KISII UNIVERSITY
UNIVERSITY EXAMINATIONS
THIRD YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN SOFTWARE ENGINEERING/IT
FIRST SEMESTER 2022/2023
[SEPTEMBER-DECEMBER, 2022]

COMP 389/BIT 301: OBJECT ORIENTED ANALYSIS AND DESIGN

STREAM: Y3S1   **TIME: 2 HOURS**

DAY: THURSDAY, 12:00 – 2:00 PM   **DATE: 08/12/2022**

INSTRUCTIONS

1. *Do not write anything on this question paper.*
2. *Answer question ONE and any other TWO questions.*

QUESTION ONE [30 MARKS]

a. Is it appropriate for one to start coding immediately an analysis model has been created? Explain your reasoning. [3 Marks]

b. Describe the four elements of an effective analysis model. [4 Marks]

c. Distinguish between structured analysis and object oriented analysis. [4 Marks]

d. Discuss the relationship between the concept of information hiding as an attribute of effective modularity and the concept of module independence. [4 Marks]

e. With the use of an example, distinguish between use case include and use case extend relationships. [4 Marks]

f. Students have a student number and are on a particular course e.g. BIT. Courses have duration (number of years). Each course has a maximum of 7 units per semester. Each course belongs to a given department. A course cannot commence if it has not attained a minimum requirement of enrolling 15 students. Identify different objects, their attributes and the operations. [6 Marks]

g. Draw a use case model showing a number of use cases involved in a library system when a user borrows a book. Show the "include", "exclude" and "generalization" relationships where necessary. [5 Marks]

QUESTION TWO [30 MARKS]

a. Models are used during analysis phase to help elicit the requirements and during design to describe the system to implementation engineers and during. While stating the appropriate diagram for each case, explain the different perspectives for which you can develop a model.   [10 Marks]

b. Draw a use case diagram to model the main interactions that takes place right from when a student registers for units up to when a student prints an exam card.   [10 Marks]

QUESTION THREE [30 MARKS]

a. A student types on an electronic form student ID, Name and up to seven units that the student wishes to register. The full form is typed without any checking. The form is submitted and if the units are on offer, the student is allocated to each of the unit chosen. Before a student is allocated a unit, the system must check for availability of each unit. If a student fails to be added to a unit, then the student must be informed that this has happened. Model this scenario using the sequence diagram.   [12 Marks]

b. Explain circumstances when appropriate to implement a modular design as a monolithic software.   [8 Marks]

QUESTION FOUR [30 MARKS]

a. Using a stepwise refinement approach, develop three different levels of procedural abstraction for a program to develop a simple task scheduling algorithm for an operating system.   [10 Marks]

b. Based on your experience with a bank ATM,
  i. Draw an activity diagram that models the data processing involved when a customer withdraws money from the ATM.   [8 Marks]
  ii. Will it be appropriate to develop a sequence diagram to model the same process? Explain your reasoning.   [2 Marks]

QUESTION FIVE [30 MARKS]

a. Draw a state diagram of the control software for an automatic washing machine that has different programs for different types of clothes.
                [10 Marks]

b. Nurses work on a particular ward. Doctors are assigned a number of patients and during their rounds visit a number of different wards. If a doctor needs advice he/she may consult with a specialist consultant regarding a particular patient. The specialist may see the patient. Specialists are basically senior doctors. Model this scenario using a class diagram. Include any inheritance where necessary.   [10 Marks]