International Islamic University Chittagong

Department of Computer Science & Engineering
B.Sc. in CSE, Mid Term Examination, Spring 2024
Course Code: CSE-1221 **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

Answers must be done sequentially

#		Questions	Marks	COs	DL
1	a)	Write a class called "**Student**" having two member variables "id" and "name". Declare two Student object in the main function and assign values to them after taking input from user.	3	CO1	C2
	b)	i. What is the output? Assuming no error in the code.	4	CO1	C2

```
{
    int x = 50;
    {
        int x = 20;
    }
    x = x + 10;
    cout << x;
}
```

ii. Write codes here to assign to x and y

```
class A{
    int x, y;
    A(int x, int y){
        /* write codes here to assign to x and y */
    }
}
```

	c)	Why the concept "class" is initiated when there is similar concept called "structure"? Explain with appropriate examples.	3	CO2	C2
	OR,	Are you learning C++ or OOP from this course? Justify your answer by explaining two objectives of the course. [*OOP: Object Oriented Programming*]			
2	a)	How do you identify the use of parameterized constructor in you code? Is it possible to use both parameterized and non-parameterized constructor at the same program? How and why? Give a concrete example with explanation.	3	CO2	C2
	b)	Correct the following code and explain the reason:	2	CO2	C3

```
#include <iostream>
using namespace std;
class Flower {
    int petal_length, leaf_length;
public:
    Flower(int petal_length, int leaf_length) {
        petal_length = petal_length;
        leaf_length = leaf_length;
    }
    void show() {
        cout << petal_length << " " << leaf_length << endl;
    }
};
int main() {
    Flower f1(12, 10), f2;
    f1.show();
    return 0;
}
```

c) Write a class named "**Product**" with private member variables like: ***P_id, P_name, P_company, P_price.*** — 5 — CO2 — C3

- Create ***n*** number of products in the main function.
- Take input for each object using **cin** in a member function of class called ***set_product***.

• Last part of 2(c) in next page. P.T.O

- Show the user a particular product information by taking **P_id** from the user.

3 **a)** In your code in ***2(c)***, there is a private variable called ***P_price***. Now rewrite the code with a non-member function called **"Update_price(double p)"** so that it can access the ***P_price*** variable without any member function of that class. 2 CO2 C3

b) In the following code, you can see a non-member function called **pri()**. Complete the function so that it can show the value of id without changing anything in the class and main function. 3 CO1 C3

```
#include <iostream>
using namespace std;
class A{
    int id;
public:
    A(int a){ id = a; }
    int get_id(){ return id; }
};
```

```
void pri(){
    // write code here
}
void main(){
   int id;
   cin >> id;
   A ob(id);
   pri(ob);
}
```

OR, In the following code, **add** function is called two times in main function. Make the required adjustments to ensure that both calls are successful.

```
#include <iostream>
using namespace std;
int add(int i, int j, int k){
    return i+j+k;
}
int main(){
    int i, j, k;
    cin >> i >> j >> k;
    cout << add(i, j, k) << endl;
    cout << add (i, k) << endl;
}
```

c) Why we must be careful when using default argument in a code where function overloading is applied? Explain with appropriate code. 3 CO2 C2

d) i. Under what circumstances is copy constructor called? 2 CO2 C2
ii. Discuss access privileges of "public, protected, and private".

OR, i. "Very small functions are good candidates for inline", Is this statement true? Explain.
ii. What is default constructor? Give an example.

International Islamic University Chittagong
Department of Computer Science and Engineering
B.Sc. in CSE
Mid-Term Examination, Spring-2024
Course Code: **PHY-1201** Course Title: **Physics-II**
Time: 1 hour 30 minutes Full Marks:30

(i) Answer **all** the questions. The figures in the right-hand margin indicate full marks.
(ii) Course Learning Outcomes and Bloom's Levels are mentioned in additional Columns.

1.	a)	State and explain Coulomb's law in electrostatics.	CLO1	R	3
	b)	Derive an expression for an electric field due to a long uniformly charged wire.	CLO1	U	4
		Or			
		Define electric potential. Derive an expression for the electric potential at a distance r from a point charge q.			
	c)	Calculate the repulsive Coulomb force that exists between two protons in a nucleus of iron. Assume a separation of 4×10^{-15} m.	CLO2	An	3
2.	a)	State and explain Biot-Savart law.	CLO1	R	2
	b)	Define self-inductance. Deduce a mathematical expression for the self-inductance of a solenoid.	CLO1	U	5
		Or			
		Derive an expression for the magnetic field at a point due to a long straight wire carrying current.			
	c)	Calculate the self-inductance of a solenoid having 2000 turns and a length of 1 m. The area of the cross-section is 7 cm^2 and the relative permeability of the core is 1000.	CLO2	An	3
3.	a)	Define Resistance and Capacitance.	CLO1	R	2
	b)	Obtain an expression for the growth of charge and current when a capacitor is charged through a resistance for a constant emf.	CLO1	U	5
	c)	A 150 μF capacitor is connected through a 500 Ω resistor to a 40 V battery. (a) What is the time constant of the circuit? (b) What is the final charge on q_o on a capacitor plate? (c) How long does it take for the charge on a capacitor plate to reach $0.8q_o$?	CLO2	An	3

International Islamic University Chittagong
Department of Computer Science and Engineering

Mid Term Examination, Spring'24 | **Program: B.Sc. Engineering in CSE**

Course Code: **EEE-1221** | Course Title: **Electronics**

Time: 1 hour 30 minutes | Full Marks: 30

[Answer all the questions from the followings. Figures in the right margin indicate full marks]
Course Outcomes (COs) and Blooms Levels are mentioned in additional columns.

					Marks
1)	a)	Describe the formation of a PN junction diode and Explain forward bias and reverse bias in a PN junction diode.	CO1	Ap	5
		Or			
1)	a)	Describe the working principle of a full-wave rectifier using a bridge rectifier configuration also draw the input and output waveform for full-wave rectifier	CO1	Ap	5
1)	b)	A crystal diode having internal resistance $r_f = 10\ \Omega$ is used for half-wave rectification. If the applied voltage $v=40\sin(wt)$ and load resistance is $980\ \Omega$ Find: **(i)** a.c power input and d.c power output **(ii)** Efficiency of rectification	CO3	Ap	5
2)	a)	Explain the working principle of N-P-N transistor and find the relation between α and β	CO4	An	5
2)	b)	A transistor is connected in common emitter (CE) configuration in which collector supply is 8V and the voltage drop across resistance R_C connected in the collector circuit is 0.5V. The value of $R_C = 800\ \Omega$. If $\alpha = 0.96$, determine: (i) Collector-emitter voltage (ii) base current	CO4	U	5

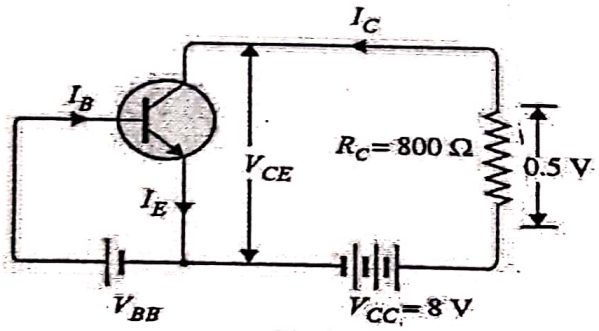


Fig-1

3)	a)	Define **Clipper** circuit . Draw and explain the i) Positive, and ii) Negative clipper with input and output waveforms.	CO2	Ap	5
		Or			
3)	a)	Define **Clamper** circuit . Draw and explain the i) Positive, and ii) Negative clamper with input and output waveforms.	CO2	Ap	5

3) b) For the input wave to the clipping circuit in **Fig 2**, find the output waveform. CO3 E 5

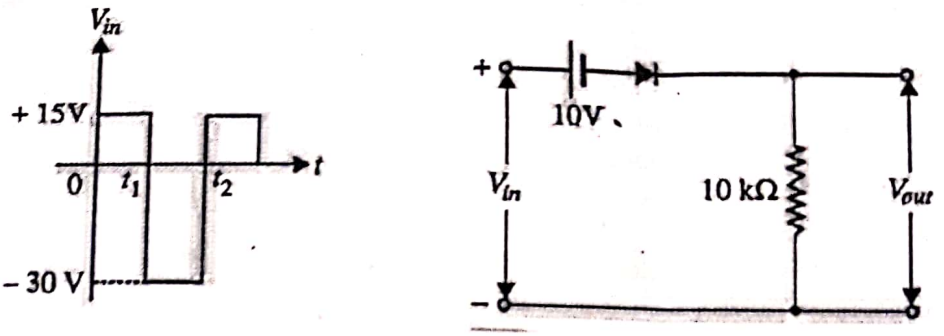


Fig-2

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE Midterm Examination, Spring 2024

Course Code: CSE 1223 Course Title: Discrete Mathematics

Total marks: 30 Time: 1 hour 30 mins

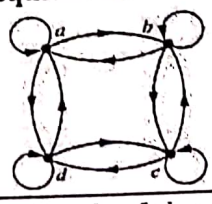
[Answer the ***three*** questions]

Figures in the right-hand margin indicate full marks.

Course Outcomes (COs) of the Questions	
CO1	Understand fundamental concepts of different discrete structures like set, function, relation, graph, tree etc. and their properties. Also, the concept of different types of formal logic and mathematical reasoning, Graphs and trees
CO2	Apply the concept of formal logic, mathematical reasoning various concepts of number theory and combinatorics, Graphs and trees

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

			CO	DL
1.				
a)	Define **Cartesian Product** of two sets? Explain with an example.	**1**	**CO1,**	**R**
b)	Use set builder notation to give a description of each of the following set: **i)** {0, 1, 1, 2, 3, 5, 8} **ii)** {1, 3, 5, 7, 11,....} **iii)**{1, 8, 27, 64, 125} **iv)** { {6, 12, 18, 24, 30, 36, ... }	**2**	**CO2**	**U**
c)	Let U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, A = {1, 3, 4, 7, 9}, B = {2, 4, 5, 8, 10} and C = {1, 2, 3, 4, 9} What **bit strings** represent the following: **i)** $(\overline{A \cup B}) \cap C$ **ii)** $B \oplus C$	**3**	**CO2**	**Ap**
or,	Prove that $(A \cap B)' = A' \cup B'$ using **computer representation** of set i.e. **bit string**. Consider, U={12, 13, 17, 19, 21, 22, 26, 28, 31},A={17, 19, 26}and B={12, 13, 17, 28 }			
d)	In a survey of food preferences conducted among 90 young adults, we asked about their favorite foods: Pizza, Biryani, and Tacos. Turns out, 50 liked Pizza, 35 liked Biryani, and 45 liked Tacos. Some people enjoyed more than one type-15 had both Pizza and Biryani, 20 had both Biryani and Tacos, and 18 had both Pizza and Tacos. Surprisingly, 10 people loved all three! Find the **number of young people** who had preferences for the following- **i)** Exactly two kinds of foods **ii)** None of the food types **iii)** At least one types of food among three	**4**	**CO2**	**Ap**
2.				
a)	Define **Proposition** with an example.	**1**	**CO1**	**R**
b)	Which of these sentences are propositions? What are the truth values of those that are propositions? **i)** The moon is made of green cheese. **ii)** Are you coming to the university? **iii)** $2^n \geq 100$	**1**	**CO1**	**U**
b)	Given the proposition $((A \rightarrow B) \vee (\sim A \rightarrow B))$, state whether the statement is tautology or not.	**3**	**CO2**	**Ap**
or,	Show that $p \leftrightarrow q$ and $(p \wedge q) \vee (\neg p \wedge \neg q)$ are logically equivalent.			

c)	Consider the following propositions with p, q, and r- **p:** You have the flu. **q:** You have missed the final examination. **r:** You pass the course. Translate the following propositions into English statements using the provided propositions: **i)** $\neg q \leftrightarrow r$ **ii)** $p \vee q \vee r$ **iii)** $p \rightarrow \neg r$ **iv)** $\neg q \wedge r$	2	CO2	Ap
or,	Translate these statements into English, where the domain for each variable consists of all real numbers. **i)** $\exists x \forall y(xy = y)$ **ii)** $\forall x \forall y \exists z(x = y + z)$			
d)	Consider the following predicates- **O(x):** "Programming language x supports object-oriented programming.", **G(x):**"Programming language x has garbage collection enabled.", **C(x,y):**"Programming language x is compiled to y." Given the domain of **all programming languages**, translate the following English statements into quantifier expressions using the provided predicates: **i)**"All programming languages that support object-oriented programming have garbage collection enabled." **ii)** "No programming languages that have garbage collection enabled do not support object-oriented programming." **iii)**"There exists a programming language x such that for every other programming language y, if x supports object-oriented programming, then y has garbage collection enabled, and if x is compiled to y, then y is also compiled to another language."	3	CO2	Ap
3.				
a)	Consider two sets A={1,2,3,4} and B={a,b,c}. Define a relation *R* from set *A* to set *B* such that *R* is not a function. Explain why *R* is not a function.	2	CO1	Ap
or,	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)=3, f(b)=2, and f(c)=1. Specify the functions **i)** $f \circ g$ **ii)** $g \circ f$ -if they exist, and give a valid argument if one/both of them do not exist.			
b)	List the first five terms of each of the following sequences: **i)** a sequence where each term is the product of the previous term and the term's position in the sequence. **ii)** a sequence where each term is obtained by doubling the previous term and then subtracting 3. **iii)** a sequence starting with 5 and obtaining each term by adding 7 to the previous term. **iv)** a sequence where each term alternates between being even and odd, starting with 6	2	CO2	Ap
c)	Determine whether the relation with the directed graph shown is an **equivalence relation.** 	2	CO2	U
d)	For each of these relations on the set {1, 2, 3, 4), decide whether it is reflexive, whether it is symmetric, whether it is antisymmetric, and whether it is transitive. 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 = { }	4	CO2	U

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

Program: B. Sc. in CSE | **Semester: Spring-2024**
Course Code: MATH-1207 | **Course Title: Mathematics-II**
Time: 1:30 hours | **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)	Define transformation of coordinates. Transform the axes inclined at 30^0 to the original axes the equation, $x^2 + 2\sqrt{3}xy - y^2 = 2a^2$.	5	CLO1	R&U
	b)	If the two straight lines represented by $x^2(tan^2\theta + cos^2\theta) - 2xy\tan\theta + y^2 sin^2\theta = 0$ makes angles α and β with the axis of x, then show than $\tan\alpha - \tan\beta = 2$.	5	CLO1	U
2.	a)	Find the condition that the lines represented by the homogeneous second degree equation will be perpendicular with each other.	4	CLO1	U
	b)	Find the value of k so that the equation $12x^2 - 10xy + 2y^2 + 11x - 5y + k = 0$ may represent pairs of straight lines.	3	CLO1	U
	c)	Test the nature of the conic given by the equation, $5x^2 - 24xy - 5y^2 + 4x + 58y - 59 = 0$	3	CLO1	U

International Islamic University Chittagong
Center for General Education (CGED)
Midterm Examination, Spring–2024

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

Answer all questions. The right side columns contain marks, CLOs, and Bloom's taxonomy domain for each question.

#	Questions	Marks	CLOs	Bloom's taxonomy domain
1.	Explain Islamic *`Aqidah* with its articles. Assess the impact of Islamic *`Aqidah* on Human life.	**10**	**2**	Create & Evaluate
2.	Define Shirk. Analyze the various kinds of *Shirk* with some examples that may lead a Muslim towards the greatest evil.	**10**	**2**	Remember. & Analyze
3.	(a) Point out different stages of *Akhirah*. Explain some logic behind belief in *Akhirah* summarizing the impact of it on the individual and collective life of Muslims. **Or,** (b) "Man is the architect of his future"- evaluate this statement explaining the clear concept of Islam regarding *Taqdir (destiny)*.	**10**	**2**	Create. Analyze & Evaluate Evaluate & Create

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