JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS INFORMARTION SYSTEMS

2ND YEAR 2ND SEMESTER 2023/2024 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: ITB 2208

COURSE TITLE: OBJECT ORIENTED ANALYSIS DESIGN AND PROGRAMMING

VENUE: CL 2

DATE: 22/04/2024 **EXAM SESSION: 9.00 – 11.00 A**

TIME: 2 HOURS

Instructions:

1. **Answer QUESTION ONE (Compulsory) and any other two questions**
2. **Tick the most correct alternative in Section A.**
3. **Candidates are advised not to write on the question paper.**
4. **Candidates MUST hand in their answer booklets to the invigilator while in the examination room.**
5. **Mobile phones are NOT allowed in the examination room.**

QUESTION ONE 30 MARKS

a) Describe the steps you would take to build a collaboration diagram. (8 marks)

b) Describe the following relationships. (8 marks)

Composition
Inheritance
Generalization
Dependency

c) Explain benefits of UML in analysis and designing of a system. (4 marks)

d) Explain the rationale for separating the user interface from the business logic. (10 marks)

QUESTION TWO 20 MARKS

a) Explain the significance of the "volatile" keyword in Java. In what scenarios is it commonly used, and how does it contribute to thread safety? (5 marks)

b) Describe the role of the "protected" access modifier in Java. How does it control access to class members, and in what scenarios is it typically employed? (5 marks)

c) Discuss the importance of the DRY (Don't Repeat Yourself) principle in software development. How does adhering to this principle contribute to code maintainability and readability? (5 marks)

d) What are the major elements that make up a sequence diagram? (5 marks)

QUESTION THREE 20 MARKS

a) Briefly explain the purpose and usage of the "super" keyword in Java. Provide a simple example to demonstrate its application. (10 marks)

b) Discuss the concept of an abstract class in Object-Oriented Programming. How does it differ from a regular class, and what advantages does it offer in software design? (10 marks)

QUESTION FOUR 20 MARKS

a) Discuss the SOLID principles in Object-Oriented Design (OOD) and how they contribute to the development of robust and maintainable software. (10 marks)

b) Describe the role of UML diagrams in Object-Oriented Analysis and Design. Provide specific examples of UML diagrams and explain how they aid in the software development process. (10 marks)

QUESTION FIVE 20 MARKS

a) Discuss the principles of encapsulation and abstraction in Object-Oriented Programming. Explain their importance in building modular and reusable code, and provide examples to illustrate their application. (10 marks)

b) Discuss the significance of the "final" keyword in Java. How does it impact class design and method implementation? Provide examples to support your explanation. (10 marks)