



MACHAKOS UNIVERSITY

University Examinations for 2021/2022

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SIT 263: SOFTWARE ENGINEERING

DATE: 16/12/2021

TIME: 11.00-1.00 PM

INSTRUCTIONS:

- i) Answer question ONE and any other TWO questions
- ii) Write on both sides of the answer sheet
- iii) Do not write in the margins of the answer booklet

QUESTION ONE (30 MARKS) COMPULSORY)

- a) Define the following terms used in software engineering
 - i) prototype (1 mark)
 - ii) metric (1 mark)
 - iii) Legacy system (1 mark)
- b) Distinguish between the following pairs
 - i) Context model and process model (2 marks)
 - ii) Data-Flow Diagram(DFD) and Flow-Chart (2 marks)
 - iii) Bespoke and Generic Software products (2 marks)
 - iv) Throw-away prototyping and Evolutionary Prototyping (2 marks)
- c) Explain the phrase “Defensive Programming” (3 marks)
- d) Describe any THREE Generic activities in all software processes (6 marks)
- e) For each of the following requirements, indicate whether functional or non-functional (5 marks)
 - i. The system shall respond to all requests within 5 seconds.
 - ii. Users shall be able to post one .jpg file containing a picture of their merchandise.
 - iii. The system shall properly secure all sensitive user information.

- iv. The system shall support 500 simultaneous users.
- v. The system shall respond to a core temperature above threshold event within 10s
- f) Explain the challenges faced by engineers when decommissioning a system. (5 marks)

QUESTION TWO (20 MARKS)

- a) Compare software engineering with other engineering disciplines. (6 marks)
- b) Explain any THREE characteristics of Graphical User Interfaces(GUI) (6 marks)
- c) Draw an entity model (class diagram) for the following scenario. (8 marks)

The following scenario is for a pet store. Each pet store has up to 20 furry friends and 10 birds. Each pet has a vaccination history. Furry friends are either dogs or cats. Each furry friend has a microchip implant for identification. Each microchip has a unique id number.

QUESTION THREE (20 MARKS)

- a) Use a diagram to explain prototyping process (5 marks)
- b) Giving examples in each case, explain the following functional system components
 - i. Sensor components (3 marks)
 - ii. Actuator components (3 marks)
 - iii. Interface components (3 marks)
- c) Draw a diagram and use it to explain component types in a fire-alarm system (6 marks)

QUESTION FOUR (20 MARKS)

- a) Explain briefly the advantages of using Graphical User Interfaces (4 marks)
- b) Giving examples, explain any THREE categories of software metrics (6 marks)
- c) Explain briefly FOUR benefits of software prototyping (4 marks)
- d) Consider a program which registers students for different programs. The students fill a form and submit it. This is sent to the departments for confirmation. Once it is confirmed, the form and the fees is sent to the account section. Draw a data flow diagram for this program. (6 marks)

QUESTION FIVE (20 MARKS)

- a) Explain the main operating system components in a real-time system (5 marks)
- b) Using diagrams explain the following Software process models
 - i. Incremental development model (5 marks)
 - ii. Spiral Model (5 marks)
- c) Describe FIVE main principles of UI Design (5 marks)