



MACHAKOS UNIVERSITY

University Examinations for 2016/2017

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

**FOURTH YEAR FIRST SEMESTER EXAMINATION FOR
BACHELOR OF SCIENCE IN COMPUTER SCIENCE**

SCO 410: DISTRIBUTED SYSTEMS

DATE: 31/7/2017

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

Answer Question One and Any Other Two Questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Differentiate between:
 - i) RMI and RPC (4 marks)
 - ii) Name space and network partition (2 marks)
 - iii) architectural model and fundamental model (4 marks)
- b) State six advantages of DS (6 marks)
- c) Describe any three key networking issues for distributed System (6 marks)
- d) Explain the following trends in Distributed computing (8 marks)
 - i) pervasive networking technology
 - ii) mobile and ubiquitous computing
 - iii) multimedia services
 - iv) distributed systems as utility

QUESTION TWO (20 MARKS)

- a) Explain any three types of failure in DS (6 marks)
- b) Differentiate SOAP and REST Web Services implementation approaches (5 marks)
- c) Discuss the following challenges in distributed systems (9 marks)
 - i. Heterogeneity
 - ii. Concurrency
 - iii. Transparency

QUESTION THREE (20 MARKS)

- a) Using a typical example of communicated objects in a DS, discuss UDP datagram communication including its advantages over TCP in DS (9 marks)
- b) Difference between flat and nested transaction (5 marks)
- c) Using diagrams, explain the following types of distributed systems including real life example
 - i. Grid (3 marks)
 - ii. Cluster (3 marks)

QUESTION FOUR (20 MARKS)

- a) Cloud computing services like Amazon's EC2 assign users virtual machines (VMs) instead of allocating physical machines directly. Explain the three benefits for this giving a brief motivation for each one. (6 marks)
- b) Peer-to-Peer computing supports distributed system concept. Supports this argument using Tapestry as a case study (8 marks)
- c) Explain Globus security architecture as applied in DS (6 marks)

QUESTION FIVE (20 MARKS)

- a) Explain why server side processing uses threads instead of a single process. (6 marks)
- b) Describe multicast communication in distributed systems (6 marks)
- c) Discuss the goal of distributed files systems, and describe SUN NFS. (8 marks)