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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: COM 408E**

**COURSE TITLE: METRICS AND MEASUREMENT IN SOFTWARE DEVELOPMENT**

**EXAMINATION DURATION: 2 HOURS**

**DATE: 10/02/2020 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 THREE (3) printed pages *please turn over***

**QUESTION ONE (COMPULSORY)**

1. Explain the following terms **[6 marks]**
   1. Metric
   2. Software quality assurance
   3. Empirical investigation
2. Differentiate between **[6 marks]**
   1. Internal attributes or external attributes
   2. Deterministic and probabilistic measurement
   3. Nominal scales and ordinal scales
3. Explain three types of software metrics **[6 marks]**
4. Explain the importance of software metrics in software development **[6 marks]**
5. Explain types of software test metrics **[6 marks]**

**QUESTION TWO**

In your fourth year second semester you will be engaged in a group project task to conduct an investigate in a given field of Software engineering.

1. Explain five reasons for SE investigation **[5 marks]**
2. Explain five sources of data for investigation **[5 marks]**
3. Explain four principles of investigation **[4 marks]**
4. How will you decide whether to conduct an experiment or perform case study **[6 marks]**

**QUESTION THREE**

1. You are a manager for a software development team and you have to construct a GQM for the goal of improving maintainability of your developed software
   1. Explain the GQM methodology **[6 marks]**
   2. Construct a GQM tree related to this goal **[6 marks]**
2. Consider a program having

-Number of distinct operator: 12, -Number of operands: 5, -Totalnumber of operator occurrences: 20, -Total number of operand occurrences: Calculate the following Halstead software metrics for above programs

* 1. Program length **[2 marks]**
  2. Program vocabulary **[2 marks]**
  3. Program level **[4 marks]**

**QUESTION FOUR**

1. Explain software quality **[2 marks]**
2. Explain five characteristics of quality product as described in ISO 9126 quality models **[5 marks]**
3. Explain the function point analysis methodology as applied in estimation of software size **[7 marks]**
4. Compare FPA and LOC methodology **[6 marks]**

**QUESTION FIVE**

1. In your third year second semester you will be engaged in a group project task to develop a working software application system.
   1. Explain the roles of project manager in the group. **[4 marks]**
   2. Explain the activities in software requirements analysis **[4 marks]**
2. Discuss the contribution of the following aspects of the modern software development environment.
   1. Dividing a project into short development episodes. **[4 marks]**
   2. Adopting CASE tools. **[4 marks]**
   3. User Centered Design **[4 marks]**