



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 (COMPUTER SCIENCE)

SCO 410: KNOWLEDGE BASED SYSTEMS

DATE: 30/4/2019

TIME: 8.30-10.30 AM

INSTRUCTIONS

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

QUESTION ONE (30 MARKS)

- a) Several strategies may be used to choose the rules to fire from the conflict set: Discuss these strategies. (5 marks)
- b) Describe the architecture of a typical rule based expert system (6 marks)
- c) Discuss four benefits of Expert systems (4 marks)
- d) Discuss the following uninformed search methods (Blind) (2 marks)
 - i. Depth –first search
 - ii. Iterative deepening search (2 marks)
 - iii. Bi-directional search (2 marks)
- e) Explain the following terms as used in Artificial intelligence
 - i. Intelligence (1 mark)
 - ii. Initial state (1 mark)
 - iii. Successor function (1 mark)
 - iv. Path cost (1 mark)

- f) Distinguish between data-directed and goal-directed analysis in rule-based systems. Which is preferred for medical diagnostic systems and why? (5 marks)

QUESTION TWO (20 MARKS)

- a) A knowledge based systems (KBSs) are developed to deal with particular application domain in which alternative techniques are unable to produce reliable and manageable solutions. Identify and discuss five aspects of human intelligence that could be used to characterize intelligent knowledge-based systems (10 marks)
- b) Convert each of the following facts to First Order Logic (10 marks)
- Everyone is related to someone who is retired
 - For any x and Y ,if X is older than Y,then Y is younger than X
 - The mother and the Child is the female parent
 - Some intelligent students study computer science

QUESTION THREE (20 MARKS)

- a) Write down the algorithms for the following stack operations: (4 marks)
- Insert a new element into stack (4 marks)
 - Remove an element from the stack (4 marks)
- b) Discuss any two applications of Search Methods. (2 marks)
- c) It is argued that semantic network representation is closer to the way humans structure knowledge by building mental links between things than the predicate logic. Use the information below to create a semantic network. (8 marks)

Tom is a cat.

Tom caught a bird.

Tom is owned by John.

Tom is ginger in colour.

Cats like cream.

The cat sat on the mat.

A cat is a mammal.

A bird is an animal.

All mammals are animals.

Mammals have fur.

QUESTION FOUR – (20 MARKS)

- a) Using a suitable example show how Backward Chaining and Forward chaining Algorithm works? (8 marks)
- b) Describe any four applications of genetic algorithms (8 marks)
- c) Differentiate between blind and heuristic search algorithms (4 marks)

QUESTION FIVE – (20 MARKS)

- a) Reasoning is the process of drawing inferences or conclusions; moving from what is known (fact) to what is unknown (inference). Discuss any four types of reasoning. (10 marks)
- b) Giving examples, briefly describe the following terms as used in prolog.
 - i. Atom (1 mark)
 - ii. Variables (1 mark)
 - iii. Compound terms (1 mark)
- c) Discuss five ways in which agent is different from other software. (5 marks)
- d) What is search? (2 marks)