



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

DEPARTMENT OF INFORMATION SYSTEMS

**UNIVERSITY EXAMINATION FOR THE DEGREE BACHELOR OF INFORMATION AND
COMMUNICATION TECHNOLOGY**

YEAR THREE: SEMESTER ONE

3rd YEAR 1ST SEMESTER 2022 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: ITB 2402

COURSE TITLE: DISTRIBUTED SYSTEMS

DATE:

TIME:

INSTRUCTIONS

- 1. Answer Question 1 (Compulsory) and ANY other TWO questions**
- 2. Candidates are advised not to write on the question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

Question One

- a) What is a Distributed System and a Parallel System? **(3 Marks)**
- b) With Examples describe the different Distributed Systems **(8 Marks)**
- c) Discuss the common characteristics of distributed systems **(8 Marks)**
- d) General software engineering principles include rigor and formality, separation of concerns; modularity, abstraction, and anticipation of change. Explain Specific issues for distributed systems **(7 Marks)**
- e) To understand the fundamental building blocks of a distributed system, it is necessary to consider four key questions, mention and explain each question in broad **(4 Marks)**

Question Two

- a) What are the advantages of distributed systems over centralized systems? **(6 Marks)**
- b) What are the entities that communicate in the distributed system? Illustrate the communication paradigm as used **(5 Marks)**
- c) If a communication paradigm is asynchronous, is it also time-uncoupled? Explain your answer with appropriate examples. **(5 Marks)**
- d) Examine some steps for migrating legacy applications into web services **(4 Marks)**

Question Three

- a) Describe the role of dynamic routing protocols and place these protocols in the context of modern network design. **(5 Marks)**
- b) Identify several ways to classify routing protocols. **(5 Marks)**
- c) Describe how metrics are used by routing protocols and identify the metric types used by dynamic routing protocols. **(5 Marks)**
- d) Identify the different elements of the routing table. **(5 Marks)**

Question Four

- a) What is service identification **(2 Marks)**
- b) Differentiate between the following terms as used in distributed systems **(6 Marks)**
 - i. Transaction integrity and load balancing
 - ii. Asynchronous Messaging and synchronous Messaging
- c) Differentiate between service oriented architecture and Service-oriented software engineering in distributed systems **(6 Marks)**

- d) Describe I AAA technology parameter used in securing systems transactions (6 Marks)

Question Five

- a) The process of developing services for re-use in service-oriented applications is that a service has to be designed as a reusable abstraction that can be used in different systems. This has three critical steps. Examine them (6 Marks)
- b) Discuss the important Steps to recovering Web Services (6 Marks)
- c) What are some of the areas for continuing research in legacy application migration? (4 Marks)
- d) In the context of a group communication service, provide example message exchanges that illustrate the difference between causal and total ordering. (4 Marks)