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**University Examinations 2015/2016**

FOURTH YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE, BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY

AND

THIRD YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

**CCS 3425: KNOWLEDGE BASED SYSTEMS**

**DATE: NOVEMBER 2015 TIME: 2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. Compare human intelligence with artificial intelligence. (5 Marks)
2. Distinguish between data-directed and goal-directed analysis in rule-based systems. Which is preferred for medical diagnostic systems and why? (5Marks)
3. Discuss any **five** aspects of Human Expert Behaviours (5 Marks)
4. Compare Conventional Systems and Expert Systems (6 Marks)
5. Discuss the role played by the following Knowledge Base (4 Marks)
6. Inference Engine
7. User Interface
8. Represent the following sentences into a semantic network: (5 Marks)

* Palco is a calico.
* Herb is a tuna.
* Charlie is a tuna.
* All tunas are fishes.
* All calicos are cats
* All cats like to eat all kinds of fishes.

**QUESTION TWO (20 MARKS)**

1. Discuss any **three** desirable features of any knowledge representation scheme (6 Marks)
2. Identify stages of knowledge acquisitions (5 Marks)
3. What kind of mistakes might ES make and why? Why is it easier to correct mistakes in ES than in conventional programs? (4 Marks)
4. Describe any **five** of the limitations of ES. (5 Marks)

**QUESTION THREE (20 MARKS)**

1. Discuss **two** major advantages of artificial intelligence over natural intelligence. (2 Marks)
2. Consider a knowledge base that consist of the following rules

A C

D E

B C F

E V F G

Use backward chaining to establish whether G is TRUE (10 Marks)

1. Knowledge can be classified on the bases of whether it is procedural, declarative or episodic. Discuss these classifications (4 Marks)
2. Write a prolog program that display “hello world” on the screen in two lines (4 Marks)

**QUESTION FOUR (20 MARKS)**

1. Let S(*x*) be the predicate “x is a student”. B(*y*) the predicate “*y* is a book”, and H(*x,y*) the predicate “x has *y”,* where the universe of discourse is the universe, that means the set of all objects. Use qualifiers to express each of the following statements. (4 Marks)
2. Every student has a book
3. Some students do not have any books
4. Not every student has a book
5. There is a book which every student has
6. Consider the following propositions:

P: The file is being printed

Q: The system is ready

R: The red light is on

Using the above symbols and the required connectives, represent the following compound propositions symbolically.

1. If the system is ready and the light is on then the file is printed.
2. If the file is not printed, then either the red light is not on or the system is not ready (6 Marks)
3. Using suitable examples discuss the following prolog terms (6 Marks)
4. Atoms
5. Variable
6. Compound terms
7. Discuss any two inference rules (4 Marks)

**QUESTION FIVE (20 MARKS)**

1. Explain the role of the intelligent systems and their potential benefits. (6 Marks)
2. What are the major difficulties in developing these systems (5 Marks)
3. Discuss the types of knowledge that constitute expertise. (5 Marks)
4. Discuss any **two** search strategies (4 Marks)