



MACHAKOS UNIVERSITY

University Examinations for 2017/2018

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR BACHELOR OF
SCIENCE (MATHEMATICS AND COMPUTER SCIENCE)

SMA 493: DEVELOPMENT OF SOFTWARE ENGINEERING

DATE: 6/12/2017

TIME: 2.00-4.00 PM

Instructions: Answer Question ONE and any other TWO Questions

QUESTION ONE (30 MARKS)

- a) The Software development models are described as just abstract representation of a system.
Explain this statement. (3 marks)
- b) Explain **TWO** attributes of a good software. (4 marks)
- c) What are the benefits of **a great** software requirements specification? (3 marks)
- d) Explain **THREE** challenges of software engineering in the 21st century (6 marks)
- e) State **FOUR** system dependability properties in system design and development (4 marks)
- f) State **FOUR** advantages of system testing. (4 marks)
- g) Describe the **THREE** principal types of critical systems, clearly outlining their differences. (6 marks)

QUESTION TWO (20 MARKS)

- a) Define the term software Reliability (2 marks)

- b) Explain with block diagram the requirement engineering process. (10 marks)
- c) Explain **FOUR** characteristics of an effective user interface? (8 marks)

QUESTION THREE (20 MARKS)

- a) Any software that supports human activity must undergo continuous change, or become steadily less useful over time. Discuss 2 reasons why change is inevitable in software development, giving an example of a software process model that can deal with change. (5 marks)
- b) Machakos University would like to replace their existing accounting system with a new system. The requirements of the system are *well* known and the system is to be used in conjunction with several other university systems. You have been selected as the lead software engineer appointed to oversee the development of the new accounting system.
 - i. With reasons, suggest a software process model that is most appropriate for managing the development of the new accounting system. (2 marks)
 - ii. Briefly describe the stages involved in the software process model chosen using a well labelled diagram. (7 marks)
 - iii. State 2 disadvantages of the software process model chosen. (2 marks)
- c) Explain the difference between software validation and software evolution. (4 marks)

QUESTION FOUR (20 MARKS)

- a) As an expert in computer security, the Kenya Human Rights Commission (KHRC) has approached you and asked you to help them gain unauthorised access to the computer security systems of a number of foreign companies, which they believe have been selling the government equipment that is used directly to torture political prisoners. The KHRC believes that this will help them confirm their position and facilitate their actions to remedy the situation, a very worthwhile cause. Discuss the ethical dilemmas that this request raises and how you would react to this request. (8 marks)
- b) A hospital in Nairobi has a customer (read patients) queue management system. When you come in, you pick a number and sit on the waiting benches. Once your number is called out, you report to the reception. If you are a new customer (patient), your details are taken where among the details recorded include Your Names, Age, Sex/Gender and Residence.

Then you are given a patient number and a file opened for you. You then pay a consultation fee of kshs 700 and wait for the doctor to see you. But if you are an existing customer (you have visited the hospital before and your file opened), you present your patient card that has your unique patient number. The Hospital attendant uses the number on the card to locate your personal file from the shelves. Once your file is retrieved, you pay a consultation fee of kshs 300 and you wait for the doctor to see you

You want to computerise the above hospital process.

Required.

- i. List the FOUR functional requirements expected of the system (4 marks)
- ii. List FOUR non-functional requirements expected of the system. (4 marks)
- iii. Explain how you will use black box testing (4 marks)

QUESTION FIVE (20 MARKS)

- a) Explain THREE ways of implementing a software in an organisation. (6 marks)
- b) Explain why software developed using evolutionary prototyping is likely to be difficult to maintain. (4 marks)
- c) Software will require maintenance during its normal lifecycle.
 - i) Briefly differentiate between corrective, perfective, preventive and adaptive maintenance. (8 marks)
 - ii) Why is it essential to document changes to software? (2 marks)