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**UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR**

**SPECIAL/SUPPLEMENTARY EXAMINATIONS
YEAR ONE SEMESTER TWO EXAMINATIONS**

**FOR THE DEGREE OF MASTERS OF
(INFORMATION TECHNOLOGY)**

COURSE CODE: MIT820

**COURSE TITLE: ARCHITECTURES FOR SOFTWARE
SYSTEMS AND EMERGING ISSUES**

DATE: 25/11/2022

TIME: 2.00 P.M – 5.00 P.M

INSTRUCTIONS TO CANDIDATES

ANSWER ANY THREE QUESTIONS

QUESTION ONE [20 MARKS]

- a. Explain the relationship between software architecture and software design. [4 Marks]
- b. "It is important to understand the key forces that are shaping architectural decisions today, and which will change how architectural decisions are made in the future. These key forces are driven by user demand, as well as by business demand for faster results, better support for varying work styles and workflows, and improved adaptability of software design". Discuss any key trends that affect how architectural decisions are made. [8 Marks]
- c. Crosscutting concerns represent key areas of a design that are not related to a specific layer in an application. Describe any four key crosscutting concerns that you must consider when architecting software applications. [8 Marks]

QUESTION TWO [20 MARKS]

- a. You have been appointed as a project manager for a software project at Kibabii University that has been funded by the Danish Government. You realize that managing software quality is a vital element of every stage of project management. To attract more funds and to deliver excellent software quality you must work smart. Discuss any five ways you are going to use to ensure you deliver excellent quality software. [10 Marks]
- b. Discuss any five software quality attributes with respect to improving system quality. [10 Marks]

QUESTION THREE [20 MARKS]

- a. Identify two reasons why software process is difficult to improve. [2 Marks]
- b. We are yet to meet a business leader who believes that every process in the organization is perfect. All business leaders want to get lower costs, better customer satisfaction scores, more efficiency, and new ways of driving revenue. The difference between organizations that achieve these ends, and those that can't, often comes down to the structure upon which process improvement initiatives are built. Software process improvement offers a number of compelling advantages. Using relevant scenarios, discuss any five reasons why an organization would consider SPI. [10 Marks]
- c. SPI mainly consists of 4 cyclic steps. With the aid of a well labelled diagram, discuss these steps and show how they relate to each other. [8 Marks]

QUESTION FOUR [20 MARKS]

- d. Briefly explain the technical importance of Software Architecture. [2 Marks]
- e. "Architecture is the vehicle for stakeholder communication". Justify. [2 Marks]
- f. Explain the difference between Architectural Style and Architectural Patterns. [2 Marks]
- g. i. Using neat diagrams, describe any two different types of architectural styles. [6 Marks]
ii. For each of the architectural styles described in (i) above, discuss its benefits and explain the forces that influence the solutions to problems based on it. [8 Marks]

QUESTION FIVE [20 MARKS]

- a. Compare and contrast TOGAF, SABSA and OSA security architecture frameworks. [6 Marks]
- b. Survivability achieves its objectives of delivering essential services and preserving essential assets via three primary capabilities known as the three R's of survivability. Discuss how survivability can be achieved through these capabilities. [6 Marks]
- c. Identify any four security threats to an organization and explain the strategies that can be

used to minimize each of the threats.

[8 Marks]