**International Islamic University Chittagong**
**Center for General Education (CGED)**
Midterm Examination, Autumn–2022

**Course Title: Basic Principles of Islam** **Course Code: URED-1201**
**Full Marks: 30** **Time: 1:30 Hours**

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Answer any **three (3)** of the following
(All questions are of equal value):

1. Is there any difference between *`Aqidah* and *Iman*? Clarify the true meaning of *Islamic* `Aqidah and its importance in our life.

2. "Belief in *Tawheed* ought to change a person's life"- discuss this statement explaining the definition, types, and impact of *Tawheed.*

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

4. "Life after death is inevitable"- justify this statement providing some important logic and discussing its impact on human life.

5. "Faith in predestination (*Taqdir*) makes a man idle"- evaluate this statement explaining the opinion of scholars regarding the definition and clear concept of *Taqdir*.

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International Islamic University Chittagong
Morality Development Program (MDP)
Mid Term Examination, Autumn- 2022
2nd Semester (for Muslim students only; other than Shari'ah faculty)
Course Title: Tajweedul Qur'an- II, Course code: MDP-1202
Time: 1:30 hours Full Marks: 30

**Answer any three (03) of the following questions:**

1. Write the meaning of following Surah (any two) 5+5 = 10

a) Surah Al- Kauther (سورة الكوثر)
b) Surah Al – Ma'un (سورة الماعون)
c) Surah Al – Quraish(سورةالقريش)

2. What are Izhar and Idgam? Write down the classification of Idgam with examples 10

3. Explain the rules of Meem Sakinah with examples 10

4. Identify the rules of Noon Sakin & Tanween in the under lined words below mentioning reasons: 5*2= 10

a) فَصَلِّ لِرَبِّكَ وَٱنْحَر Idhar

b) سَلٰمٌ هِىَ حَتّٰى مَطْلَعِ ٱلْفَجْر Idhar

c) مِنْ جُوعٍ وَّاٰمَنَهُمْ Ikhfa

d) إِنَّ ٱللَّهَ سَمِيعٌۢ بَصِير Iqlab

e) وَّاَنْزَلْنَا مِنَ الْمُعْصِرٰتِ مَآءً ثَجَّاجًا Ikhfa

# International Islamic University Chittagong (IIUC)
## Department of Computer Science and Engineering (CSE)
## Mid Term Examination

Program: B. Sc. in CSE
Course Code: MATH-1207
Time: 1:30 hours

Semester: Autumn-2022
Course Title: Mathematics-II
Total Marks: 30

| | |
|---|---|
| (i) | Answer all the questions. The figures in the right-hand margin indicate full marks. |
| (ii) | Please answer the several parts of a question sequentially. |
| (iii) | Course Learning Outcomes (CLOs) and Bloom's Levels are mentioned in additional Columns. |

**Course Learning Outcomes (CLOs) of the Questions**

| | |
|---|---|
| CLO1: | Demonstrate knowledge of geometry and its applications in the real life contexts as well as into complex engineering problems. |

**Bloom's Taxonomy Domain Levels of the Questions**

| Letter Symbols | R | U | Ap | An | E | C |
|---|---|---|---|---|---|---|
| Meaning | Remember | Understand | Apply | Analyze | Evaluate | Create |

| | | Marks | CLO | DL |
|---|---|---|---|---|
| 1. | a) What is Transformation of Co-ordinates? Transform the equation, $11x^2 + 24xy + 4y^2 - 20x - 40y - 5 = 0$ to rectangular axes through the point (2, -1) inclined at an angle $\tan^{-1}\left(\frac{-4}{3}\right)$ to the original axes. | 5 | CLO1 | R&U |
| | b) Show that the equation, $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ will represent two parallel straight lines if, $a:h = h:b = g:f$ Also show that the distance between them is $2\frac{\sqrt{g^2-ac}}{\sqrt{a(a+b)}}$ | 5 | CLO1 | U |
| 2. | a) Find the value of $k$ so that the following equation may represent pairs of straight lines. $2x^2 - y^2 + kxy - 2x - 5y - 3 = 0$ | 3 | CLO1 | U |
| | b) Test the nature of the conic given by the equation, $5x^2 - 24xy - 5y^2 + 4x + 58y - 59 = 0$ | 3 | CLO1 | U |
| | c) If a line makes angles $\theta, \theta, \theta, \theta$ with the four diagonals of a cube. Then show that $\sin\theta = \pm\sqrt{\frac{2}{3}}$ | 4 | CLO1 | U |

3. a) Define Plane. Find the equation of the plane through the points (1, 0, -1) and (2, 1, 3) and perpendicular to the plane, $2x + y + z = 1$. 5 CLO1 R&U

Or. Define Tetrahedron. Find the volume of tetrahedron formed by the four planes. $x + y = 0$, $y + z = 0$, $z + x = 0$ *and* $x + y + z = 1$

b) Define Shortest Distance. Find the shortest distance between the lines 5 CLO1 R&U

$$\frac{x+7}{-8} = \frac{y-5}{3} = \frac{z-4}{1} \text{ and } \frac{x+4}{4} = \frac{y}{3} = \frac{z-19}{-2}$$

Or. Define Great Circle. Find the equation of the sphere for which the circle $x^2 + y^2 + z^2 + 7y - 2z + 2 = 0$, $2x + 3y + 4z = 8$ is a great circle.

# International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE

Mid-Term Exam, Autumn 2022

Course Code: **PHY 1201** Course Title: **Physics-II**

Time: 1 hour 30 minutes Full Marks: 30

(i) The figures in the right-hand margin indicate full marks

(ii) Course Outcomes and Bloom's Levels are mentioned in additional Columns

| Course Outcomes (COs) of the Questions | |
|---|---|
| CO1 | **Understand** the basic knowledge of different areas of physics like electromagnetism, structure of matter and modern physics as well as engineering aspect. |
| CO2 | **Apply** mathematical knowledge to formulate and solve engineering problems. |

| Bloom's Levels of the Questions | | | | | | |
|---|---|---|---|---|---|---|
| Letter Symbols | R | U | App | An | E | C |
| Meaning | Remember | Understand | Apply | Analyze | Evaluate | Create |

## Part A

[Answer the questions from the followings]

| | | | | | |
|---|---|---|---|---|---|
| 1. | a) | State and explain Coulomb's law for electrostatics. | CO1 | U | 2 |
| | b) | Derive an expression for an electric field due to a long uniformly charged wire. | CO1 | U | 5 |
| | | Or | | | |
| | | State and Explain Gauss's law for electrostatics. | | | |
| | c) | Show that the electrical force between the electron and proton in the hydrogen atom is approximately $2.2\times10^{39}$ times stronger than the gravitational forces. | CO2 | A | 3 |
| 2. | a) | State the Faraday's laws of electromagnetic induction. | CO1 | U | 2 |
| | b) | Define self Inductance. Deduce a mathematical expression for the self inductance of a solenoid. | CO1 | U | 5 |
| | | Or | | | |
| | | Derive an expression for magnetic field at a point due to a long straight wire carrying current. | | | |
| | c) | A solenoid having an air core and 100 cm long has 140 turns and its area of cross-section is 4 $cm^2$. Find the co-efficient of self-inductance of the solenoid. | CO2 | A | 3 |
| 3. | a) | What is RC Circuit? | CO1 | R | 1 |
| | b) | Obtain an expression for the growth charge and current when a capacitor is charged through a resistance for a constant emf. | CO1 | U | 6 |
| | c) | A capacitor of capacitance 0.1 μF is first charged and then discharged through a resistance of 10 megaohm. Find the time, the potential will take to fall to half its original value. | CO2 | A | 3 |

*Bismillahir Rahmanir Rahim*

# International Islamic University Chittagong

## Department of Computer Science and Engineering

Mid-Term Examination, Autumn-2022

Course Code: **CSE-1223** Semester: 2nd

**Time:** 1 Hours 30 minutes Course Title: **Discrete Mathematics**

**Marks:** 30

| | | | | CO | DL |
|---|---|---|---|---|---|
| **Q1.** | **a)** | What is the set? Write the definition and example: Cardinality of a set, Complement of a set. | 2 | CO1 | C1 |
| | | **OR** | | | |
| | **a)** | Define Cartesian product. Explain why $(A \times B) \times (C \times D)$ and $A \times (B \times C) \times D$ are not the same. | 2 | CO1 | C2 |
| | **b)** | Let A and B two sets. Prove that - $(A \cup B)' = A' \cap B'$ | 3 | CO2 | C3 |
| | | **OR** | | | |
| | **b)** | Define proper subset. Find the sets A and B if A-B ={1,5,7,8,15}, B-A ={3,6,10} and A∩B = {2,9,11,15}. | 3 | CO2 | C3 |
| | **c)** | Suppose that the universal set is U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}. Express each of these sets with bit strings where the $i^{th}$ bit in the string is 1 if i is in the set and 0 otherwise.<br>a) {3, 4, 5}<br>b) {1, 3, 6, 10}<br>c) {2, 3, 4, 7, 8, 9} | 2.5 | CO2 | C3 |
| | **d)** | Using the same universal set as in 1(c), find the set specified by each of these bit strings.<br>**a)** 11 1100 1111<br>**b)** 01 0111 1000<br>**c)** 10 0000 0001 | 2.5 | CO2 | C3 |
| **Q2.** | **a)** | What is the proposition? What do you mean by universal and existential Quantifier? | 2 | CO1 | C1 |
| | **b)** | Let l(x) be the statement "x has an internet connection and C(x, y) be the statement "x and y have chatter over the internet". Where the domain for the variables x and y consists of all students in your class. Use quantifier to express each of these statements.<br>i) Rasel has not chatted over the internet with Rahul.<br>ii) Not everyone in your class has an internet connection.<br>iii) Everyone in your class with an internet connection has chatted over the internet with at least one other student in your class. | 3 | CO2 | C3 |
| | **c)** | Translate each statement into English. Where the domain for each variable for each variable consists of all real numbers.<br>i) $\exists x \forall y\ (xy = y)$<br>ii) $\forall x \forall y((x \geq 0) \wedge (y < 0)) \rightarrow (x - y > 0)$<br>iii) | 2 | CO2 | C3 |
| | **d)** | Show that each of these conditional statement is a tautology by using truth table:<br>i) $[\neg p \wedge (p \vee q)] \rightarrow q$<br>ii) $[(p \rightarrow q) \wedge (p \rightarrow r)] \rightarrow (p \rightarrow r)$ | 3 | CO2 | C3 |
| **Q3.** | **a)** | Find the domain and range of these functions. Note that in each case, to find the domain, determine the set of elements assigned values by the function | 3 | CO2 | C2 |

a) The function that assigns to each bit string the number of ones in the string minus the number of zeros in the string
b) The function that assigns to each bit string twice the number of zeros in that string
c) The function that assigns the number of bits left over when a bit string is split into bytes (which are blocks of 8 bits)

b) Consider these functions from the set of students in a discrete mathematics class. Under what conditions is the function one-to-one if it assigns to a student his or her
a) mobile phone number.
b) student identification number.
c) final grade in the class.
d) home town

2 CO1 C2

**OR**

b) Consider these functions from the set of teachers in a school. Under what conditions is the function one-to-one if it assigns to a teacher his or her
a) Office.
b) Assigned bus to chaperone in a group of buses taking students on a field trip.
c) Salary.
d) Social security number.

2 CO1 C2

c) What are the truth values of those that are propositions?
a) Do not pass go.
b) What time is it?
c) There are no black flies in Maine.
d) $4 + x = 5$

2 CO2 C3

d) Let p and q be the propositions
p: I bought a lottery ticket this week.
q: I won the million dollar jackpot.
Express each of these propositions as an English sentence.
1) $p \rightarrow q$
2) $p \wedge q$
3) $p \leftrightarrow q$
4) $\neg p \rightarrow \neg q$
5) $\neg p \wedge \neg q$
6) $\neg p \vee (p \wedge q)$

3 CO2 C3

**OR**

d) Let f and g be functions from the set of integers to the set of integers defined by $f(x) = 2x^2+3$ and $g(x) = 3x+5$. What is the composition of f and g, and also the composition of g and f?

3 CO2 C3

**International Islamic University Chittagong**
**Department of Computer Science and Engineering**
*B. Sc. in CSE Final Examination, Autumn- 2022*
**Course Code: EEE-1221 Course Title: Electronics**

**Total marks:** *30* **Time: 1.5 hours**

[Answer all the questions; Figures in the right hand margin indicate full marks.]

| | | | | |
|---|---|---|---|---|
| 1. a) | Suppose an electronic device requires the same output polarity for either input polarity. Design a rectifier with the four diodes to get the required output and calculate its efficiency. | 7 | CO2 | A |
| b) | The four diodes used in a bridge rectifier circuit have forward resistances which may be considered constant at 1Ω and infinite reverse resistance. The alternating supply voltage is 240 V r.m.s. and load resistance is 480 Ω. Calculate<br>(i) mean load current and<br>(ii) (ii) power dissipated in each diode. | 3 | CO2 | A |
| 2. a) | What do you understand by transistor biasing? Derive expressions for collector current and collector-emitter voltage of a transistor amplifier that used the voltage divider bias method. | 7 | CO4 | U |
| | **Or** | | | |
| | Define (i) cut-off, (ii) saturation, (iii) active region, and (iv) operating point. Show them in the output characteristics curve of a common emitter transistor amplifier. | | | |
| b) | Calculate the emitter current in the voltage divider circuit shown in Fig. 2(b). Also find the value of $V_{CE}$ and collector potential $V_C$. | 3 | CO4 | A |

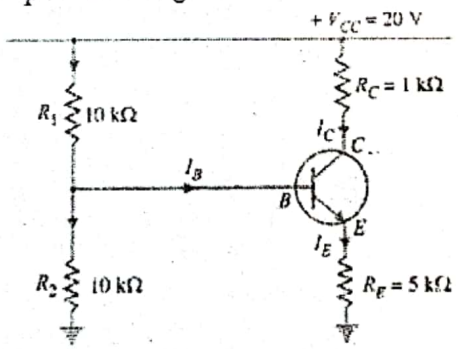



Fig. 2(b)

**Or**

Determine whether or not the transistor in Fig. 2(b-or) is in saturation. Assume $V_{knee}$ = 0.2V.

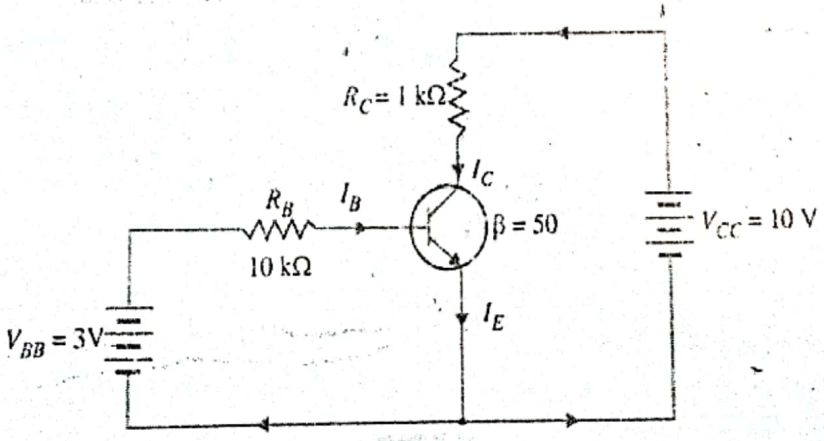
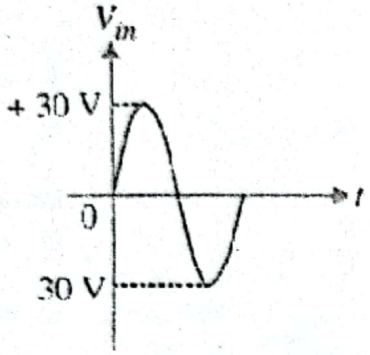



Fig. 2(b-or)

3. a) What is clipper? Draw and explain the circuits of (i) positive, (ii) biased, and (iii) combinations clipper with input and output waveforms. 7 CO3

b) For the input wave to the clipping circuit shown in Fig. 3(b), find the output waveform. 3 CO3. A



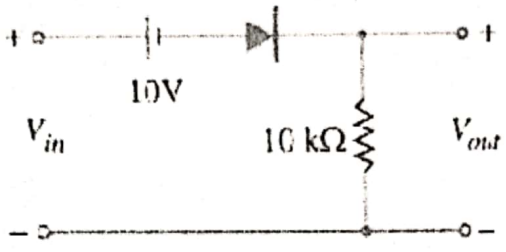




Fig. 3(b)

# International Islamic University Chittagong

Department of Computer Science & Engineering

B.Sc. in CSE, Mid Term Examination, Autumn 2022

**Course Code:** CSE-1221 **Course Title:** Computer Programming 2

**Total Marks:** 30 **Time:** 90 minutes

*Answer all 3 from the following Questions. Figures in the right-hand margin indicate full marks*

1 a) Describe the characteristics of OOP with examples. 3 CO 1

b) What are the main differences between **struct** and **class**? 2 CO 1

c) Describe what problems associated with structured programming are solved by object-oriented programming and how? 2 CO 2

d) Identify and explain the error in the following program: 3 CO 1

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

class student{
        int a = 5;
        float f;
public:
        void show(){
                cout << a << endl;
        }
};

main(){
        student s1;
        s1.f = 2.5;
        s1.show();
}
```

OR,

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

class student{
        int a = 5;
public:
        float f;
        void show();
};

void show(){
        cout << a << endl;
}

main(){
        student s1;
        s1.f = 2.5;
        s1.show();
}
```

2 a) What are the goals of the friend function? Give an appropriate example to illustrate. 3 CO 2

b) Give two possible restrictions to in-lime functions. Give an appropriate example of inline function. 3 CO 2

c) Write the output of following codes: 4 CO 1

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

class X
{
public:
   int x;
};

int main()
{
   X a = {10};
   X b = a;
   cout << a.x << " ";
   cout << b.x;
   return 0;
}
```

```
#include<iostream>
using namespace std;
class X
{
   int x;
public:
   X(){}
   X(int x){ x = x; }
   void show(){
     cout << x << endl;
   }
};

main()
{
   X a, b(4);
   b.show();
}
```

**OR,**

Identify the error of the following code and explain the error.

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

class X{
    int x, y;
public:
    X(){}
    X(int a = 0, int b = 0){
        x = a;
        y = b;
    }
    void show(){
        cout << x <<endl;
        cout << y << endl;
    }
};
int main()
{
    X s1, s2(3);
    s2.show();

    return 0;
}
```

3 a) What is a parameterized constructor? How do we invoke a constructor function? 3 CO 2

b) Why would someone overload a function? How can a compiler identify an overloaded function? Describe using an example. 4 CO 2

c) Why we use copy constructor? Write an example of copy constructor. 3 CO 2

**OR,**

"By default, when an initialization occurs, the compiler will automatically provide a bitwise copy, that is C++ automatically provides a default copy constructor that simply duplicates the object" – justify the statement with example.