Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B.Tech.

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

Time: 2 Hours **Maximum Marks: 25**

Note : Attempt ALL questions.

Q1. (i) Convert: (2+1+2)

$(25.625)_{10} = (\quad)_{16}$

$(27.4)_{10} = (\quad)_{4}$

(ii) Perform binary subtraction using 2's complement

$(10110)_2 - (1111)_2$

(iii) $(6000)_8 - (777)_8 = (\quad)_8$

Q2. Find the output of the following questions. Ignore any syntactical error/s. (2+1+1)

(i)

```
int main()
{
 int x=1, y=1;
 for(;y;printf("%d %d",x,y))
 {   y=x++ <= 6;
     printf("\n");
 }
return 0;
}
```

(ii)

```
int main()
{
char c;
for (c= 'a'; c< 'g'; ++c)
{ switch (c)
  { case 'a': c+=2;
    case 'c': c+=1;
    case 'g': ++c;
          printf("%c",c--);
   default: printf("**%c\n",c);}}}
```

(iii)
```
main()
{ int a=5, b=1;
  while( a>1)
  b*= --a;
  printf("%d",b);
}
```

Q3. Write a program to print the sum of the proper divisors of a list of numbers entered by the user.

A proper divisor of a natural number is the divisor that is strictly less than the number.

For ex input: 3 (list)

2

10

20

Output: 1

8

22

Here total number of numbers input are 3 and the sum of divisors of 2 (1) is 1, sum of divisors of 10(1,2,5) is 8, sum of divisors of 20(1,2,4,5,10) is 22. (5)

Q4. When interest compound q times per year at the rate of r % for n years, the principle p compounds to an amount A as per the following formula:

$$A=p*(1+r/q)^{nq}$$

a) Write a program to read 10 sets of p,r,n and q and calculate the corresponding A.

b) Also draw the flowchart for the same. (3+1)

Q5. WAP to input an integer in base 5. Number of digits in the input integer should not exceed four.

a) Validate that input is in base 5, if not then ask to input again.

b) Also find the frequency of each digit in the number. Display the digits along with their frequencies (only non zero). (2+3)

Q6. Explain the basic architecture of the computer with the help of diagram and also explain the working of different components like hardware, operating system, ALU etc. (2)