TECHNICAL UNIVERSITY OF MOMBASA

INSTITUTE OF COMPUTING AND INFORMATICS

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR:

BSC. INFORMATION TECHNOLOGY

ICS2405: KNOWLEDGE BASED SYSTEMS

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2HOURS

DATE: Pick Date Apr 2016

Question ONE

(a) Give a definition of "Expert System". Outline how Expert Systems can be distinguished from more conventional computer systems.[8 Marks]

(b) In the context of Expert Systems, describe what the term "knowledge acquisition" covers.[2 Marks]

(c) Outline some of the main technical problems one has to overcome when attempting to build a successful Expert System for a new domain.[6 Marks]

(d) Discuss four practical problem areas in which you may recommend the development of an Knowledge based system as opposed to a conventional IT system.
(4 Marks)

(e) Write down first order logic sentences to express the follwing pieces of knowledge:
  I.   Eveyr person has a name
  II. No person has more than one name
  III. At least two people have the same name [6 Marks]

f) Two important properties that we aim at for in a reasoning process are soundness and completeness. Explain what each means and why each is desirable [2 Marks]

Question TWO

a) Describe at least 3 advantages that expert systems have as compared to human experts.[6 Marks]
b) What are the major knowledge representation methods? Describe any two of them in greater detail? [6 Marks]
c) List some reasoning methods. What are approaches used in inferencing with rules? [4 Marks]

d) What are data mining and knowledge discovery in databases ? [4 Marks]

Question THREE

a) Write down first order logic sentences to express the follwing pieces of knowledge:
   I.   Eveyr person has a name
   II.   No person has more than one name
   III. At least two people have the same name [6 Marks]
b) What are the qualities of a good knowledge representation system?Explain them [6 Marks]
c) Convert the following well formed formula to cluse form Ø
   Roman(x) V know(x, Marcus) V hate(x, Caesar) V hate(y, z) V thinkcrazy(x, y). [2 Marks]
d) Identify three shortcomings of using natural languages for knowledge representation [4 marks]

Question FOUR

a) Google has recently developed prototype self-driving cars, which are able to drive people around without human control, and are expected to soon be more reliable and safer than human drivers. Discuss the social and ethical implications of sell-driving cars with respect to accountability and privacy. [8 Marks]

b) Using your own words give a definition of Artificial intelligence [3marks]
c) Human beings carry out perceptual tasks give three examples   [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   [6 Marks]

Question FIVE

a) Create and justify your own deduction of Artificial intelligence [3 marks]
b) Outline 4 areas where AI can be applied   [4 Marks]
c) Will computers someday be able to have human like consciousness and intelligence
[3 marks]

d) Present an example knowledge base using a knowledge representation formalism of your choice. Ensure that it is adequately annotated with a textual explanation of how it could be used to solve suitable problems. **(10 marks)**