



(Knowledge for Development)

KIBABII UNIVERSITY (KIBU)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

END OF SEMESTER EXAMINATION

2021/2022 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER EXAMINATION

**FOR THE DEGREE OF BACHELORS OF SCIENCE IN
(COMPUTER SCIENCE)**

COURSE CODE: CSC 362E

COURSE TITLE: OBJECT ORIENTED ANALYSIS AND DESIGN

DATE: 19/05/2022

TIME: 9.00 A.M. – 11.00 A.M.

2HRS

INSTRUCTIONS TO CANDIDATES:

ANSWER QUESTION ONE AND ANY OTHER TWO.

Paper Consists of 4 Printed Pages. Please Turn Over ►

QUESTION ONE [COMPULSORY]

[30 MARKS]

- a) (i) Briefly explain what is meant by the object oriented approach to systems development. **[2 marks]**
(ii) Highlight any three limitations of earlier development approaches, which necessitated **[3 marks]**
- b) Distinguish between the 'IS-A' relationship from the "HAS-A' relationship. Provide an example for each **[4 marks]**
- c) Object modeling develops the static structure of the software system in terms of objects. Explain how this process can be visualized. **[4 marks]**
- d) i. Differentiate between Aggregation and Composition and explain in details how subclass-Superclass relation and aggregation can be identified in a project? **[4 marks]**
ii. What are the major properties of a-part-of relation? Explain with relevant examples **[3 mark]**
- e) Explain any THREE limitation of using a Data Flow Diagram during functional Modeling process. **[3 marks]**
- f) Discuss briefly the FIVE main primary tasks you will pursue during Object Oriented Analysis. **[5 marks]**
- g) What does it mean to say that complex systems generally evolve from stable intermediate forms? **[2 marks]**

QUESTION TWO

[20 MARKS]

- a) In object-oriented analysis and design, what is meant by "key abstraction" and why is this concept important? Give an example. **[4 Marks]**
- b) Explain what is meant by domain analysis in the context of object-oriented analysis and design **[2 marks]**
- c) Briefly describe the following terms: Conceptual model, logical model and physical model **[6 marks]**
- d) Describe any TWO problems that may be encountered when software developers fail to address the issue of complexity of the software system in advance. **[4 marks]**
- e) Name and briefly describe any TWO attributes of a complex system. **[4 marks]**

QUESTION THREE

[20 MARKS]

- a) Differentiate between the following object oriented terms: [4 Marks]
- (i) Activity vs Action
 - (ii) Class diagram vs Package diagram
- b) The Conceptual Model of UML encompasses THREE major elements. Discuss these elements in details. [6 Marks]
- c) **Consider a bank system:** A bank has many branches. In each zone, one branch is designated as the zonal head office that supervises the other branches in that zone. Each branch can have multiple accounts and loans. An account may be either a savings account or a current account. A customer may open both a savings account and a current account. However, a customer must not have more than one savings account or current account. A customer may also procure loans from the bank.
- Required:**
- i. Identify Classes in the system [2 Marks]
 - ii. Specify the nature of relationships depicted in the bank system [2 Marks]
 - iii. Construct a class diagram to model this scenario. [6 Marks]

QUESTION FOUR

[20 MARKS]

- a) Activity diagrams provide visual depictions of the flow of activities. It is a diagram of the details of a use case. Briefly outline the elements of an activity diagram showing clearly how these elements are represented in UML. [4 marks]
- b) What is a component diagram and which roles does it play in object modeling. [4 marks]
- c) Consider an Automated Trading House System that has the following features of the system
- The trading house has transactions with two types of customers, individual customers and corporate customers.
 - Once the customer places an order, it is processed by the sales department and the customer is given the bill.
 - The system allows the manager to manage customer accounts and answer any queries posted by the customer.

You are required to draw:

- i. Use case diagram for Automated Trading House System [4 marks]
- ii. Sequence diagram for Automated Trading House System [4 marks]
- iii. Activity diagram for Automated Trading House System [4 marks]

QUESTION FIVE**[20 MARKS]**

- a) Write a suitable code extract using C++ or java to illustrate the concept of inheritance. **[2 marks]**
- b) After the hierarchy of subsystems has been developed, the objects in the system are identified and their details are designed. Here, the designer details out the strategy chosen during the system design. The emphasis shifts from application domain concepts toward computer concepts. The objects identified during analysis are etched out for implementation with an aim to minimize execution time, memory consumption, and overall cost. Explain various phase followed to achieve this processes. **[6 marks]**
- c) Consider a Wholesaler Software system that automates the transactions of a wholesale shop. The shop sells in bulks and has a clientele comprising of merchants and retail shop owners. Each customer is asked to register with his/her particulars and is given a unique customer code, C_Code. Once a sale is done, the shop registers its details and sends the goods for dispatch. Each year, the shop distributes Christmas gifts to its customers, which comprise of a silver coin or a gold coin depending upon the total sales and the decision of the proprietor.

Required:

- i. Identify the actors in the system **[2 marks]**
- ii. The three processes in the system **[2 marks]**
- iii. The data stores that will be required **[2 marks]**
- iv. Draw a data flow diagram (DFD) for Wholesaler Software system. **[6 marks]**