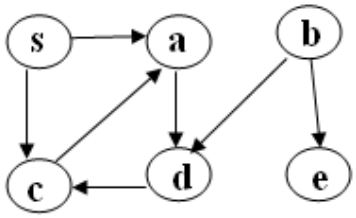
b. Write an algorithm to evaluate a postfix expression. **(6)**

c. Convert the expression A * (B + D) / E – F * (G + H / K) into postfix expression. **(4)**

Q.8 a. What is a binary search tree? Write an algorithm to insert an element k into a Binary search tree. **(8)**

b. A binary tree T has 10 nodes. The inorder and preorder traversals of T yield the following sequence of nodes:
Inorder: D B H E A I F J C G
Preorder: A B D E H C F I J G
Draw the tree T. **(8)**

Q.9 a. Apply the depth-first-search algorithm on the following graph and mark the node in the order it is visited. **(7)**



b. What are various ways of representing a graph? Give various representation of the following graph: **(9)**