



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 113: FOUNDATIONS OF ARTIFICIAL INTELLIGENCE

DATE: 14/12/2020

TIME: 2.00-4.00 PM

INSTRUCTIONS

Answer question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

- a) State three types of intelligence. (3 marks)
- b) Discuss three applications of Artificial Intelligence in smart phones: (6 marks)
- c) An Expert System has the following facts and rules

RULES

R1: IF one has at least 1 million shillings to invest AND has basic knowledge of running businesses THEN he should invest in securities.

R2: IF the persons annual income is 50 million AND has basic knowledge of running businesses THEN he should invest in stocks.

R3: IF a person is younger than 30 but older than 22 THEN he should invest in stocks.

R4: IF a person is younger than 30 but older than 22 THEN he has basic knowledge of running businesses.

R5: IF a person is wants to invest in stocks THEN he should invest KenGen shares.

FACTS:

F1: Jack has at least 1 million shillings to invest.

F2: Jack is 25 years old

- i. Use forward chaining to generate Jack's status. (4 marks)
- ii. Rewrite rules 1 and 2 in predicate logic form (4 marks)
- d) Explain two attributes of an agent environment (4 marks)
- e) Giant technology vendors like Microsoft and IBM have greatly contributed to developing AI platforms and applications. Discuss two vendor specific AI applications that are already in use. (5 marks)
- f) AI has been applied in organizations like banks and colleges to solve various problems. Discuss two types of machine learning that can be used in these organizations. (4 marks)

QUESTION TWO (20 MARKS)

- a) Machine learning is an important component of AI. Discuss Artificial Neural Networks as a machine learning method. (6 marks)
- b) AI has been widely applied in different fields. Discuss two ways in which AI has been applied in the entertainment industry. (4 marks)
- c) You have been selected to be part of the team that is assigned the task of developing a knowledge-based system. Describe the phases your team must undertake in the process of acquiring knowledge for the system. (10 marks)

QUESTION THREE (20 MARKS)

- a) Given the statement below:
Everyone dislikes beef.
Task:
 - i. Write the statement in predicate logic (4 marks)
 - ii. Re-write the statement below using existential quantifier. (4 marks)
- b) Show the validity of the following statement using truth tables.
 $\neg(P \wedge Q) \rightarrow \neg P \vee \neg Q$ (6 marks)
- c) Explain three methods for representing knowledge for an AI system (6 marks)

QUESTION FOUR (20 MARKS)

- a) John wants to deploy a robot in an industrial environment. Explain four functions he is likely to implement. (8 marks)
- b) One method of making machines intelligent is through training them. Discuss three challenges that can be experienced while training systems. (6 marks)
- c) Natural Language Processing is one of the main areas of artificial intelligence that has been widely explored. Discuss three areas of application related to NLP. (6 marks)

QUESTION FIVE (20 MARKS)

- a) Given the facts below:

Facts:

likes(john,flowers).

likes(john,mary).

likes(paul,mary).

Evaluate the following goals:

- i. ?likes (john, flower).
- ii. ?likes (john, flowers).
- iii. ?likes (john, mary).
- iv. ?likes (john, X).
- v. ?likes (X, mery). (10 marks)
- b) Discuss five disciplines from which artificial intelligence borrows concepts. (10 marks)