International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE Midterm Examination, Spring 2022

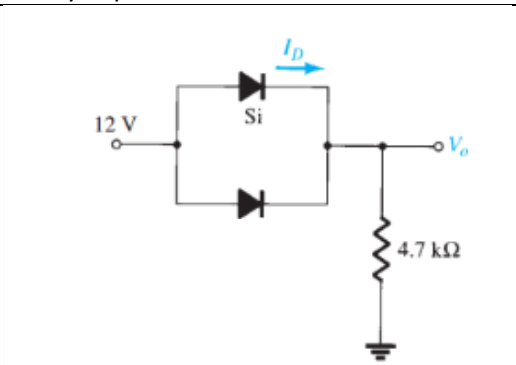
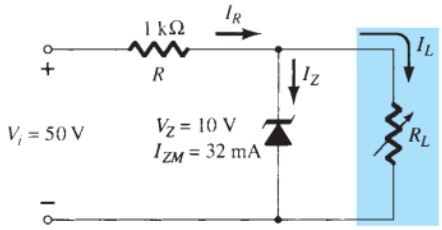
Course Code: EEE-1221

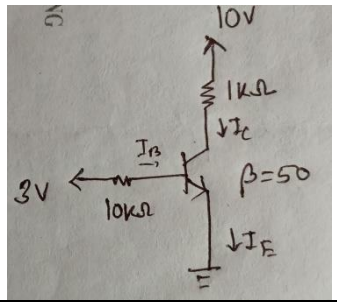
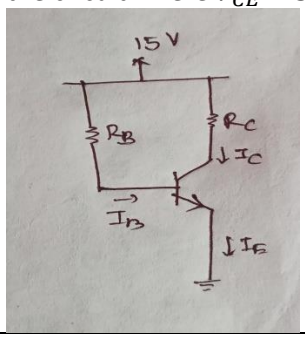
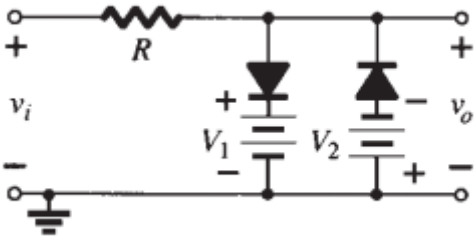
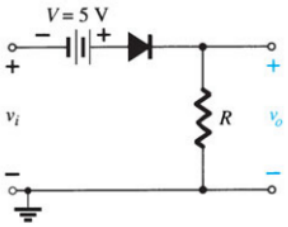
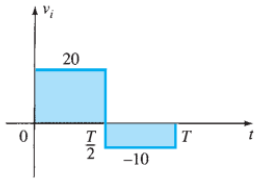
SET: Alpha

Course Title: Electronics

Total marks: ***30***

Time: ***2*** *hours* ***30*** *minutes for* ***exam*** *+* ***30*** *minutes for* ***submission***

	[**Answer all the questions**; For all questions, assume **X**, **Y and Z** are the last three digits of your ID and **R is the sum of X, Y,Z**, if not mentioned otherwise; Precisely follow the guideline for preparing and submitting the answer script; Figures in the right hand margin indicate full marks.]	
Question no.		
1(a)	Define Drift Current. Draw V-I Characteristics of Diode and briefly explain it.	1.5
1(b)	 From the figure given, Find V_o and I_D (Both are Si Diode.)	2
1 (c)	 For the network given determine the range of I_L and R_L that will result in output voltage being maintained at 10 V	2.5
1 (d)	What is Intrinsic Semiconductor? Briefly explain how N-type semiconductor is formed.	1
2(a)	Define Current amplification Factor. Derive $I_C = \frac{\alpha}{1-\alpha} I_B + \frac{I_{CBO}}{1-\alpha}$ Where Symbols have their usual meaning. In a Common Base Configuration, α =0.9, If emitter current is 1 mA then what is the Base current?	1.5

2(b)	Define Stabilization and need of stabilization. For the circuit given. Find whether the transistor is in saturation or not. Given $V_{CE}\ (sat) = 0.2\ V$ 	2.5
2(c)	Define Stability Factor. What is thermal Runway? Design the circuit where V_{CE} = 8 V I_c =2mA, β=100, V_{BE} =0.6V 	3
3(a)	What is Linear Wave shaping? If a Step voltage of 'V' volts is applied to a linear RC high pass circuit, derive that the output voltage = $\mathbf{V}e^{-\frac{t}{\tau}}$ where τ = time constant. If 20V step voltage is applied to such a High Pass RC circuit with R=100Kohm and C= 1uF, Find output Voltage at t=0.05 second	3
3(b)	 For sinusoidal input of peak voltage V_m (Where V_m > V_1, V_2) Draw the output waveform. Given V_1 > V_2 and Diodes are ideal	2
3 (c)	 . Find output waveform for the input given. 	2

	International Islamic University Chittagong **Department of Computer Science and Engineering** B. Sc. in CSE Midterm Examination, Spring 2022 **Course Code: CSE 1223 Course Title: Discrete Mathematics** **Section: 2AM** ***Total marks: 21*** ***Time: 2 hours 30 minutes for exam + 30 minutes for submission***	
	[Answer all the questions; Precisely follow the guideline for preparing and submitting the answer script; Figures in the right hand margin indicate full marks.]	
1.	**i)** List the elements of the following sets if the universal set is U= {a , b,…., y, z} : a) A = {x | x is a vowel } b) B = {x | x precedes **a** in the alphabet} c) C = {x | x is a letter in the word "**Discrete Mathematics**"} **ii)** Let A= {p, q, r}, B= {x, z}, C= {4, 7}. Find C ×B ×A and |P(C ×B ×A)| **iii)** Consider the following data for 120 students at a college concerning the languages- French, German and Russian 65 study French 45 study German 42study Russian 20 study both French and German 25 study both French and Russian 15 study both German and Russian 8 study all three languages. a) Find the number of students who study at least one of the three languages. b) b) Fill in the correct number of students in each of the eight regions of the Venn Diagram.	7

2.	**i)** Translation from English to Logic: a) Everyone speaks Bengali. b) A student in your class has been in a movie. c) c) Everyone in your class has a cellular phone. **ii)** Translate these specifications into English, where F(p) is "Printer p is out of service," B(p) is "Printer p is busy," L(j) is "Print job j is lost," and Q(j) is "Print job j is queued." a) $\exists p(F(p) \wedge B(p)) \rightarrow \exists jL(j)$ b) $\forall pB(p) \rightarrow \exists jQ(j)$ c) $\exists j(Q(j) \wedge L(j)) \rightarrow \exists pF(p)$ d) d) $(\forall pB(p) \wedge \forall jQ(j)) \rightarrow \exists jL(j)$ iii) Let U be the real numbers, Define P(x,y) : $x \cdot y = 0$ What is the truth value of the following: 1. $\forall x \forall yP(x,y)$ 2. $\forall x \exists yP(x,y)$ 3. $\exists x \forall y\ P(x,y)$ a) 4. $\exists x\ \exists\ y\ P(x,y)$	7
3.	**i)** Draw the figures of, a) One-to-one, not onto b) Onto, not one-to-one c) One-to-one and onto d) Neither one-to-one nor onto e) Not a function **ii)** Let g be the function from the set {a,b,c} to itself such that g(a) = b, g(b) = c, and g(c) = a. Let f be the function from the set {a,b,c} to the set {1,2,3} such that f(a) = 5, f(b) = 9, and f(c) = 2. What is the composition of f and g, and what is the composition of g and f. **iii)** Consider the following relations on {1, 2, 3, 4}: R1 = {(1, 1), (1, 2), (2, 1), (2, 2), (3, 4), (4, 1), (4, 4)}, R2 = {(1, 1), (1, 2), (2, 1)}, R3 = {(1, 1), (1, 2), (1, 4), (2, 1), (2, 2), (3, 3), (4, 1), (4, 4)}, R4 = {(2, 1), (3, 1), (3, 2), (4, 1), (4, 2), (4, 3)}, R5 = {(1, 1), (1, 2), (1, 3), (1, 4), (2, 2), (2, 3), (2, 4), (3, 3), (3, 4), (4, 4)}, R6 = {(3, 4)}. Find **Reflexive, Symmetric, Antisymmetric and Transitive** from the above relations and describe.	7

International Islamic University Chittagong
Department of Computer Science & Engineering
Mid Term Assignment (Written, Online), Spring-2022, 2nd Semester
Course Code: CSE 1221, Course Title: Computer Programming 2
Set: A, Marks: 21
[Answer all the questions serially. Figures in the right-hand margin indicate full marks]
[Time: 2 hours 30 minutes for exam + 30 minutes for submission]

1. a. Find the error in the following program. **1.5**

```
#include <iostream>
using namespace std;
int sub(int a=20, int b)
 {
    int result;
    result = a - b;
    return result;
}
int main () {
    int a = 100;
    int b = 200;
    int result;
    result = sub(b);
    cout << "value 1 :" << result ;
    result = sub(a);
    cout << " value 2 :" << result ;
    return 0;
}
```

b. Find the error in the following program. **1.5**

```
void fun( int count)
{
if(count == 0)
     cout <<count;
else
        {
        cout <<count<<endl;
        fun(--count);
        return;
        }
}
```

c. What is wrong with the following function prototype? **1**

```
char *f(char *p, int x = 0, char *q);
```

d. Write a C++ program usign class and object to swap two numbers by using both call by reference and call by value method. **3**

2. a. Create a function called **sroot( )** that returns the square root of its argument. Overload **sroot( )** three ways: have it return the square root of an integer, a long integer, and a **double**. (To actually compute the square root, you can use the standard library function **sqrt( )**.) 3

b. Create a class called **t_and_d** that is passed the current system time and date as a parameter to its constructor when it is created. Have the class include a member function that displays this time and date on the screen. (Hint: Use the standard time and date functions found in the standard library to find and display the time and date.) 3

Create a class called **box** whose constructor function is passed three **double** values, each of which represents the length of one side of a box. Have the **box** class compute the volume of the box and store the result in a **double** variable. Include a member function called **vol( )** that displays the volume of each **box** object.

c. Why might the following function not be in-lined by your compiler? 1

```
void f1()
{
  int i;

  for(i=0; i<10; i++) cout << i;
}
```

3. a. Create a function called **rev_str( )** that reverses a string. Overload **rev_str( )** so it can be called with either one character array or two. When it is called with one string, have that one string contain the reversal. When it is called with two strings, return the reversed string in the second argument. For example: 3

```
char s1[80], s2[80];
strcpy(s1, "hello");
rev_str(s1, s2); // reversed string goes in s2, s1 untouched
rev_str(s1); // reversed string is returned in s1
```

b. What is wrong with the following fragment? 1

```
#include <iostream>
using namespace std;

class myclass {
  int i;
public:
.
.
.
};

int main()
{

        myclass ob;
        ob.i = 10;
      .
      .
      .
      }
```

c. 3

Given the following class, create a two-by-five two-dimensional array and give each object in the array an initial value of your own choosing. Then display the contents of the array.

```
class a_type {
  double a, b;
public:
  a_type(double x, double y) {
    a = x;
    b = y;
  }
  void show() { cout << a << ' ' << b << "\n"; }
};
```

International Islamic University Chittagong
Department of Computer Science & Engineering
Mid Term Assignment (Written, Online), Spring-2022, 2nd Semester
Course Code: CSE 1221, Course Title: Computer Programming 2
Set: B, Marks: 21
[Answer all the questions serially. Figures in the right-hand margin indicate full marks]
[Time: 2 hours 30 minutes for exam + 30 minutes for submission]

1. a. What will be output of the following program. **2**

```
#include <iostream>
using namespace std;
int add (int p, int q)
{
        int r;
        r=p+q;
        return r;
}
int main ()
{
         int x=7, y=5, z;
         z = add (7,2);
         cout << "Result 1:-  " << z << '\n';
        cout << "Result 2:- " << z + add (7,8) << '\n';
        cout << "Result 3:- " << add (x,y) << '\n';
         z= 4 + add (9,y);
         cout << "Result 4:- " << z << '\n';
}
```

b. Find the error in the following program. **1**

```
int main()
{
    int a = 2;
    float b = 2.5;
    int  show(a);
    float show(b);
    return 0;
}
```

c. Create a function called **order( )** that takes two integer reference parameters. If the first argument is greater than the second argument, reverse the two arguments. Otherwise, take no action. That is, order the two arguments used to call **order( )** so that, upon return, the first argument will be less than the second. For example, given **3**

```
int x=1, y=0;
order(x, y);
```

following the call, **x** will be 0 and **y** will be 1.

d. Show how to allocate a **float** and **int** by using **new** keyword. Also show how to free them by using **delete.** **1**

2. a. **1**

Find the error in the following program.

```
#include <iostream>
using namespace std;
int p;
int& display();
int main()
{
    display()=5;
    cout << p ;
    return 0;
}
int& display()
{
    return 2;
}
```

b. Create a class called **stopwatch** that emulates a stopwatch that keeps track of elapsed time. Use a constructor to initially set the elapsed time to 0. Provide two member functions called **start( )** and **stop( )** that turn on and off the timer, respectively. Include a member function called **show( )** that displays the elapsed time. Also, have the destructor function automatically display elapsed time when a **stopwatch** object is destroyed. (To simplify, report the time in seconds.) **3**

c. Consider you have three classes: CSE, EEE and ME. In all classes you have a private member variable and a public member function. The member variable and member function of each class is used to take input of marks for Maths for a specific student of each class. Your task is to determine the highest mark considering all three classes. Write a C++ program to perform the task. You can assume that there are 10 students. **3**

3. a. Create a function called **min( )** that returns the smaller of the two numeric arguments used to call the function. Overload **min( )** so it accepts characters, integers, and **doubles** as arguments. 3

b. What is wrong with the constructor shown in the following fragment? 1

```
class sample {
  double a, b, c;
public:
  double sample();  // error, why?
};
```

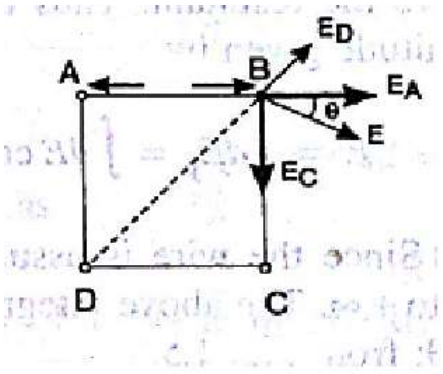
c. Imagine a situation in which two classes, called **pr1** and **pr2**, shown here, share one printer. Further, imagine that other parts of your program need to know when the printer is in use by an object of either of these two classes. Create a function called **inuse( )** that returns **true** when the printer is being used by either and **false** otherwise. Make this function a friend of both **pr1** and **pr2**. 3

```
class pr1 {
  int printing;
  // ...
public:
  pr1() { printing = 0; }
  void set_print(int status) { printing = status; }
  // ...
};

class pr2 {
  int printing;
  // ...
public:
  pr2() { printing = 0; }
  void set_print(int status) { printing = status; }
  // ...
};
```

Bismillahir Rahmanir Rahim
International Islamic University Chittagong
Department of Computer Science & Engineering
B. Sc. in CSE, Mid-Term Examination(Assignment), Spring-2022
Course Code: PHY- 1201 Course Title: Physics-II
Total marks: *21* Time: *3* hours

Answer All the Question

1. a)	Define electric dipole.	01
b)	Derive an expression for the electric field at a point on the equatorial line due to an electric dipole.	03
c)	ABCD is a square of **X** cm slide. Charges of 16×10^{-X}, -16×10^{-X} and 16×10^{-X} are placed at a point A, C and D respectively. Find the intensity of the electric field at a point B. **X= last digit of your ID , in case of 0, consider 3].**  Fig. 1(c)	03
2. a)	Define Magnetic Induction.	01
b)	Find the value of **B** due to a straight conductor carrying current loop of perpendicular distance x from the conductor.	03
c)	The magnetic field at a distance **X.Y** cm from the axis of a long straight wire is 13 mT. What is the current in the wire**? [X= last digit of your ID and Y= second last digit of your ID, in case of 0, consider 3].**	03
3. a)	What is time constant of RC Circuit?	01
b)	Show that the form factor is 1.11.	03
c)	An **X**0 μF capacitor initially uncharged is connected through a X00 ohm resistor to a 12 V battery. [**X= last digit of your ID, in case of 0, consider 3**]. (a) What is the magnitude of the final charge q_o on the capacitor? (b) What is time constant of the circuit? (c) How long after the capacitor is connected to the battery will it be charged to $\frac{1}{2}q_o$? (d) How long after the capacitor is connected to the battery will it be charged to $0.90q_o$?	03

International Islamic University Chittagong
Center for General Education (CGED)

Midterm Assessment Test, Spring–2022

Course Title: Basic Principles of Islam Course Code: URED-1201

Full Marks: 30
Time: 3:00 Hours (for written 2:30 and for submission 30 minutes.

Group: A: (20 Marks)
Answer any Four (4) of the following
(All questions are of equal value):

1. Explain some extraordinary characteristics of Islam proving it to be the only religion acceptable to Allah (SWT).

2. What is Tawhid? Analyze how to implement the teachings of Tawhid in your individual and collective life.

3. Identify the superiority of the holy Qur'an among all Devine Books and Scriptures briefly.

4. "Muhammad is not the father of any of your men, but he is the Messenger of Allah and the Seal of the Prophets"- explain this Ayah establishing the finality of Prophet Muhammad (SAAS).

5. Prove the necessities of the hereafter using some logic according to your understanding.

Group: B: (10 Marks) Viva

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE Midterm Examination, Spring 2022

Course Code: **MATH 1207** Course Title: **Mathematics II (Geometry and Differential Equations)**

Section: **2AM**

Total marks: ***21***

Time: ***2*** *hours* ***30*** *minutes for* ***Exam*** *+* ***30*** *minutes for* ***submission***

[Answer all the questions; in some questions, there are options; solve the one which you have been instructed to solve;
For all questions, assume **P** as the last digit of your ID;
Precisely follow the guideline for preparing and submitting the answer script;
Figures in the right-hand margin indicate full marks.]

1.

a) **(i)** What does the equation $(a-b)(x^2+y^2)-2abx=0$ become if the origin be moved to the point $\left(\frac{ab}{a-b},0\right)$? **02**

(ii) Transform to axes inclined at 45^0 to the original axes the equation $x^2-y^2=a^2$?

b) Find what straight lines are represented by the following equation and determine the angles between them. **03**

$$4x^2-24xy+11y^2=0$$

Also find the equation of the straight lines bisecting the angles between them.

c) Find the value of β so that the following equation may represents pair of straight lines. **02**

$$6x^2+11xy-10y^2+Px+31y+\beta=0$$

Here, ***P*** represent the last digit of ***Student ID***.

2.

a) **(i)** Verify whether it is possible for a line to make the angles $30^0, 60^0$ *and* 90^0 with the coordinate axes or not? **03**

(ii) For what value of y the line joining $A(4,1,2)$, $B(5,y,P)$ is perpendicular to the line joining $C(1,2,3)$ and $D(3,5,7)$.
Here, ***P*** represent the last digit of ***Student ID***.

b) Find the distance of the point $(1,2,3)$ from the plane passing through the points $(3,-1,1)$, $(1,2,-1)$ *and* $(1,1,1)$. **02**

c) Find equation of the planes bisecting the angle between the planes **02**

$$x+2y+2z=9, 4x-3y+12z+12=0$$

and specify the one which bisects the obtuse angle.

3.

a) Find the angle between the line $\frac{x-1}{-6} = \frac{y-2}{1} = \frac{z-3}{5}$ and the plane $2x - 3y + 3z = 7$ and make comments. **02**

b) Find the equation of the line through the point $(1, 2, -1)$ perpendicular to each of the lines **02**

$$\frac{x}{1} = \frac{y}{0} = \frac{z}{-1} \text{ and } \frac{x}{3} = \frac{y}{4} = \frac{z}{5}.$$

c) Find the points on the lines **03**

$$\frac{x-1}{2} = \frac{y-2}{-3} = \frac{z-3}{1} \text{ and } \frac{x-5}{3} = \frac{y-5}{2} = \frac{z+1}{-5}$$

which are nearest to each other. Hence find the shortest distance between the lines and its equations.

International Islamic University Chittagong

Morality Development Program (MDP)

Mid-Term Assessment, Spring-2022

2nd Semester ***(for Muslim Students only, other than Shari`ah Department)***

Course Title: Tajweedul Qur'an-II, Course Code: MDP-1202

Time: 3:00 Hours **Full Marks: 30**

Answer any three (03) of the following questions: 3×10=30

1. What is *`Idgham* (إدغام)? Write down the types of *Idgham* (إدغام) with examples.

2. Identify the rules of *Noon Sakinah* in the underlined words below mentioning reasons.

a. فَصَلِّ لِرَبِّكَ وَانْحَرْ b. كَلَّا لَيُنْبَذَنَّ فِي الْحُطَمَةِ c. وَقُولُوا حِطَّةٌ نَغْفِرْ لَكُمْ

d. يَوْمَ يُنْفَخُ فِي الصُّور e. أَوْ إِطْعَامٌ فِي يَوْمٍ ذِي مَسْغَبَةٍ

3. Write the meaning of following *surah* (any two).

a. Surah al- Kauther (سورة الكوثر)
b. Surah al- Ma 'un (سورة الماعون)
c. Surah al-Quraish (سورة القريش)

4. Identify the rules of *Meem Sakinah* in the underlined words below mentioning reasons.

a. أَلَمْ تَرَ كَيْفَ فَعَلَ رَبُّكَ بِأَصْحَابِ الْفِيل **b**. تَرْمِيهِمْ بِحِجَارَةٍ **c**. الَّذِينَ هُمْ عَنْ صَلَاتِهِمْ سَاهُون

d. وَجَعَلْنَا نَوْمَكُمْ سُبَاتً **e**. إِنَّهَا عَلَيْهِمْ مُؤْصَدَةٌ

Note:

- The PDF file of the answer sheet must be submitted within three hours from starting the examination through Google Classroom.
- 2:30 hours for the written examination, 30 minutes for uploading and submitting the documents. Total: 3 hours.