TECHNICAL UNIVERSITY   **OF MOMBASA**

UNIVERSITY EXAMINATION FOR:

BTIT Y3S2

EIT 4312: DISTRIBUTED SYSTEMS

END OF SEMESTER EXAMINATION

SERIES:

TIME: HOURS

DATE:

Instructions to Candidates

You should have the following for this examination
-*Answer Booklet, examination pass and student ID*
This paper consists of _____ questions. Attempt
_____ .
Do not write on the question paper.

Question ONE (30 marks)

(a) Distinguish between a distributed system and a standalone computer?   (2 marks)
(b) Describe any five characteristics of distributed systems   [5 marks]
(c) A distributed system has three major components, state and explain each of these components
                                                                                [6 marks]
(d) Give five types of hardware resource and five types of data or software resource that can usefully be shared. Give examples of their sharing as it occurs in distributed systems. [10 marks]
(e) List the three main software components that may fail when a client process invokes a method in a server object, giving an example of a failure in each case. To what extent are these failures independent of one another? Suggest how the components can be made to tolerate one another's failures.
                                                                                [7 marks]

Question TWO (20 marks)

(a) Describe the meaning of the following terms   [3 marks]
   - Distributed file system

- Remote procedure call
- Binding

(b) Explain any four types of distribution transparency   [4 marks]

(c) State and explain any two concurrency problems that may occur in distributed systems
                                                                        [4 marks]

(d) Briefly explain three categories of faults that occur in distributed systems   [6 marks]

(e) There are various design approaches that have been suggested in building dependable distributed systems that exhibit a high level of stability and fault tolerance, explain any three of these approaches
                                                                        [3 marks]

Question THREE (20 marks)

(a) Fundamentals models are concerned with the description of properties that are common in all of the architectural models, describe the three main fundamentals models [6 marks]

(b) State and explain the three types of services provided by a distributed file system [3 marks]

(c) Security goals of any computer system are decided by its security policy, state and explain three security goals that can be set in a distributed system   [6 marks]

(d) Outline five kinds of security threats to consider when designing and implementing a distributed system
                                                                        [5 marks]

Question FOUR (20 marks)

(a) A system that fails does not adequately provide services it was designed for, explain four types of failures that may occur in parallel and distributed systems.   [4 marks]

(b) Explain the meaning of the term 'Remote Method Invocation' and how it works in a distributed system
                                                                        [2 marks]

(c) Describe using diagrams, three algorithms used to achieve mutual exclusion in distributed systems
                                                                        [6 marks]

(d) Explain four advantages of file replication   [8 marks]

Question FIVE (20 marks)

(a) Distinguish between synchronous and asynchronous communication   [2 marks]

(b) A system that fails is not an adequately providing the services it was designed for. Describe four types of failure in parallel and distributed systems   [2 marks]

(c) Outline the steps involved in remote procedure call between clients and servers   [5 marks]

(d) With appropriate diagrams differentiate between loosely coupled and tightly coupled systems
                                                                        [6 marks]

(e) State and explain five importance of IPC (Inter-process Communication)   [5 marks]