



MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR FIRST SEMESTER EXAMINATIONS FOR

BACHELOR OF SCIENCE (APPLIED PHYSICS AND TECHNOLOGY)

SIT305: FOUNDATIONS OF ARTIFICIAL INTELLIGENCE

DATE:

TIME:

INSTRUCTIONS:

Answer Question ONE and other TWO Questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) State three approaches to AI (3 marks)
- b) Differentiate between artificial intelligence, deep learning and machine learning. (6 marks)
- c)
 - i. Discuss modus ponens knowledge inference technique as proposed by De' Morgan (4 marks)
 - ii. Describe the structure of an intelligent agent (4 marks)
- d)
 - i) Discuss the application of AI in the manufacture of motor vehicles (4 marks)
 - ii) Analyze a vacuum tube cleaner agent using the PEAS description model. (4 marks)
 - iii) Jack wants to develop a system that is able to collect live news from around the world, sort and assign various journalists to follow up on the same.
- e) Explain the type of machine learning he can use to train the system. (3 marks)
- f) State two algorithms that fall in the category of e (i) above. (2 marks)

QUESTION TWO (20 MARKS)

- a) Explain FOUR areas where natural language processing has been applied. (8 marks)
- b) Discuss three steps of syntax analysis as used in natural language processing using a suitable example. (6 marks)
- c) You have been selected to be part of the team that is assigned the task of developing a chat bot for Machakos University customer care. Describe the steps you will use to achieve this task as a team. (6 marks)

QUESTION THREE (20 MARKS)

- a) Distinguish between production rules and propositions as used in AI using examples. (6 marks)
- b) Evaluate the following propositions using truth tables.
 - i). $(\neg P \vee Q) \Rightarrow (P \vee Q)$ (4 marks)
 - ii). $\neg (P \wedge Q) \vee (\neg P \wedge \neg Q) \wedge R$ (4 marks)
- c) Describe THREE tools or environments that can be used to do AI based projects. (6 marks)

QUESTION FOUR (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) Write the following statements in predicate Logic:
 - i. Some dogs bark. (2 marks)
 - ii. Barking dogs are irritating. (3 marks)
- d) Show how forward chaining can be used in reasoning using an illustration. (5 marks)

QUESTION FIVE (20 Marks)

- a) Draw a semantic network that includes the following objects: Jane, Machakos University, Ministry of Education, KUCCPS, Machakos County. (6 marks)
- b) Explain four types of intelligence apart from artificial intelligence. (8 marks)
- c) Discuss the Alpha Beta Pruning method for game playing. (6 marks)