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**UNIVERSITY EXAMINATIONS  
2023/2024 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATIONS  
YEAR FOUR SEMESTER ONE EXAMINATIONS**

**FOR THE DEGREE OF  
(COMPUTER SCIENCE)**

**COURSE CODE: CSC 462E**

**COURSE TITLE: SOFTWARE MEASUREMENT  
AND METRICS**

**DATE: 13/12/2023**

**TIME: 14:00 HRS – 16:00 HRS**

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**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTIONS ONE AND ANY OTHER TWO.**

### QUESTION ONE (COMPULSORY) [30 MARKS]

- Discuss the motivation behind the use of metrics in software projects [5 Marks]
- Function point analysis is a preferred size metric over Lines of code. Explain. [5 Marks]
- Describe the qualities of good data to be used to perform experiments [6 Marks]
- Data concerning a system to be developed can be collected through several ways. Explain four ways in which data can be acquired [4 Marks]
- Standardizing definitions for the entities and their measured attributes is an important step in software metrics. Using a relevant examples, state the reason. [4 Marks]
- Use the following table of functional units with weighting factors to answer the following question:

| Functiona units                | Weighting factors |         |      |
|--------------------------------|-------------------|---------|------|
|                                | Low               | Average | High |
| External Inputs (EI)           | 3                 | 4       | 6    |
| External Outputs (EO)          | 4                 | 5       | 7    |
| External Inquiries (EQ)        | 3                 | 4       | 6    |
| Internal Logical Files (ILF)   | 7                 | 10      | 15   |
| External Interface Files (EIF) | 5                 | 7       | 10   |

A given project has 7 user inputs, 15 user outputs, 8 inquiries, 7 logical files and 2 external interfaces. All of these are average complexity EXCEPT 4 of the inputs are complex, 7 of the outputs are complex and 3 of the outputs are simple. Calculate unadjusted function points.

[6 Marks]

### QUESTION TWO [20 MARKS]

- Using software metrics is advantageous to a software project manager. Justify [10 Marks]
- Discuss five resources required when costing software development projects and their implication in project success [10 Marks]

### QUESTION THREE [20 MARKS]

- a. Differentiate between product and process metrics. [3 Marks]
- b. Discuss the following terms with reference to experimental design:
  - i. Randomization [2 Marks]
  - ii. Local control [4 Marks]
  - iii. Replication [2 Marks]
- c. Describe THREE different approaches to estimating duration for a system development project stating an advantage for each [6 Marks]
- d. Describe the guidelines for evaluating the appropriateness of data to be used for answering questions in experimental design. [3 Marks]

### QUESTION FOUR [20 MARKS]

- a. Define the term reliability? [2 Marks]
- b. As reliability increases system efficiency tends to decrease. Explain. [2 Marks]
- c. Describe in detail about Goal Question Metric paradigm and its implementation. [12 Marks]
- d. How do software process metrics differ from software project metrics? [4 Marks]

### QUESTION FIVE [20 MARKS]

- a. Explain why operational profile is necessary when dealing with software and describe the five steps involved in developing operational profile for a system. [12 Marks]
- b. Defect tracking is of much importance in software development. Discuss. [6 Marks]
- c. Differentiate between failures and faults [2 Marks]