



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (MATHEMATICS AND COMPUTER SCIENCE)

SCO 113: FOUNDATIONS OF ARTIFICIAL INTELLIGENCE

DATE: 23/9/2019

TIME: 2:00 – 4:00 PM

INSTRUCTIONS:

Answer Question One and Other Two Questions.

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) State three types of intelligence (3 marks)
- b) Describe four applications of Artificial Intelligence: (8 marks)
- c)
 - i). State two knowledge inference techniques according to De' Morgan (2 marks)
 - ii). Distinguish between backward and forward chaining (4 marks)
- d)
 - i). Explain two attributes of an intelligent agent (4 marks)
 - ii). Distinguish between a universal and existential quantifier with the aid of an example. (4 marks)
- e) Write a PROLOG program that prompts and reads two integer numbers and then it determines and displays the largest number. Your program should display "Equal numbers" if the numbers are equal. (5 marks)

QUESTION TWO (20 MARKS)

- a) Distinguish between symbolic and non-symbolic computing (4 marks)
- b) Frames and Semantic networks are knowledge representation schemes. Briefly explain any three advantages for each of these schemes. (6 marks)
- c) Explain the principal components of a Production System. (6 marks)
- d) Show that $\neg (P \wedge Q) \equiv \neg (\neg (\neg P \vee \neg Q))$ using truth tables (4 marks)

QUESTION THREE (20 MARKS)

- a) Explain three hill climbing techniques (6 marks)
- b) Explain two ways in which AI can be applied in medicine and 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 FOUR (20 MARKS)

- a) Explain five types of knowledge that can be represented and used to solve problems in Artificial intelligence. (10 marks)
- b) With the aid of relevant examples, explain the main approaches to Artificial Intelligence that embodies all its concepts and theories. (10 marks)

QUESTION FIVE (20 MARKS)

- a) Discuss five methods that can be used to analyze a search strategy. (10 marks)
- b) Given the 8-puzzle problem below, show how to move from the initial state to the goal state using heuristic function. (10 marks)

Initial State

1	2	3
5	6	4
8		7

Goal State

1	2	3
4	5	6
7	8	