(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

FOURTH YEAR FIRST SEMESTER SPECIAL AND SUPPLEMENTARY EXAMINATIONS

FOR THE DEGREE
OF
BACHELOR OF SCIENCE IN INFORMATION SYSTEMS AND KNOWLEDGE MANAGEMENT
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

COURSE CODE: BIK415 /BIT414E/BCS 462

COURSE TITLE: SOFTWARE MEASUREMENT AND METRICS

DATE: Thursday 13th December, 2022   **TIME:** 08.00p.m. – 10.00p.m.

INSTRUCTIONS TO CANDIDATES

Question ONE (1) is compulsory
Answer TWO (3) questions (one question each from section II and III respectively)

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

Question One   **[30 Marks]**

(a) What do you understand by the following concepts?
(i) Metrics   (2 marks)
(ii) KLOC   (2 Marks)
(iii) Measurement   (2 marks)
(iv) Gaming metrics   (2 marks)
(b) Complete the types of software metrics table below. Give two examples in each type (12 marks)

S/N	Product Metrics	Process metrics	Project metrics
1		Effort required	
2	Complexity		Staffing levels
3			
4	Performance		
5		Quality	Productivity

(c) In Kenyan software firms, the cost of software is directly to perceived company size in terms of perceived turnover. How does this pricing model differ with COCOMO   (5 marks)
(d) In a paper written by Kaner and Bond, a general framework for evaluating a metric was developed. Summarize the paper into six points to check for based on the IEEE software metric criteria.
(5 marks)

Question Two
(a) While implementing the Enterprise recourse planning (ERP) at MMUST it was discovered that the number of defects detected in all the a million lines of code was 306,534 and in all a million general features there were 6,210. Compute the percentage defects in each case and comment on their six-sigma rating.   (8 marks)
(b) Using DMAIC in the implementation of time and attendance module of the ERP, the six-sigma value was 2. It was decided that there should be a redesign of the module. Required:
   (i) Write DMAIC in full and explain each of its components   (2 marks)
   (ii) Would you still recommend the use of DMAIC in such a situation as above or not? Give reasons
      for your answer.   (4 marks)

(c) It is said that DFSS requires IDOV approach. What do you understand by these two methodologies?
(6 marks)

Question Three   **[20 marks]**
```
if (x < 4)&& (y>1)
{
if (x > 1)
y = y*x, else y=o;
}
```
   (a) Use Halstead's Metrics to compute the estimated program volume and the efficiency

(12 marks)

  (b) Compute the program effort given $V^* = 70$ (8 marks)

Question Four   [20 marks]

A project size of 150 KLOC is to be developed. Software development team has average experience on similar type of projects. The project schedule is not very tight. Calculate the Effort, development time, average staff size, and productivity of the project.   (20 marks)

Question Five   [20 marks]
(a) Line of code is one of product metrics developed by William Barry Boehm. Suggest any two benefits and two demerits associated with this metric   (4 marks)
(b) (i) One of the most reliable predictive software product metrics tool is the COCOMO, identify any FOUR parameters predicted by this tool.   (2 marks)
   (ii) Its said that all key project parameters that the quality of software, can be summarized into two. State and explain these two parameters.   (3 Marks)
(c) After working on 63 software projects, Barry William Boehm, in 1970, categorized software systems into three types namely: Organic, Semi-detached and embedded. Differentiate among these types by illustrating the characteristics and two examples of each type.   (6 marks)
(d) Match the relevant COCOMO model to the following characteristic.
   (i) Used for quick and slightly rough calculations of Software Costs. Its accuracy is somewhat restricted due to the absence of sufficient factor considerations.
                                                                      (1 mark)
   (ii) takes Cost Drivers into account and   (1 Mark)
   (iii) accounts for the influence of individual project phases. it accounts for both these cost drivers and also calculations are performed phase wise henceforth producing a more accurate result.   (1 mark)
   (iii) Write COCOMO in full and define it.   (2 Marks)