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*(Knowledge for Development)*

**KIBABII UNIVERSITY**

**(KIBU)**

**UNIVERSITY EXAMINATIONS  
2021 / 2022 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATIONS  
YEAR ONE SEMESTER TWO EXAMINATIONS**

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

**COURSE CODE: MIT 820**

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

**DATE: 30/09/2022      TIME: 9.00 A.M. – 12.00 NOON**

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**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 four 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. Discuss the benefits of message-bus architectural style and layered architectural styles **[10 Marks]**
- b. Explain how the following quality attributes are (positively or negatively) impacted when message-bus architectural style and layered architectural styles are used: **[10 Marks]**
  - i. Maintainability
  - ii. Portability
  - iii. Performance
  - iv. Reusability
  - v. Testability

### 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]

- a. The Software Survival Analysis (SSA) method was developed as a means for organizations to understand survivability in the context of their operating environment. Explain the objectives of the SSA method. **[4 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. Discuss the four steps of the SSA method. **[10 Marks]**

### QUESTION FIVE [20 MARKS]

- a. Identify any four security threats to an organization's systems and explain the strategies that can be used to minimize each of the threats. **[8 Marks]**

- b. What are the benefits of using the security architecture? [6 Marks]
- c. Discuss the differences between Traditional Software Development methods and Agile Software development. [6 Marks]