



DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY
UNIVERSITY EXAMINATIONS 2021/2022 ACADEMIC YEAR
THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR THE
DEGREE OF BACHELOR OF SCIENCE IN TELECOMMUNICATION AND
INFORMATION ENGINEERING

ETI 3210: INTRODUCTION TO SOFTWARE ENGINEERING

DATE: 13TH APRIL 2022

TIME: 2:00-4:00PM

Instructions: Answer Question 1 and Any Other Two.

QUESTION 1: (30 MARKS)

- a) Define software engineering **[2 Marks]**
- b) Discuss how software engineering can be essential for the functioning a national government. **[4 Marks]**
- c) What are the most important differences between generic software product development and custom software development? What might this mean in practice for users of generic software products and custom software product? **[3 marks]**
- d) Explain why there are fundamental ideas of software engineering that apply to all types of software systems. **[2 marks]**
- e) It states that “testing can only detect the presence of error, not their absence”. Do you agree with this statement? If yes, explain why. If not, use an example to show how? **[3 marks]**
- f) Explain why development of a computer systems that has all personal information of citizens of a country and is able to track all their actions is not ethical **[4 marks]**
- g) Explain some of the challenges faced in professional software development. **[4 marks]**
- h) Explain how the principles underlying agile methods lead to the accelerated development of a software. **[4 marks]**

- i) Explain what can cause failures of projects despite the application of software engineering. **[4 marks]**

QUESTION 2: (20 MARKS)

- a) After your graduation in Dedan Kimathi University, you have secured a job with software development consulting firm in Nairobi as software engineer. Your daily work involve work involve helping companies to employ the right software development methodologies in their software projects on the type of system being developed. As a consultant, suggest the most appropriate generic software process model that you would recommend for the development of the following systems:
- i. A system to control anti-lock braking in a car
 - ii. A virtual reality system to support software maintenance
 - iii. A university accounting system that replaces an existing system
 - iv. An interactive travel planning system that helps users plan journey with the lowest environment impact

Give reasons for your answers

[8 marks]

- b) Explain why incremental development is the most effective approach for developing business software systems. Why is this model less appropriate for real-time systems engineering? **[4 marks]**
- c) You're a project manager of software Development Company. The company has signed a new contract with a client that urgently needs a software system developed. The time period that the software need to be delivered seem to be shorter compared to other projects of the same magnitude. You have consulted with your former classmates who are also project managers at other software development firms on the development methodology to adopt in order to deliver the project on time. Majority of them has advised you to use agile methodology. Give reasons why majority of your classmates preferred agile methodology. **[4 marks]**
- d) When would you recommend against the use of an agile method for developing a software system? Explain your answer. **[4 marks]**

QUESTION 3: (20 MARKS)

a) Suggest why it is important to make a distinction between developing the user requirements and developing system requirements in the requirements engineering process [4marks]

b) Discover ambiguities or omissions in the following statement of requirements for part of a ticket-issuing systems: [6 marks]

An automated ticket-issuing system sells rail tickets. Users select their destination and input a credit card and a personal identification number. The rail ticket is issued and their credit card account charged. When the user presses the start button, a menu display of potential destinations is activated, along with a message to the user to select a destination. Once a destination has been selected, users are requested to input their credit card. Its validity is checked and the user is then requested to input a personal identifier. When the credit transaction has been validated, the ticket is issued.

c) Write a set of non-functional requirements for the ticket-issuing system, setting out its expected reliability and response time. [6 marks]

d) How might the delivery of a new system itself affect user's requirements?[4 marks]

QUESTION 4: (20 MARKS)

a) Briefly describe the three main types of software maintenance. Use examples to explain why it sometimes difficult to distinguish between them? [7 marks]

b) Your organisation is considering to scrap a software system, before this is done, you have been tasked to conduct a system assessment. Your assessment results indicates that the system is still of high quality and of high business value. However, your recommendation to the organisation is that the system need to be scrapped. Under what circumstances would you make such recommendations despite that the system is of high quality and of high business value [3marks]

- c) Do software engineers have a professional responsibility to produce code that can be maintained and changed even if this is not explicitly requested by their employer? **[2 marks]**
- d) As a software project manager in a company that specializes in the development of software for offshore oil industry, you have been given the task of discovering the factors that affect the maintainability of the systems developed by your company. Suggest how you might set up a program to analyze the maintenance process and discover appropriate maintainability metrics for your company.**[8 marks]**