ITM
IT MUSTAKBIL

MID TERM EXAMINATION

ROLL NO	
SECTION	**CIRCLE: A/B/C&D**

Subject: Object Oriented Programming	**Time: 1 hour**
Section	**Theory**

Instructions:

- You must answer **all** questions. There are **no optional** questions.
- You are responsible for ensuring your answers are clear and unambiguous.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- You must give your answers in the spaces provided on the question paper.
- Write your full name, roll number, and section in the boxes at the top of the page.
- **You may not use any online / offline notes, handouts, notes or resources other than those provided in this exam.**
- This exam affords **zero tolerance** to students found using dishonest or unfair means.

Information:

- The total marks for this paper are 55. This section carries 30 marks.
- The number of marks for each question or part question is shown in brackets.
- Students may only be awarded a whole number of marks, with no partial marks.
- There are a total of 6 pages in this paper.
- This paper has been divided into two parts. Theory & Practical.
- This paper contains

A) Multiple Choice Questions, B) Short Questions, C) Case Study Questions.

Total Marks
/ 30

systems

Section A

Multiple Choice Questions

Circle the correct answers:

Examiner Use

[5]

1. Fatima writes the following code:

```
class Student {
public:
   void display();
};
void Student::display() {
   cout << "Outside Class" << endl;
}
```

Will it compile successfully?
A) **Yes**
B) **No**

2. Ali creates a class of Document that contains a pointer to a dynamically allocated array of characters (i.e., char* content). He writes a copy constructor like this:

```
Document(const Document& d) {
   content = d.content;
```

Later, when he deletes one **Document** object, the content of the other becomes inaccessible or causes a crash.

What type of copy is being performed here, and what is the issue?

A) Deep copy; avoids memory leak
B) Shallow copy; both objects share the same memory
C) Deep copy; but pointer not handled
D) Shallow copy; but works fine

	3. What is the main difference if you change struct to class in C++? A) Syntax Difference B) Members will become private by default C) Members will become public by default D) Nothing changes **4. Sarah wants to visually represent the classes, their attributes, and how they relate to each other before writing code.** **Which of the following tools/diagrams should she use?** A) Entity Relationship Diagram (ERD) B) Gantt Chart C) UML Class Diagram D) Data Flow Diagram **5. Which of the following best describes composition in object-oriented design?** A) A relationship where the child object can exist independently of the parent object. B) A relationship where the child object's lifecycle is strictly dependent on the parent object. C) A weak association where objects are linked but loosely coupled. D) A relationship that uses inheritance to share behavior.	

Section B

Short Questions

i-	**Write a class for Student with data members: name, Roll No, and GPA. Include:** a) a constructor **[2]** b) a display function **[2]** c) getters and setters **[3]** d) demonstrate creating an objects list using dynamic memory allocation **[3]** e) sort the objects in descending order **[5]**	*Examiner Use* **[25]**
ii-	Draw a UML class diagram for a Book class with the following members: title, author, price, and a function to calculate discount also write the implementation of that function. **[10]**	

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SUBJECT: Object Oriented Programming	**Time Duration: 30 min**
Section	**Practical**

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Information:

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Total Marks
/ 25

systems

Section C

Case Study

Examiner Use

i- Write a program using inheritance to model the relationship between University and Student, where Student inherits from **university.** Note: Add relevant attributes on your own. **[10]**

[25]

ii- **Draw a UML Class Diagram** showing the relationship between the Book, Student, and Library class. (attributes are given) **[15]**

Class: Book
Title
Author
ISBN
Price
Stock

Class: Student
Student ID
Name
Email
Borrowed Books List

Class: Library
Booklist
Students List

Blank Page

Rough Work / Additional Space