ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION **WINTER SEMESTER, 2019-2020**

DURATION: 1 Hour 30 Minutes **FULL MARKS: 75**

CSE 4361: Computer Science and Technology I

Programmable calculators are not allowed. Do not write anything on the question paper.

There are **4 (four)** questions. Answer **3 (three)** of them.

Figures in the right margin indicate marks.

---

1. a) What is the basic definition of a computer? Describe different types of computers based on number of persons using at the same time and their sub categories. 2+6

   b) What are the fundamental parts of a computer system? 4

   c) Perform the following operations: 9

      i. $(26B.C12)_{16}$ (Convert from Hexadecimal to Decimal)

      ii. $(101001.010011101)_2$ (Convert from Binary to Decimal)

      iii. $(917.25)_{10}$ (Convert from Decimal to Octal)

   d) What would be the output of the program in Figure 1? 4

```c
#include <stdio.h>
#include <math.h>
int main()
{
      int a, b;
      a = 2;
      b = 5;
      int temp;
      temp = a;
      a = b;
      b = temp;
      a++;
      b--;
      temp = a+b;
      temp+=2;
      temp = sqrt(temp);
      printf("%d %d %d",a, b, temp);
      return 0;
}
```

Figure 1: Code for question no. 1(d)

2. a) What is software? Describe different types of softwares with examples. 5

   b) Write short notes on different types of *Memory* and *Storage* devices. Give an example of Infinite loop using FOR and WHILE loop separately. 6+6

   c) What would be the output of the program in Figure 2? 8

```c
#include <stdio.h>
int main()
{
    int i;
    for(i=1;i<100;i++)
    {
        if(i%5==0 && i%3==0) printf("%d\n",i);
        else if(i%5==0) printf("?\n");
        if(i>45)break;
    }
    return 0;
}
```

Figure 2: Code for question no. 2(c)

3. a) Write short notes on the Information Processing Cycle. What is the significance of comments in code? 4+3

b) Perform binary subtraction on the following numbers and convert the binary result into decimal for justifying your answer. 7

$$(-21)_{10} - (5)_{10}$$

c) Write a C program to find whether a given year is a leap year or not. If it is a leap year print YES, otherwise print NO. You have to take input from the user. 5

d) Take an integer N as input. Print all the numbers divisible by 7 from 1 to N. Use FOR loop to do the task. 6

4. a) Sakib likes to throw balls into the air with all his might. He becomes happy if the ball reaches greater heights. However, he does not know how to calculate the maximum height his ball attains. Write a C program that will help him find the height of his projected ball. Assume that the ball is thrown in the direction perpendicular to the earth surface with an initial velocity of V ms^{-1} (V is the only input provided by the user and you have to print the maximum height of the ball). 7

[**Hint**: Use the formula $v^2 = u^2 + 2as$, where u is the initial velocity, v is the final velocity, s is the displacement and a is the acceleration, and the acceleration due to gravity is 9.8 ms^{-2}]

b) Write a C program to find whether a given number is prime or not. If prime, then print YES, otherwise, print NO. You have to take input from the user. 10

c) Find out the number of bugs in the following program. Briefly explain about each bug in one or two sentences. 8

```
#include <stdio.h>

int main()
{
    float a,b;
    a = 6.0;
    b = 5.0;
    int c = a % b;
    printf("%f",c);
    int num1 = 10;
    int num2 = 5/10;
    int res = num1/num2;
    print("%d",res);
    return 0;
}
```

Figure 3: Code for question no. 4(c)