The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Electrical and Computer Engineering

Study Programme	:	Bachelor of Science Honours in Engineering
Name of the Examination	:	Final Examination
Course Code and Title	:	**EEX3262 Introduction to Object Oriented Programming**
Academic Year	:	2024/25
Date	:	11th February 2026
Time	:	1330-1630h
Duration	:	3 hours

General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of two parts (Part A and Part B).
3. Part A has twenty (20) MCQ type and Part B has three (03) essay type questions in eight (8) pages
4. Use the sheet provided (page 9) at the end of this exam paper to answer the MCQ questions (Part A), remove it and attach it to the **end of the answer** booklet.
5. Use answer booklet to answer Part B
6. Answer **all** questions.
7. Do not use a red colour pen to write answers.
8. Answer for each question in Part B should commence from a new page.
9. This is a Closed Book Test (CBT).

Part A (20 Marks – Each question carries 1 mark)

1. Consider the following statements about Object-Oriented Programming (OOP):

X) OOP organizes programs around objects that combine data and behaviour.
Y) OOP completely removes the need for procedural programming concepts.
Z) OOP supports code reuse through features such as inheritance.

A) Only X and Y are correct
B) Only X and Z are correct
C) Only Y and Z are correct
D) All X, Y, and Z are correct

2. Consider the following statements about the Java programming environment:

X) Java source code is compiled into bytecode.
Y) Java bytecode is executed by the Java Virtual Machine (JVM).
Z) Java programs are platform dependent because they are hardware specific.

A) Only X and Y are correct
B) Only X and Z are correct
C) Only Y and Z are correct
D) All X, Y, and Z are correct

3. Why is Java considered platform independent?

A) Java programs use low-level hardware instructions
B) Java code runs only on Windows systems
C) Java bytecode can run on any system with a compatible JVM
D) Java programs are interpreted without compilation

4. Which of the following best describes recursion in programming?

A) A loop that never ends
B) A method that calls itself to solve a problem
C) A conditional statement inside a method
D) A method that cannot return a value

5. Consider the following statements about attributes and methods:

X) Attributes represent the state of an object.
Y) Methods define the behaviour of an object.
Z) Attributes and methods must always be declared as public.

A) Only X and Y are correct
B) Only X and Z are correct
C) Only Y and Z are correct
D) All X, Y, and Z are correct

6. Which of the following statements about constructors is incorrect?

A) A constructor is a special method that is automatically called when an object is created.
B) A constructor must always have the same name as the class.
C) A class can have only one constructor, and it cannot be overloaded.
D) Constructors are used to initialize objects with default or specific values.

7. Consider the following statements about polymorphism:

X) Polymorphism allows the same method call to behave differently for different objects.
Y) Polymorphism reduces flexibility in program design.
Z) Polymorphism supports extensibility without modifying existing code.

A) Only X and Z are correct
B) Only X and Y are correct
C) Only Y and Z are correct
D) All X, Y, and Z are correct

8. What is the role of methods in a Java class?

A) To define object structure only
B) To store object data
C) To represent behaviour of an object
D) To initialize attributes

9. Consider the following statements about access modifiers in Java:

X) Private members are accessible only within the same class.
Y) Protected members are accessible in subclasses.
Z) Public members cannot be accessed outside the package.

A) Only X and Y are correct
B) Only X and Z are correct
C) Only Y and Z are correct
D) All X, Y, and Z are correct

10. Consider the following statements about exception handling and program robustness:

X) In Java programming, *try–catch* blocks help prevent abnormal program termination.
Y) The finally block executes regardless of whether an exception occurs.
Z) Exception handling eliminates all logical errors in a program.

A) Only X and Y
B) Only Y and Z
C) Only X and Z
D) All X, Y, and Z

11. Consider the following statements about encapsulation:

X) Encapsulation restricts direct access to object data.
Y) Encapsulation is achieved using access modifiers.
Z) Encapsulation allows external classes to freely modify private data.

A) Only X and Y
B) Only X and Z
C) Only Y and Z
D) All X, Y, and Z

12. Which of the following best describes the benefit of encapsulation in OOP?

A) Faster execution of programs
B) Improved data security and maintainability
C) Elimination of inheritance
D) Automatic memory management

13. What is the main benefit of inheritance in OOP?

A) Faster program execution
B) Code reuse and reduced redundancy
C) Hiding implementation details
D) Preventing method overriding

14. Inheritance mainly represents which type of relationship?

A) has-a
B) uses-a
C) is-a
D) depends-on

15. Consider the following statements about method overloading and overriding:

X) Method overloading occurs within the same class.
Y) Method overriding occurs between superclass and subclass.
Z) Both overloading and overriding require inheritance.

A) Only X and Y
B) Only X and Z
C) Only Y and Z
D) All X, Y, and Z

16. Which of the following is an example of runtime polymorphism in Java?

A) Method overloading
B) Constructor overloading
C) Method overriding
D) Variable shadowing

17. Which of the following statements are correct?

X) Encapsulation improves data protection
Y) Inheritance promotes code reuse
Z) Polymorphism increases flexibility in design

A) Only X and Y
B) Only X and Z
C) Only Y and Z
D) All X, Y, and Z

18. What does code refactoring primarily aim to do?

A) Add new features by modifying existing methods
B) Improve code readability and structure without changing its external behaviour
C) Replace object-oriented principles with procedural programming
D) Optimize memory usage by removing redundant classes

19. What is the key purpose of abstraction in Object-Oriented Programming?

A) To expose all implementation details
B) To hide unnecessary details and show essential functionality
C) To prevent code reuse
D) To eliminate the need for classes

20. Consider the following statements about errors, exception handling, and debugging:

X) Exception handling helps manage runtime errors gracefully.
Y) Unhandled exceptions may cause abnormal program termination.
Z) Debugging helps identify and fix logical and runtime errors.

A) Only X and Y
B) Only Y and Z
C) Only X and Z
D) All X, Y, and Z

Part B

Question 01 (40 Marks)

You are designing a Laboratory Equipment Management System for an electronics laboratory.
The system manages different types of electronic equipment such as Oscilloscopes, Power Supplies, and Signal Generators.
Each piece of equipment has:

- a unique equipment ID
- name
- manufacturer
- power rating
- operational status (available / in use)

Laboratory experiments use these equipment items.
Use the Java programming language to answer the following questions.

Important:

- Marks will be given for both correct code and correct identification of OOP concepts.
- Add necessary comments to your java code.
- In each answer, clearly write which OOP concepts are used as a comment near the relevant code block.
- Use suitable access modifiers.

a. Write a Java class called *Equipment* and a constructor to initialize the attributes. (10 marks)

b. Implement appropriate getter and setter methods for the *status* attribute (04 marks)

c. Create three subclasses of Equipment: (10 marks)

- *Oscilloscope* (has an attribute '*bandwidth*')
- *Power Supply* (has an attribute '*max current*')

For each subclass:

- implement one constructor that initializes all attributes
- implement one constructor that initializes only the subclass specific attribute and assigns default values to inherited attributes

d. Add a method called *Use Equipment* to the *Equipment* class that changes the status of the equipment to "*in use*". (06 marks)

Then, override this method in one subclass to display a message, specific to that equipment type.

e. Create a class called Experiment with *Experiment Name, Experiment ID*, and an array capable of storing up to 10 Equipment objects. (04 marks)

Then add a method to assign equipment to an experiment.

f. Write a *main* method and (06 marks)

- Create one object of *Equipment*
- Create two objects of Power Supply using both constructors.
- Call Use Equipment on above created objects
- Create an Experiment object and assigns some equipment to it
- Print the status of one equipment.

Question 02 (20 Marks)

a. Define the following terms. (12 marks)

I. Abstract Class
II. Java Interpreter
III. Constructor Overloading
IV. Garbage Collection in Java

b. I. Explain why controlling access is important in OOP with an example. (08 marks)

II. Identify the different levels of access control in Java and provide a small code example for each showing how it affects visibility.

Question 03 (20 Marks)

a. Briefly explain the terms 'class' and 'object' in OOP? (04 marks)

b. Explain, in point form, the situations where Object-Oriented Programming is more suitable than structured programming. (05 marks)

c. What is nesting in Java, and where can it be applied? (03 marks)

d. Write a Java program to print the following number pattern according to given requirements: (08 marks)

```
3
3 6
3 6 9
3 6 9 13
```

Requirements:

- Write using only two "for" loops.
- No pre-building strings (print each number immediately using print() or println() functions)
- No hardcoding values (the pattern must adapt if we change the row count)

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Use this **sheet** to provide answers to the **Part A** (MCQ questions) and attach to the end of the answer script (booklet).

Mark "**X**" on the correct answer number.

Index No. : .....

EEX3262 Final Examination 2024/25: Answers for **Part A**

Queston Number	Answer			
1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D
11	A	B	C	D
12	A	B	C	D
13	A	B	C	D
14	A	B	C	D
15	A	B	C	D
16	A	B	C	D
17	A	B	C	D
18	A	B	C	D
19	A	B	C	D
20	A	B	C	D

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