



TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATIONS FOR DEGREE IN:
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY (BSIT)

ICS 2405: KNOWLEDGE BASED SYSTEM

END OF SEMESTER EXAMINATION

SERIES: APRIL 2015

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions.

Attempt question **ONE (Compulsory)** and any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

Question One (Compulsory)

- a) Using appropriate examples, differentiate between the following:
- | | |
|--|-----------|
| (i) Forward chaining and backward chaining | (4 marks) |
| (ii) Declarative and procedural knowledge | (4 marks) |
| (iii) KBS & information system | (4 marks) |
- b) KBS are developed to deal with particular application domains in which alternative techniques are unable to produce reliable & manageable solution. Identify and discuss FIVE aspects of human intelligence that could be used to characterize intelligent knowledge based system (10 marks)
- c) Consider the following rules “ If one is drunk or sick then he/she is not sober.
Further, assume the following facts concerning the respective people:
- “Tony is sober”
- “Tom is not sober”
- “Esther is sick”

“Alice is not sick and is not drunk”

“John is very principled. He can never be drunk when sick”

Required:

State whether each of the following conclusions is TRUE or FALSE according to the above rules and facts based on the rules of propositioned logic **(4 marks)**

- (i) “Tony is not drunk and is not sick”
- (ii) “Either Tony is not drunk or is not sick”
- (iii) “Tom is either drunk or sick”
- (iv) “Alice is sober”
- (v) “John is never sick when drunk”

- d) State what kind of reasoning could be applicable in each of the following structures giving reasons in each case. **(4 marks)**
- (i) All people believe in life after death because Maume, whos is a person happens to do so.
 - (ii) When his car made a funny noise in the engine, he concluded it had a problem

Question Two

- a) Discuss FOUR techniques for acquiring knowledge **(4 marks)**
- b) Discuss FOUR challenges associated with knowledge acquisition **(4 marks)**
- c) Define the term expert system **(2 marks)**
- d) Discuss FOUR practical problem areas in which you may recommend the development of a KBS as opposed to a conventional is system. **(4 marks)**
- e) With an appropriate diagram, explain the structure of typical knowledge based system **(4 marks)**
- f) Distinguish between an expert system and a KBS **(2 marks)**

Question Three

- a) Explain the work of any FOUR personnel involved in expert system development **(4 marks)**
- b) Consider the following logical argument.
“Every KBS is intelligent, CYC is a KBS, therefore, CYC is intelligent.
Explain why the argument could not be valid symbolized using propositional logic and present the predicate logic form for the argument. **(5 marks)**
- c) Identify FOUR knowledge representation schemes **(4 marks)**
- d) State the desirable features of a knowledge representation scheme **(4 marks)**
- e) Distinguish between knowledge, information and data **(3 marks)**

Question Four

- a) Using your own words give a definition of Artificial intelligence **(2 marks)**
- b) Human beings carry out perceptual tasks giving THREE examples **(3 marks)**
- c) Identify THREE shortcomings of using natural languages for knowledge representation **(3 marks)**
- d) Convert the following to standard predicate logic using predicates **(8 marks)**

- (i) Some paper clips come in boxes
 - (ii) All paper clips are made of ductile material
 - (iii) All metal conduct electricity
- e) State FOUR advantages of production rules in artificial intelligence **(4 marks)**

Question Five

- a) Tasty (Cheese)
Tasty (bread)
Made-from (cheese, milk)
made-from (bread, floor)
has (milk, calcium)
has (floor, carbohydrates)

Based on the facts above, formulate a rule based clause using X, Y, Z to show that bread contains carbohydrates, therefore bread is made from floor and floor has carbohydrates. **(4 marks)**

- b) The following symbols are used in predicate calculus sentences. What are the names given to each of these symbols and what are the differences between them. **(6 marks)**
- c) Prolog clauses can either be facts or rules what is the difference between a fact and a rule. Give an example of each **(6 marks)**
- d) Define the following terms in predicate calculus.
- (i) Variable symbols **(2 marks)**
 - (ii) Function symbols **(2 marks)**