

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**SECOND YEAR EXAMINATION FOR THE AWARD OF DIPLOMA OF SCIENCE IN
COMPUTER SCIENCE**

COSC 0262: DISTRIBUTED SYSTEMS

STREAMS: DIPLOMA (COMPUTER SCIENCE)

TIME: 2 HOURS

DAY/DATE: FRIDAY 07/12/2018

11.30 A.M. – 1.30 P.M.

CANDIDATES' INSTRUCTIONS

- **Answer question one and any other two from section B**
- **Do not write on this paper**

SECTION A {compulsory}

QUESTION ONE (30MARKS).

- a) Describe the following terms used in distributed system (6 marks)
 - (1) Distributed systems.
 - (2) Remote procedure call.
 - (3) Distributed file system.
- b) Explain three main characteristics that differentiate a distributed system from a centralized system. (3 marks)
- c) Define the term middleware, explain the role of middleware in distributed systems. (4 marks)
- d) Explain any three advantages of file replication. (3 marks)
- e) A number of corporate organizations have of late gone full blast in adopting distributed systems. Briefly explain three reasons behind most organizations adopting a distributed system as opposed to the traditional mainframe or centralized computing. (6marks)

- f) The RPC model has been basically used to demonstrate how messages may be passed between two or more remotely connected computers. With the help of a diagram briefly describe what takes place between the two machines during this process. (8 marks)

QUESTION TWO (20MARKS)

- a) A number of threats to security in distributed systems exist; discuss four requirements that need to be addressed. (4 marks)
- b) Discuss replication as a characteristic of a widely used concept in distributed systems. (6marks)
- c) Middle-ware is a Software that is mainly used in distributed systems for various reasons, this is because without the middle-ware, it would be quite difficult to implement and use distributed systems;
- i. What do you understand by the term middle-ware? (2 marks)
 - ii. Describe four middle-ware models used in distributed systems(8 marks)

QUESTION THREE (20MARKS)

- a) Describe the term distributed system memory. (2 marks)
- b) Identify and describe four features of a good distributed file system (8 Marks)
- c) Distributed systems can be very complex during the design as well as the implementation stage. Some issues must therefore be handled with care to ensure a smooth running system. Discuss the following issues in distributed systems to ensure your system works well; (10marks)
- a) Fault tolerance
 - b) Replication
 - c) Synchronization

QUESTION FOUR (20MARKS)

- a) Differentiate load balancing from process migration (2 marks)
- b) Explain how the time synchronizations algorithms below function in distributed time co-ordination (8marks)
- (i) Cristian's algorithm.
 - (ii) Berkeley algorithm.
 - (iii) Central server algorithm.
 - (iv) Ring-based algorithm.

- c) Define the term transparency, State and explain any four forms of transparency found in distributed systems. (10marks)

QUESTION FIVE (20MARKS)

- a) What is a computer Network? With the use of relevant examples, discuss the **two** types of computer topologies (5mks).
- b) Differentiate tightly coupled systems from loosely coupled systems (3 marks)
- c) Security is a major concern in many establishments that have adopted distributed systems.
- i. Explain any three types of security concerns/threats/challenges that an ICT Manager in a large distributed organization may deal with in the course of duty (6 Marks)
- ii. Describe possible strategies of dealing with each of the issues identified in 'i' above (6Marks)
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