



PAN AFRICA CHRISTIAN UNIVERSITY

UNIVERSITY EXAMINATIONS: 2025/2026

END OF SEMESTER EXAMINATION

**BACHELOR OF SCIENCE INFORMATION TECHNOLOGY AND BACHELOR OF
BUSINESS INFORMATION TECHNOLOGY**

BSIT300/BIT300: OBJECT ORIENTED ANALYSIS AND DESIGN

DATE: WEDNESDAY, 10TH DECEMBER, 2025

TIME: 2:00PM-

4:00PM

DURATION: 2 HOURS

**INSTRUCTIONS: Question One is Compulsory, Choose Three Other
Questions**

SECTION A (COMPULSORY)

QUESTION ONE (15 Marks) Compulsory

a) Distinguish between the following terms:

- i. Object Oriented Analysis and Object Oriented Design.

[2

Marks]

- ii. Class and Object

[2

Marks]

b) Explain the four phases of unified process of software development process framework.

[4

Marks]

c) Based on the context specified, identify the most fitting UML relationship that best describes the relationship between each pair of objects or classes given. Answer with one of the following: *aggregation*, *association*, *generalization/specification*.

[2

Marks]

- i. In software process: People to Development Activity

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- ii. In Travel: Car Trunk to Luggage
- d) UML has become very popular among software developers. Highlight two reasons why it is important for software developers to use UML. **[2 Marks]**

e) Using a well labelled package diagram, create a package called structures with the following attributes public registration number, private address, protected exam results.

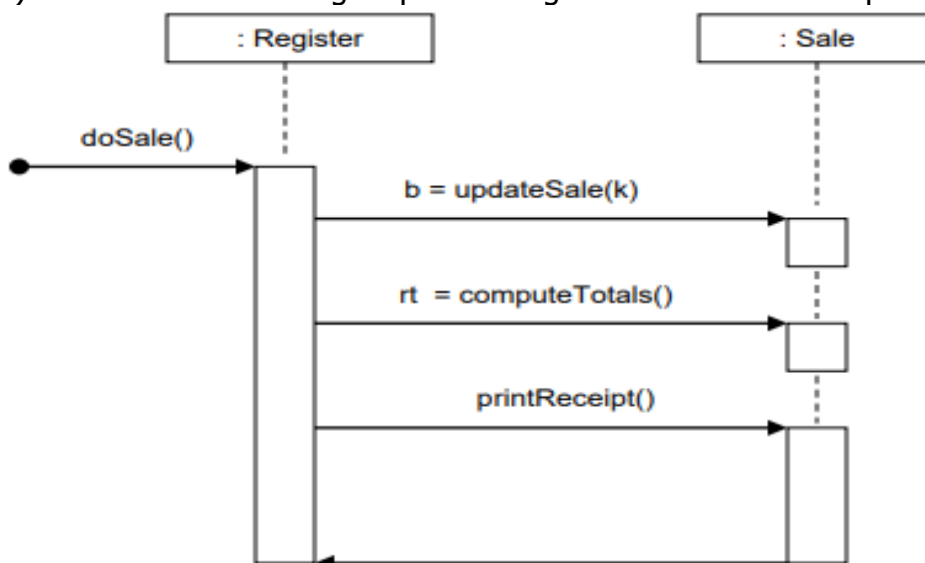
[3 Marks]

SECTION B: (ANSWER ANY THREE (3) QUESTIONS IN THIS SECTION)

QUESTION TWO (15 marks)

- a) Explain three key characteristics of an object- oriented analysis and design. **[3 Marks]**

- b) Examine the following sequence diagram and answer the questions that follow:



- i. Identify the lifeline. **[2 Marks]**

- ii. Explain what is happening in the sequence diagram above. **[4 Marks]**

c) The course administrator is responsible for managing course information in the Courseware Management System. As part of managing the course information, the course administrator carries out the following activities:

- i. Check if course exists

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- ii. If course is new, proceed to the "create Course" step
- iii. If course exists, check what operation is desired whether to modify the course or remove the course
- iv. If the modify course operation is selected by the course administrator the "Modify Course" activity is performed.
- v. If the remove course operation is selected by the course administrator, the "Remove Course" activity is performed.

Draw an activity Diagram for the above description.

[6

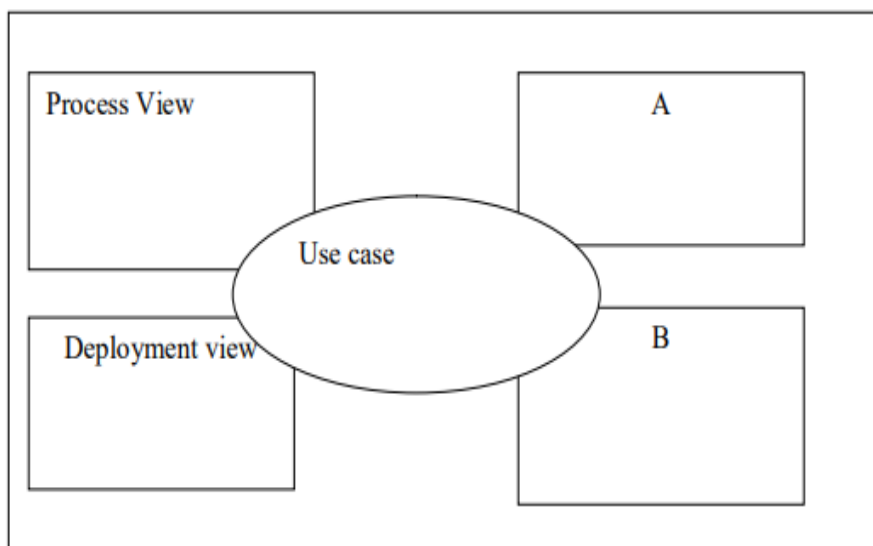
Marks]

QUESTION THREE (15 marks)

- a) Differentiate between <<include>> and <<extend>> relationships as used in use case diagram. **[2**

Marks]

- b) The diagram below shows the views of system's Architecture Model. Study it and answer the questions that follow.



- i. Identify the views.

[2

Marks]

A.....

B.....

- ii. Explain the view that addresses system topology and delivery.

[3

Marks]

- c) A busy Restaurant consists of one Chef, a customer and one Waiter. The Chef is responsible for ordering all the food ingredients, preparation of the food and doing the washing up. The Waiter is responsible for taking the customer order, preparing the bill and taking the payment made by the customer. The customer browses the menu, orders the food, consumes the food, orders the bill and pays the bill.

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Draw the Use Case Diagram for the Restaurant showing role of Chef, Waiter and Customer. **[8**

Marks]

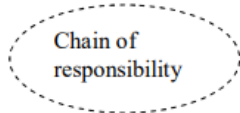
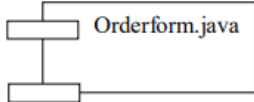
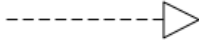
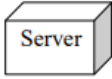
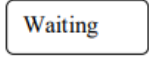
QUESTION FOUR (15 marks)

a) A client has approached you to develop a program for his startup company. As a programmer you choose to use object oriented approach. State three reasons why you choose object oriented approach. **[3**

Marks]

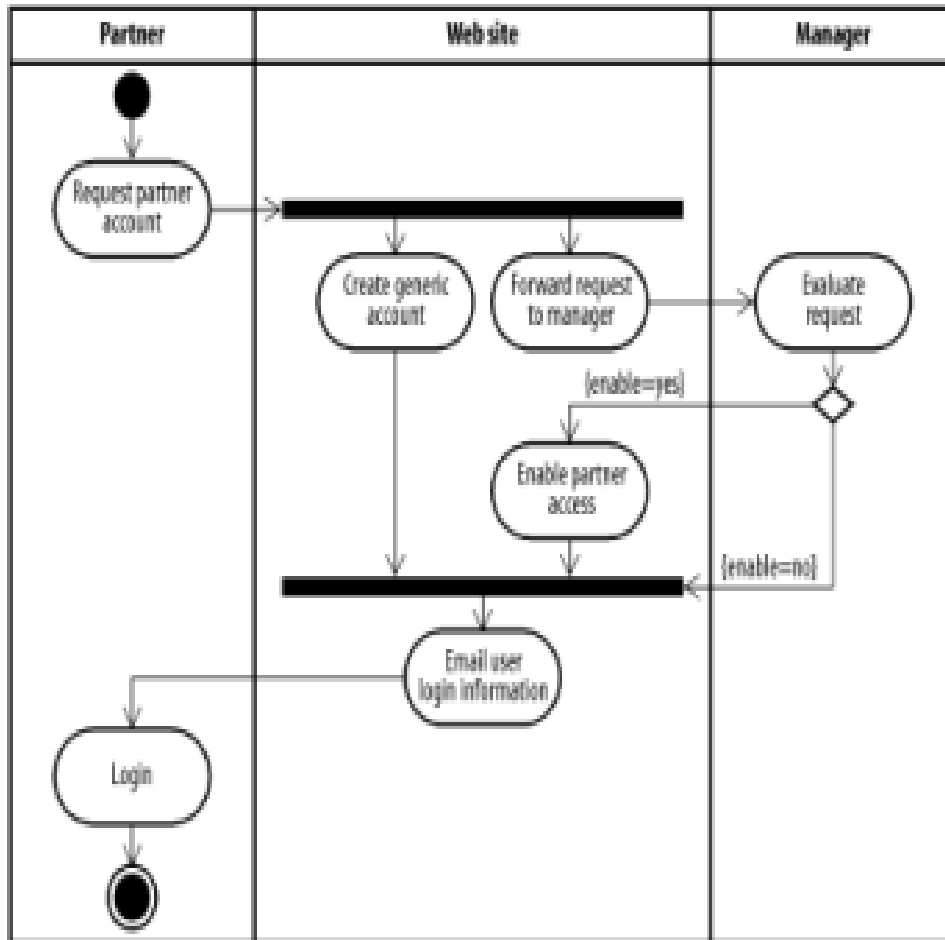
b) The table below shows the building blocks of the Unified Modeling Language (UML). Study the diagrams carefully and name each of them.

[4 Marks]

Building blocks of UML	
Diagram	Name
	Colaborations
(i) 	
(ii) 	
(iii) 	
(iv) 	

b) Answer the questions that follow the UML diagram below.

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- i. Identify the type of diagram represented in the figure above. **[1 Mark]**
- ii. State how the above diagram represents parallel programming. **[3 Marks]**
- iii. Explain in detail two individual component parts that make up the above diagram. **[4 Marks]**

QUESTION FIVE (15 marks)

a) Describe the significance of Object Model in Object-Oriented Analysis Design.

[2

Marks]

b) Explain the importance of the following OOP paradigms.

[6

Marks]

- i. Encapsulation
- ii. Polymorphism
- iii. Abstraction

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c) Consider a system where a student is required to login to online portal with a student Id number, and their password. The student can check fee balance, generate fees statement, and check provisional results. Develop a sequence diagram to model this system interaction. Show the objects involved in the interaction and the messages to be sent across.

[7 Marks]

QUESTION SIX (15 marks)

Examine the following bank scenario and answer the questions that follow:

A bank contains many customer records. An account can be opened at the bank, and deposits or withdrawals can also be made. Customer records that the bank holds are about the account(s) customers have in the bank. Every account contains details such as customer name, account number and the current balance. There are two types of accounts that the bank can maintain namely: savings and current. A savings account has a minimum balance that a customer must maintain at any given time; whereas for a current account customers have an overdraft which also has a limit. A customer with a current account can withdraw up to the overdraft limit whereas a customer with a savings account can only be allowed to withdraw up to the minimum balance put by the bank for that account. Each account also maintains a series of transaction records which detail the type of transaction (i.e. debit or credit) and the amount being transacted.

From the above do the following tasks:

- i. Identify the classes that evident in the description text above. **[3 Marks]**
- ii. Identify the attributes and operations for the classes in (i.). **[4 Marks]**
- iii. Identify the relationship instances that exists between these classes. **[3 Marks]**
- iv. Draw a design class diagram for that will fit the above description. **[5 Marks]**

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