MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIVERSITY ORDINARY EXAMINATION

2017/2018 ACADEMIC YEAR

FOUR YEAR **SECOND** SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

ICS 2405 – KNOWLEDGE BASED SYSTEMS

DURATION: 2 HOURS

DATE: 26TH APRIL, 2018

TIME: 9.00 – 11.00 A.M.

Instructions to Candidates:

1. Answer **Question 1** and **Any Other Two** questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

SECTION A – ANSWER ALL QUESTIONS IN THIS SECTION

QUESTION ONE

a) What do you understand by the term expert system? (2 marks)

b) Differentiate between information and knowledge, as it relates with KBS (2 marks)

c) State two applications of KBS (2 marks)

d) Discuss two technologies that have emerged from the KBS developments (2 marks)

e) What is a shell, explain its features? (2 marks)

f) List any four challenges that ES developers face while acquiring knowledge (2 marks)

g) State two merits that internet sources of expert knowledge have (2 marks)

h) Explain any two main objectives of knowledge representation in KBS (2 marks)

i) Explain the meaning of the following terms:

   i. Inference procedure

   ii. Valid expression (2 marks)

j) Differentiate between truth and facts, in regard to knowledge representation (2 marks)

k) List and explain four logical connectives that can be applied to a logic system (2 marks)

l) State any two basic elements of frame-based system method of knowledge representation (2 marks)

m) Explain any two basic components of a rule-based system method of knowledge representation (2 marks)

n) Write a code to execute the knowledge, using rule-based statements, "If there is power and no screen message display, then the computer if faulty" (2 marks)

o) Differentiate between casual reasoning and rule-based methods of inference (2 marks)

SECTION B – ANSWER ANY TWO QUESTIONS IN THIS SECTION

QUESTION TWO

a) Using a diagram, describe the general architecture of KBS (4 marks)

b) Citing examples, differentiate between procedural and declarative knowledge (4 marks)

c) Given the following predicate logic statements: "All animals have hooves." Write a prolog statement to represent a precise representation and explain their meaning (4 marks)

d) Explain the four advantages of combining frames and object oriented methods in an knowledge representation scheme (4 marks)

e) State two suitability factors of decision tree in knowledge representation as compared to decision tables (4 marks)

QUESTION THREE

a) State four differences between conventional program and expert systems (4 marks)

b) Describe four fields of application where expert systems development can be used (4 marks)

c) State two advantages and two disadvantages that automatic rule induction methods have in learning process of knowledge refinement (4 marks)

d) Use appropriate notations to represent the following statements:
"Whenever he wears shirts that have short sleeves, then he ends up either staying indoors at her house or drinks warm water." Explain your notations (4 marks)

e) Explain the use of script-based method of knowledge representation (4 marks)

QUESTION FOUR

a) Outline any four characteristic features of expert systems (4 marks)

b) Explain the basic steps that can be followed during knowledge acquisition process (4 marks)

c) Describe the theory of certainty factors (FCS), using evidence and belief (4 marks)

d) Explain the major features of semantic networks method of knowledge representation and then state one advantage and one disadvantage of SNS (4 marks)

e) Describe case based reasoning (CBR) method of inference mechanism (4 marks)