Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech. Make Up

Branch	**: CSE/ECE/EEE**	**Semester**	**: Ist**
Title of the Course	**: Problem Solving & Computer Programming**	**Course Code**	**: CSB101**

Time: 3 Hours **Maximum Marks: 50**

Note : All sections are compulsory. Calculators not allowed.

Section A

Carry only one (01) question of 10 parts of 01 mark each and all parts are compulsory.

1. Which header file is used for dynamic memory allocation?
2. Is it necessary to typecast the address returned by *malloc()*?
3. What does the following declaration mean?
   int (*ptr)[10];
4. In C, if you pass an array as an argument to a function, what actually gets passed?
5. What is the use of a '\0' character?
6. What is the difference between compiler and interpreter?
7. What is the difference between formal parameters and actual parameters?
8. When is a "switch" statement preferable over an "if" statement?
9. What do you mean by scope of a variable?
10. The % symbol has a special use in a printf statement. How would you place this character as part of the output on the screen?

Section B

Contains Five (05) questions of 5 marks each and any four (04) are to be attempted.

Q1. (a) [3 Marks] Find the output of the following code and justify your answer.

```
main(){
int a[][3]= {1,2,3,4,5,6};
int (*ptr)[3]=a;
printf("%d%d", (*ptr)[1], (*ptr)[2]); ++ptr;
printf("%d%d\n", (*ptr)[1], (*ptr)[2]);
}
```

(b) [2 Marks] What are the 2 main drawbacks of arrays.

Q2. Write a program to input a number 'N' and display the sum of the following sequence:

$1 - 2 + 3 - 4 + 5 - 6 + 7 \ldots\ldots \pm N$

For Example:

If N = 10

$1 - 2 + 3 - 4 + 5 - 6 + 7 - 8 + 9 - 10 = -5$

Q3. (a) [3 Marks] What are the different types of software. Explain in detail.
(b) [2 Marks] What is the difference between break and continue statements. Explain giving examples.

Q4. Write a program to produce the following output:

```
                1
            2       3
        4       5       6
    7       8       9       10
```

Q5. (a) [3 Marks] Write a program to convert a Decimal Number to a Binary Number.
(b) [2 Marks] Where can one think of using pointers?

Section C

Contains Three (03) questions of ten (10) marks each and any two (02) are to be attempted.

Q1. (a) [4 Marks] A positive integer is entered through the keyboard; write a program to obtain the prime factors of the number using functions.

(b) [3 Marks]

```
void main()
{  int i=0;
   for (i=0; i<20; i++)
        {     switch(i)
              {
              case 0: i+=5;
              case 1: i+=2;
              case 5: i+=5;
              default: i+=4;
              break;
              }
              printf("%d", i);
        }
}
```

(c) [3 Marks] What is the difference between call by value and call by reference. Show giving examples.

Q2. (a) [4 Marks] What are the outputs of the following codes? Justify the outputs. Assume no compile

time error and all header files are included.

```
void main()
{ int n=21, b=n/2, c=65+b, k,i,j;
 for( k=1;k<=(n/2+1); k++)
  {
        for(i=65;i<=c;i++)
        {
        printf("%c",i);
        }
        printf("\n");
        for(j=65+b;j>=65;j--)
        {
         printf("%c",j);
        c--;
        b--;
        }
  }
}
```

(b) [6 Marks] WAP in C to take 3 non decimal digit binary numbers (size at most 4 digits) from user. Write two functions having following prototypes:

int max (int, int, int) and
int min (int, int, int)

which returns the maximum and minimum number respectively from the three arguments passed from main(). The function main() uses these two functions to display the three input binary numbers in ascending order.

Q3. (a) [5 Marks] Create a structure to specify data of customers in a bank. The data to be stored is: Account number, Name, Balance in account. Assume maximum of 200 customers in the bank.

(i) Write a function to print the Account number and name of each customer with balance below Rs. 100.

(ii) If a customer request for withdrawal or deposit, it is given in the form: Acct. no, amount, code (1 for deposit, 0 for withdrawal)

Write a program to give a message, "The balance is insufficient for the specified withdrawal".

(b) [5 Marks] WAP in C to make two 2D matrices A[m][n] and B[k][l] from user (m,n > k,l). This program must print 1 if matrix B is a subset of matrix A, 0 otherwise.

Input: $A=\begin{bmatrix}1&2&3\\4&5&6\\7&8&9\end{bmatrix}$ $B=\begin{bmatrix}2&3\\5&6\end{bmatrix}$

Output: 1