



MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (MATHEMATICS AND COMPUTER SCIENCE)

SCO 113: FOUNDATIONS OF ARTIFICIAL INTELLIGENCE

DATE: 15/6/2021

TIME: 2.00-4.00 PM

INSTRUCTIONS

Answer question ONE and any other TWO questions.

QUESTION ONE (30 MARKS) (COMPULSORY)

- a) State four types of agent environments (4 marks)
- b) Explain three foundational disciplines of Artificial Intelligence (6 marks)
- c) Distinguish between Modus Ponens and Modus Tollens using examples in each case. (4 marks)
- d)
 - i Define the term state as used in game theory. (2 marks)
 - ii Explain two types of states that can be used in a game search problem. (4 marks)
 - iii Distinguish between a universal and existential quantifier with the aid of an example. (4 marks)
- e) Discuss three approaches of learning that can be used for machine learning applications. (6 marks)

QUESTION TWO (20 MARKS)

- a) James, a student of BSC math's and computer science wants to know the relevance AI. Explain to him in details why AI would be important to:
 - i. A College (4 marks)
 - ii. Motor Vehicle Industry (4 marks)

- b) Explain three advantages of using production rules as a method of representing knowledge for AI systems. (6 marks)
- c) Write the following statements in predicate Logic:
 - i. Some dogs bark. (3 marks)
 - ii. Barking dogs are irritating. (3 marks)

QUESTION THREE (20 MARKS)

- a) Explain three types of knowledge that can be used for reasoning in an AI system. (6 marks)
- b) Discuss the Turing test with respect to artificial intelligence. (4 marks)
- c) KNEC wants to deploy an agent for electronically marking KCPE papers called MARKBOT agent. Use the PEAS description model to describe the MARKBOT agent. (10 marks)

QUESTION FOUR (20 MARKS)

- a) Ken wants to train a system so that it is able to classify mails as spam or non-spam. Discuss the process that he is likely to use to train the system using supervised learning method. (10 marks)
- b)
 - i. Distinguish between tautology and contradiction in propositional logic. (3 marks)
 - ii. Using examples in each case draw truth tables to highlight each of these concepts in (i) above. (7 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). (2 marks)
 - ii. ?likes (john, flowers). (2 marks)
 - iii. ?likes (john, mary). (2 marks)
- b) Explain four applications of natural language processing. (8 marks)
- c) Explain three algorithms that can be used to train AI systems. (6 marks)