



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF COMPUTING AND INFORMATICS
DEPARTMENT OF COMPUTER SCIENCE**

QUALIFICATION: BACHELOR OF COMPUTER SCIENCE, BACHELOR OF INFORMATICS	
QUALIFICATION CODE: 07BACS,07BAIF	LEVEL: 7
COURSE: SOFTWARE ENGINEERING 2	COURSE CODE: SEN721S
DATE: JANUARY 2020	PAPER: THEORY
DURATION: 2 HRS	MARKS: 50

SUPPLEMENTARY/ SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Mr. STEVEN UATUAROMUINJO TJIRASO
MODERATOR:	Ms. VALERIE GARISES

INSTRUCTIONS

1. Answer all questions.
2. Please, ensure that your writing is legible, neat and presentable.
3. When answering questions you should be led by the allocation of marks.
4. Clearly mark rough work as such or cross it out unambiguously in ink.

PERMISSIBLE MATERIALS

1. Calculator

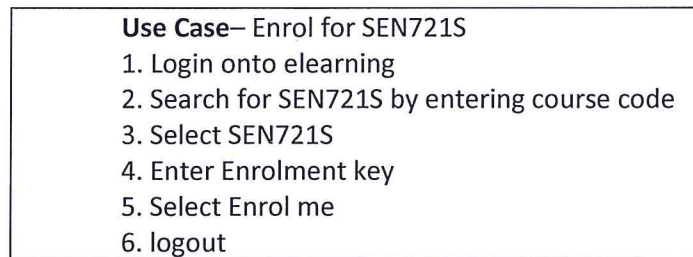
THIS QUESTION PAPER CONSISTS OF 3 PAGES (Including this front page)

Question 1 [5 Marks]

- 1.1. Which of the following is a valid declaration of an abstract method? [1 Mark]
- a) `public abstract double calculateArea();`
 - b) `abstract public double calculateArea();`
 - c) `public double abstract calculateArea();`
 - d) none of the above
- 1.2. In UML diagrams, relationships have multiplicities associated with a given relationship. What does the multiplicity **0..1** mean? [1 Mark]
- a) Exactly one
 - b) Zero or One
 - c) Zero or More
 - d) None of the above
- 1.3. Which of the following is true about the concept of “interface” in the context of object orientation? [1 Mark]
- a) It can be inherited
 - b) An interface *can be instantiated*
 - c) An interface is a 100% abstract superclass which define a set of methods its subclasses must support
 - d) None of the above
- 1.4. Which UML diagram shows interactions between roles/actors and the system? [1 Mark]
- a) Class diagram
 - b) Sequence diagram
 - c) Use case diagram
 - d) None of the above
- 1.5. A component model is a definition of standards for component implementation, documentation and deployment. Which of the following is an example of a component model. [1 Mark]
- a) State diagram
 - b) Class model
 - c) Use case
 - d) None of the above

Question 2 [25 Marks]

- 2.1 Consider a use case called **“Enrol for SEN721S”** below for enrolling for Software Engineering 2(SEN721S) on the eLearning platform. Draw a use case diagram for the Enrol for SEN721S use case below. [13 Marks]



- 2.2 Differentiate between generalization and specialization in the context of object orientation concept. [4 Marks]

- 2.3 Given the relationships below, answer the questions that follows.
 a) Identify this type of relationship [1 Mark]



- b) Identify this type of relationship [1 Mark]



- c) Differentiate between Aggregation and composition. [6 Marks]

Question 3 [10 Marks]

- 3.1 You are tasked with implementing a software project from existing components, briefly provide key Component Based Software Engineering (CBSE) problems that you may encounter? [4 Marks]
- 3.2 Briefly define a software component. [2 Marks]
- 3.3 Briefly describe The Common Closure Principle (CCP). [2 Marks]
- 3.4 Define the Dependency Inversion Principle (DIP). [2 Marks]

Question 4 [10 Marks]

- 4.1 Discuss any three (3) characteristic of an effective design pattern. [6 Marks]
- 4.2 Briefly discuss the four (4) Ps of effective project management. [4 Marks]

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QUALIFICATION CODE: 07BACS,07BAIF	LEVEL: 7
COURSE: SOFTWARE ENGINEERING 2	COURSE CODE: SEN721S
DATE: NOVEMBER 2019	PAPER: THEORY
DURATION: 2 HRS	MARKS: 50

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Mr. STEVEN UATUAROMUINJO TJIRASO
MODERATOR:	Ms. VALERIE GARISES

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PERMISSIBLE MATERIALS

1. Calculator

THIS QUESTION PAPER CONSISTS OF 4 PAGES (Including this front page)

Question 1 [5 Marks]

1.1. Which of the following is **not** one of the fundamental concepts of object orientation? [1 Mark]

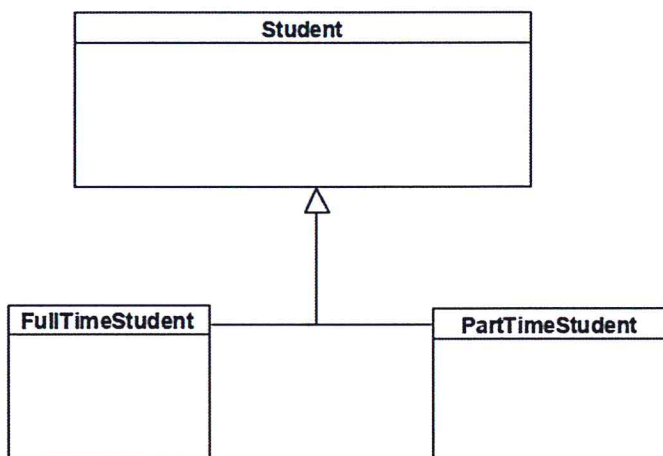
- a) Encapsulation
- b) Abstraction
- c) Exception
- d) Inheritance

1.2. Given a sample code snippet below, which object oriented concept is indicated by the sample snippet? [1 Mark]

```
public class PartTimeStudent extends Student {.....}
```

- a) Abstraction
- b) Encapsulation
- c) Inheritance
- d) None of the above

1.3. Consider the class diagram below for modelling a Student object in your application, why are classes often organized in a hierarchical manner? [1 Mark]



- a) Enable classes in the higher hierarchies to inherit all variables(static attributes) and methods(dynamic behaviours) from classes in the lower hierarchies
- b) Avoid duplication and reduce redundancy
- c) Avoid inheritance
- d) None of the above

- 1.4. Which UML diagram shows how the system reacts to internal and external events? [1 Mark]
- a) Class diagram
 - b) Sequence diagram
 - c) State diagram
 - d) Use case diagram
- 1.5. A component model is a definition of standards for component implementation, documentation and deployment. Which of the following is an example of a component model. [1 Mark]
- a) EJB model (Enterprise Java Beans)
 - b) Class model
 - c) Use case
 - d) None of the above

Question 2 [25 Marks]

2.1 Define object orientation concept? And how does it differ from the traditional procedural approach? [3 Marks]

2.2 Consider the scenario below and answer the questions that follows.

The Electoral Commission of Namibia (ECN) want an online voter registration system to enable prospective voters to register online. Voter's Information such as name, identification number, date of birth, citizenship and constituency should be captured by the system. The registration officer (RO) is responsible for verifying the captured records by viewing the records and also, he/she should be able to print reports of registered voters. To access the system, users should be able to register with the system. You are hired to develop this online voter registration system to replace the existing system.

a) Identify two (2) actors who will be interacting with the online voter registration system above. [2 Marks]

b) Identify and describe one use case for each actor identified in (a) above. [4 Marks]

c) Draw a use case diagram for the online voter registration system. [6 Marks]

d) Draw a class diagram for the online voter registration system clearly showing at least two variables (static attributes), at least two methods (dynamic behaviours) and generalization. [9 Marks]

2.3 Considering your UML class diagram in 2.2(d), how would your model incorporate encapsulation? [1 Mark]

Question 3 [10 Marks]

3.1 Define Component Based Software Engineering (CBSE) approach and what solution did Component Based Software Engineering (CBSE) provide that Object Oriented development did not offer? [3 Marks]

3.2 Consider the scenario below and answer the questions that follows. [6 Marks]

Namibia University of Science and Technology want to add an additional module to the ITS system. As a Software Engineer, you are considering using existing components to achieve this. Discuss any three key characteristics you would consider.

3.3 Briefly describe The Liskov Substitution Principle (LSP). [1 Mark]

Question 4 [10 Marks]

4.1 Discuss the three(3) "parts or elements" of a design pattern. [6 Marks]

4.2 Differentiate between a nongenerative and a generative pattern? [4 Marks]

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