



MACHAKOS UNIVERSITY

University Examinations for 2021/2022

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (MATHEMATICS AND COMPUTER SCIENCE)

BACHELOR OF EDUCATION (SCIENCE)

BACHELOR OF SCIENCE (MATHEMATICS)

SMA 490: SYSTEMS ANALYSIS AND DESIGN

DATE: 14/12/2021

TIME: 8.30-10.30 AM

INSTRUCTIONS:

This paper consists of FIVE questions

*Answer question **ONE** and other **TWO** questions in this paper.*

QUESTION ONE (30 MARKS)

- (a) (i) Define the term *system design* as used in Information Technology. (2 marks)
- (ii) Explain two characteristics of a closed system. (4 marks)
- (b) (i) Using entities Student and Lecturer show each of the following types of relationships between the two entities in entity relation diagrams.
 - I. One to many; (2 marks)
 - II. Many to many. (2 marks)
- (ii) Mary, a system analyst was requested to maintain an information system. Explain **three** types of maintenance she could carry. (6 marks)
- (c) (i) Describe the most appropriate output method for persons who are vision impaired. (2 marks)
- (ii) A university commissioned a software development project which seems to be failing. Explain **three** symptoms that the project could be exhibiting. (6 marks)
- (d) When invoicing customers, a cashier in a furniture shop works out the discount allowable on each order. Any order over Ksh. 50,000 attracts a discount of 10%, A customer within the trade is allowed a discount of 5% and a regular customer is allowed a discount of 2%.
Using a decision tree, model this case. (6 marks)

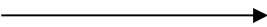
QUESTION TWO (20 MARKS)

- (a) Outline **three** components of an information system. (3 marks)
- (b) A bank has advised its customers that its mobile banking will not be available between midnight and 5 O'clock in the morning due to system update.
- (i) Identify the implementation method the bank has adopted. (1 mark)
- (ii) Explain two other implementation methods the bank could use. (4 marks)
- (b) A system analyst investigates the viability of a system before initiating the process of designing the system using feasibility studies. Explain **three** types of such studies. (6 marks)
- (c) Comrade Canteen has a system for processing customer orders. A customer gives a food order to a waiter. The waiter orders the food from a chef who then prepares the food. The Chef gives the food to a waiter who then serves the customer. A customer eats the food and pays to the cashier. The customer may or may not a soft drink.
- Model this scenario using *use case* diagram. Use extends where appropriate. (6 marks)

QUESTION THREE (20 MARKS)

- (a) Outline the type of system used at each level of management. (3 marks)
- (b) Describe two stakeholders involved in the development of system. (4 marks)
- (c) For an information system to work efficiently it should have a suitable user interface. Explain **three** types of interfaces that could be included in a system. (6 marks)
- (d) Read the case below and use it to answer the question that follows:-
- Infant passengers under two years old are offered a discount of 80% on domestic flights. Infant passengers under two years old are offered a discount of 70% on international flights. Youth passengers (between two and sixteen) are offered a discount of 10%, for any kind of destination. Passengers who make reservation five months before their journey are offered a discount of 10%. For international flights, passengers are offered 15% discount if they travel during off-season. There would be no discount for international flights, except that when the passenger is an infant passenger or when travelling during off-season. Frequent flyer enjoys a discount of 15%. The amount of discount is accumulated. The maximum amount of discount for infant passengers is 80%. The maximum amount of discount for non-infant passengers is 20%.
- Create a decision table for the case. (7 marks)

QUESTION FOUR (20 MARKS)

- (a) (i) Explain each of the following terms as used in Human Computer Interactions.
- I. Accessibility; (2 marks)
 - II. Acceptance. (2 marks)
- (ii) Distinguish between *fit* and *well-being* as used in Human Computer Interaction. (4 marks)
- (b) An organization that deals with manufacturing of two products A and B intends to decide on which of the two products to produce. The organization requires Ksh. 50,000 and Ksh. 80,000 to produce products A and B respectively. Product A sells at Ksh. 200,000 while product B sells at Ksh. 250,000 when complete.
- Using a decision tree, advise the organization on the most profitable product. (6 marks)
- (c) Amani used the following objects to represent various relationships during system design.
- (i) 
 - (ii) 
- Name the type of relationship represented by each object. (2 marks)
- (d) A class *Vehicle* has two subclasses *Saloon* and *Pickup*. *Vehicle* has attributes *regno.*, *length*, *manufacturer* and *year*. *Saloon* has *passengers*, *color* and *enginetype*. *Pickup* has *tonnage* and *fueltype*.
- Represent this information in a class diagram. (4 marks)

QUESTION FIVE (20 MARKS)

- (a) (i) Define the term documentation as used in System Analysis and Design. (2 marks)
- (ii) John, a system analyst would like to test a student he has developed. Explain **three** methods he could use in order to achieve this goal. (6 marks)
- (b) Distinguish between *waterfall* and *spiral* system development methodologies. (4 marks)
- (c) A student was required to develop a system as part of his course work. Describe **two** fact finding methods that he could use in order to gather the system requirements. (4 marks)
- (d) A student developed a prototype to model a system he was creating. Justify his choice of this methodology of system development. (4 marks)