NATIONAL INSTITUTE OF TECHNOLOGY, DURGAPUR
Mid-Term Examination Odd Semester 2021-22
Subject: Introduction to Computing Sub code: CSC01 Program: B. Tech. (1st semester) Full marks: 25 Time: 90 minutes

[**Instructions:** Attempt any five questions. Read the questions carefully and answer accordingly. Different parts of a question must be written consecutively.]

- ***Do Not send answer script via E-mail.***
- ***Write your Name, Roll Number, Paper Code and Paper Title on the front page.***
- ***Scan the handwritten answer scripts and save as a PDF file.***
- ***Each student must upload one single (.pdf) file saved as RollNo_Name_CA2.pdf. Example: 21CS2001_Name_CA2.pdf***

1.

a. Convert the following numbers from one number system to another:

i. Binary to decimal : 1001110011_2 to (?) $_{10}$ [1]

ii. Decimal to binary: 157.375_{10} to (?) $_2$ [2] b. Find the value of x for the following code snippet. [2]

```
main()
{
  int a=15, b=13, c=16;
  int x;

  x = a - 3 % 2 + c * 2 / 4 % 2 + b / 4;

  printf("x=%d", x);
}
```

2.

a. Briefly describe the importance of using parenthesis in writing expressions in C programming language with a suitable example.

The following expression has a single pair of parentheses missing that makes it syntactically wrong and it does not compile. Place a pair of parentheses in proper places to correct the expression.

```
x * w + y * z = 7;
```

[3]

b. Consider the snippet of a C program shown below. Assume all the variables appearing within the code snippet shown are integers and are already declared. Modify the snippet by replacing the **for** loop with a **while** loop without modifying the semantics of the program. Do not use any new variable. [2]

```
for(i=Num;i>0;i/=2)
   {
    k = i * 3;
    printf("%d\n",k);
```

```
}
```

3.

a. Compare the use of the `if-else` branching statement with the use of the operator ternary `?:` [2]

b. Write a program to verify whether an integer number is palindrome or not. [3] 4.

a. Suppose we define an integer array as below

```
int student[10];
```

Let the base address of the array `student` is `12340` (in decimal). What would be the start address of `student[4]`. Consider that integer is 4 Bytes. [2] b. Consider the array declared as below:

```
int A[] = {1,2,3,4,5,6,7,8};
```

What would be the value of `b` in the following statement?

```
int b = A[A[2]+A[3]];
```

[2] c. Consider the snippet of C code

```
main(){
 int redius;
     float area;
 i. area = 22/7*redius*redius;
ii. Area = 22/7.0*redius*redius;
iii. Area = 22/7(float)(redius*redius);
  }
```

Among the three statements (`i.` `ii.` and `iii.`) find the appropriate statement(s) that computes the area of a circle perfectly. [1]

5. What will be the output of the following code? Explain your answer. [2+2+1] a.

```
#include<stdio.h>
main()
{
   int i=10;
 printf("i=%d", i);
   {
 int i=20;
 printf("i=%d", i);
 i++;
 printf("i=%d", i);
   }
i++;
printf("i=%d", i);
}
```

b.

```
#include <stdio.h>
int main()
{
 int x, y = 5, z = 5;
       x = y == z;
 printf("%d", x);
 return 0;
}
```

c. Let the variables `x,y` and `z` having the values as `1,2` and `3`, respectively. Evaluate the statement below:

```
z = x + y % z < x*y - 30
```

Write the operators in sequence as they are executed during the evaluation of the above statement.

6. Write the pseudocode and draw the flow chart for the following problem: [5]

Input: Marks obtained out of 100 by N students in a class. Increment their marks by giving grace marks 5. Then segregate the marks in two ways. Below 35 is considered FAIL and equal or above 35 considered as PASS.

Output to be printed:

a. Original marks obtained by the student:
b. Modified marks after adding grace:
c. No of students scoring PASS marks :
d. No of students unable to PASS:

7. a. Write a Program to print a pattern like: [5] *

```
***
*****
*******
*********
**********
***********
**********
*********
*******
*****
***
**
*
```

Read the height from user input.

OR

b. Let `email` is a character array that stores the email address. For example,

```
char email[] =
{'o','f','f','i','c','e','@','g','m','a','i','l','.','c','o','m'
}
```

Write a C program to print the user name of the email address.