KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN SOFTWARE ENGINEERING FIRST SEMESTER 2022/2023 [SEPTEMBER-DECEMBER, 2022]

SOEN 201: OBJECT ORIENTED ANALYSIS AND DESIGN

STREAM: Y2S1   **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. Distinguish between an object and a class   [2 Marks]

b. Explain the importance of the following object oriented concepts
   - i.   Polymorphism   [2 Marks]
   - ii. Encapsulation   [2 Marks]
   - iii. Information hiding   [2 Marks]

c. Explain three things that you should look at when identifying elements as objects in an environment   [3 Marks]

d. With the use of an example in each case, describe the three types of relations that can exist between classes   [6 Marks]

e. Describe the main elements of an activity diagram   [3 Marks]

f. Explain the importance of UML state diagrams in modelling   [2 Marks]

g. With the use of an example distinguish between object creation and object deletion in a sequence diagram   [4 Marks]

h. Explain the relationship between coupling and software portability [4 Marks]

QUESTION TWO [30 MARKS]

a. With the use of an illustration, describe the main steps during requirements elicitation and analysis [10 Marks]

b. Draw a use case diagram to demonstrate the events that takes place right from when a student reports session up to when a student prints an exam card. [10 Marks]

QUESTION THREE [30 MARKS]

a. Using an example in each case, describe the different types of inheritance that can exist between a class and its sub-classes. [10 Marks]

b. Browns Bikes sells bicycles and bicycle parts. Bicycles are made up from a number of parts. Some of these parts are manufactured by Browns bikes, others are bought from suppliers. The bicycles and parts are manufactured and assembled by the factory workers. These products are sold by the salespeople to customers. There are retail and wholesale customers. The firm also operates a special scheme for direct sales to employees. Sales orders from the salespeople are passed to the office staff who create the factory schedules for manufacturing and assembling. The sales orders are also used to create the invoices which are then sent to customers.
Model this scenario using a class diagram. [10 Marks]

QUESTION FOUR [30 MARKS]

a. Draw a state diagram for an automatic irrigation system which allows plants to be watered when the moisture level goes down. [10 Marks]

b. Draw an activity diagram for a library system where the activity is that of a member borrowing and/or returning a book to/from the library. [10 Marks]

QUESTION FIVE [30 MARKS]

a. Based on your experience with a bank ATM,
   i. Draw a sequence 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 activity diagram to model the same process? Explain your reasoning. [2 Marks]

b. You are a software engineering manager and your team proposes the use of a model-driven engineering approach to develop a new system. Discuss the main factors of consideration in deciding whether or not use this new approach to software development. [10 Marks]