MACHAKOS UNIVERSITY

University Examinations for 2017/2018

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FOURTH YEAR SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE

SMA 490: SYSTEMS ANALYSIS AND DESIGN

DATE: 24/8/2018 **TIME: 8:30 – 10:30 AM**

INSTRUCTIONS

This paper consists of FIVE questions
Answer question ONE and other TWO questions in this paper.

1. (a) (i) Define the term *system thinking* as used in Information Technology. (2 marks)

(ii) Explain **two** characteristics of an open system. (4 marks)

(b) (i) Using entities ***Patient*** and ***Doctor*** show each of the following types of relationships between the two entities in entity relation diagrams.

I. many to many;

II. many to one. (4 marks)

(ii) A Student Management Information System in a certain University has frequent down times. Explain **three** types of maintenance that could be carried out on the system. (6 marks)

(c) (i) Describe the most appropriate output method that can be provided in a system for persons with each of the following conditions:

I. hearing impairment;

II. color blind. (2 marks)

(ii) Describe **three** methodologies that could be used to develop a system. (6 marks)

(d) The Ministry of Health has estimated that a disease outbreak has a 40% chance of being high, a 30% chance of being fair and 30% chance of being low. The cost of eradicating the disease is Ksh. 300000. It is also estimated that the government will save Ksh. 2 million, 3 million and 4 million in treatment costs when the chances are high, fair or low respectively.

Using a decision tree, model this case. (6 marks)

2. (a) (i) Define the term *feasibility study* as used in systems analysis and design. (2 marks)

(ii) Describe **two** types of feasibility studies that may be carried out by a system analyst. (4 marks)

(b) A telecommunication company in Kenya recently informed its subscribers that its services will not be available for four hours due to system upgrade.

(i) Identify the most probable change over method the company could be using. (2 marks)

(ii) Explain **two** advantages of the method identified in (i). (4 marks)

(c) An applicant wishing to join a university applies to the registrar for admission. The registrar admits the applicant. Once admitted one may request the dean of students to be allocated a hostel room. If there is a vacant room, the dean of students allocates the room and directs the applicant to the housekeeper for issuance of a key to the room.

Model this scenario using *use case* diagram. Use extends where appropriate. (8 marks)

3. (a) (i) Define the term *robotics* as used in systems analysis and design. (2 marks)

(ii) Describe **two** components of an expert system. (4 marks)

(b) A manufacturing company is developing a new system to automate its operations. Explain **three** reasons that could have necessitated this. (6 marks)

(c) 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-seasons. 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. (8 marks)

4. (a) (i) Explain each of the following terms as used in Human Computer Interaction.

I. usability;

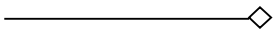
II. fit. (4 marks)

(ii) Distinguish between *acceptability* and *accessibility* as used in Human Computer Interaction. (4 marks)

(b) A newly chartered University would like to develop a Student Management Information System. Describe **three** types of user interface that may be included in the system. (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 *Commercial* and *Private. Vehicle* has attributes *regno*., *make*, *colour* and *capacity. Commercial* has *model*, *weight* and *load*. *Private* has *shape* and *fuel.*

Represent this information in a class diagram. (4 marks)

5. (a) (i) Define the term *problem analysis* as used in System Analysis and Design. (2 marks)

(ii) Explain each of the following types of system testing.

I. Unit testing;

II. Alpha testing;

III. Integration testing. (3 marks)

(b) A company has developed a system for its operations.

(i) Describe **two** stakeholders that would be consulted during the development stages. (4 marks)

(ii) Outline **four** benefits that the company would realize from this. (4 marks)

(c) Before a system is developed there is need to gather and record user requirements. Describe **two** methods that could be used to record these requirements. (4 marks)

(d) John, a manager at CitiCyber Company initiated the process of developing a new system for the company however the process has stalled. Outline three reasons that could have led to this. (3 marks)