



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 421/SIT 408: DECISION SUPPORT SYSTEMS

DATE: 29/4/2019

TIME: 2.00-4.00 PM

INSTRUCTIONS

Answer **question ONE** and any other **TWO** questions.

QUESTION ONE (COMPULSORY, 30 MARKS)

- a) Distinguish between Information and Knowledge (2 marks)
- b) Explain the following terms:
 - i. Decision support systems (DSS) (2 marks)
 - ii. Automated decision systems (ADS) (2 marks)
 - iii. Business intelligence (BI) (2 marks)
 - iv. Data mining (2 marks)
 - v. Work system (2 marks)
- c) Describe the application of the following terms as used in Expert Systems:
 - i. Certainty (1 mark)
 - ii. Uncertainty (2 marks)
- d) Use a diagram to explain the phases in Knowledge Management System Cycle (5 marks)
- e) Compare Blind search to Heuristic search (4 marks)
- f) Distinguish between Iconic model and Analog model (2 marks)
- g) Briefly describe the technologies used to Support knowledge management (4 marks)

QUESTION TWO (20 MARKS)

- a) What is a model (1 mark)
- b) Describe the Structure of Mathematical Models for Decision Support (5 marks)
- c) What are the benefits of using models in decision making? (5 marks)
- d) Use the dataset below to learn a decision tree which predicts if people pass machine learning (Yes or No), based on their previous GPA (High, Medium, or Low) and whether or not they studied.

GPA	Studied	Passed
L	F	F
L	T	T
M	F	F
M	T	T
H	F	T
H	T	T

- i. What is the entropy $H(\text{Passed})$? (2 marks)
- ii. What is the entropy $H(\text{Passed} \mid \text{GPA})$? (2 marks)
- iii. What is the entropy $H(\text{Passed} \mid \text{Studied})$? (2 marks)
- iv. Draw the full decision tree that would be learned for this dataset. You need to show all the calculations. (3 marks)

QUESTION THREE (20 MARKS)

- a) List down the tools used in data mining (4 marks)
- b) Use diagrams to describe the various database models (5 marks)
- c) What are the phases of decision making process (4 marks)
- d) Describe the Components of a Decision Support System (DSS) (7 marks)

QUESTION FOUR (20 MARKS)

- a) What are the advantages of using Prototyping technique in Decision Support Systems (DSS)? (5 marks)
- b) What are the disadvantages of using Prototyping technique in Decision Support Systems (DSS)? (5 marks)

- c) Suppose you want to choose between two business projects: Investment in Mangoes sales or investment in Pineapple sales in Machakos town. What if the Mangoes business has a 50% chance of success and a 50% chance of failure? If it is a success, the Mangoes business can earn you upto Ksh 100000 and if it fails you lose Ksh30000. And if you choose to invest in Pineapple business, you have a 50% chance of success and a 50% chance of failure. If the Pineapple business succeeds you earn Ksh 90000 and if it fails you lose Ksh 10000. Suggest the business type that you will prefer to invest in. Show how you arrive to the answer using a decision tree. (7 marks)
- d) Describe the methods used for sensitivity analysis (3 marks)

QUESTION FIVE (20 MARKS)

- a) What are the components of a Linear Programming (LP) problem? (5 marks)
- b) What are the advantages of using simulations in Decision Support Systems? (5 marks)
- c) What are the disadvantages of using simulations in Decision Support Systems? (5 marks)
- d) Describe the methodology used for simulation in DSS (5 marks)