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**GARISSA UNIVERSITY**

**UNIVERSITY EXAMINATION 2018/2019 ACADEMIC YEAR FOUR**

**SECOND SEMESTER EXAMINATION**

**SCHOOL OF INFORMATION SCIENCE AND TECHNOLOGY**

**FOR THE DEGREE OF BACHELOR OF INFORMATION SCIENCE**

**COURSE CODE: COM418**

**COURSE TITLE: EXPERT SYSTEMS**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 05/02/2020 TIME: 09.00-11.00 AM**

**INSTRUCTION TO CANDIDATES**

* **The examination has FIVE (5) questions**
* **Question ONE (1) is COMPULSORY**
* **Choose any other TWO (2) questions from the remaining FOUR (4) questions**
* **Use sketch diagrams to illustrate your answer whenever necessary**
* **Do not carry mobile phones or any other written materials in examination room**
* **Do not write on this paper**

**This paper consists of TWO (2) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. Define the following terms: (5 marks)
2. Expert System
3. Knowledge base
4. Knowledge representation
5. Knowledge acquisition.
6. Semantic network
7. With the help of a well -labelled diagram describe the structure of an expert system (5 marks)
8. Describe any four primitive datatypes of CLIPS (8 marks)
9. Describe five types of knowledge (10 marks)
10. What is conflict resolution in rule-based systems? (2 marks)

**QUESTION TWO**

1. Using examples Explain the differences between field constraints and conditional elements in Clips. (8 Marks)
2. The Rete algorithm is a core element of most rule-based expert systems. Describe its basic idea, and explain why it is critical for performance. (12 Marks)

**QUESTION THREE**

1. Write a Clips or Jess program that generates all the permutations of a base fact. For example, (base-fact red green blue) should generate (10 Marks)

(red green blue) (red blue green)

(green blue red) (green red blue)

(blue red green) (blue green red)

1. Describe knowledge acquisition (2 marks)
2. Describe issues in knowledge acquisition (4 marks)
3. State four properties of knowledge representation (4 Marks)

**QUESTION FOUR**

1. Describe the following terms: (12 marks)
2. Pattern recognition
3. Classification
4. Discrimination function
5. Nearest neighbor
6. The expert’s knowledge base and the inference engine algorithms get inextricably entwined, and it becomes impossible to update one without introducing problems into the other; suggest how we could minimize the chances of them happening, and how we should proceed if they do occur. (8 marks)

**QUESTION FIVE**

1. Outline some of the main technical problems one has to overcome when attempting to build a successful Expert System for a new domain (5 marks)
2. List five advantages of Expert Systems over Human Experts. (5 marks)
3. Differentiate between forward and backward chaining (4 marks)
4. State and describe roles of three different users in expert systems (6 marks)