

Mount Kenya University



UNIVERSITY EXAMINATION 2014/2015

**SCHOOL OF PURE AND APPLIED SCIENCES
DEPARTMENT OF INFORMATION TECHNOLOGY**

**BACHELOR OF EDUCATION
SCHOOL BASED**

UNIT CODE: BIT2204

**UNIT TITLE: DATA COMMUNICATION
AND NETWORKS**

DATE: AUGUST 2015

MAIN EXAM

TIME: 2 HOURS

**ANSWER QUESTION ONE AND ANY OTHER TWO
QUESTION 1 (30 MARKS)**

- a) Define the following terminologies:
- i. Firewall
 - ii. Multiplexing
 - iii. IP address
 - iv. Packet
 - v. MAC address
 - vi. Segment
 - vii. Switching (7 Marks)
- b) Network setup can be configured as either peer-to-peer or client-server.
- i. Differentiate the two types of configurations using illustrations (3 Marks)
 - ii. Discuss the challenges associated with each type of configuration (3 Marks)
- c) Describe five network design goals (5 Marks)
- d) Differentiate between circuit switching and packet switching giving examples (4 Marks)

- e) Discuss two types of routing (2 Marks)
- f) Differentiate the following concepts:
- i. MAN and WAN (2 Marks)
 - ii. Bandwidth and Throughput (2 Marks)
 - iii. Logical and Physical topology (2 Marks)

Question 2 (20 Marks)

- a) Discuss three factors considered when designing Medium Access Control techniques (6 Marks)
- b) Explain three common network topologies with the aid of diagrams giving advantages and disadvantages of the same (9 Marks)
- c) With the aid of diagrams, discuss two multiplexing schemes as used in computer networking (5 Marks)

Question 3 (20 Marks)

- a) Define Network Address Translation (NAT) and briefly explain how it works. (4 Marks)
- b) Briefly discuss the main differences between TCP (Transmission Control Protocol) and UDP (User Datagram Protocol) (5 Marks)
- c) Which of the services in (b) above is most suitable for developing a 'Real time' application? Explain your reasoning (5 Marks)
- d) Outline the differences between the two main switching techniques as used in networks (6 Marks)

Question 4 (20 Marks)

- a) Briefly discuss the importance of the Open Systems Interconnection (OSI) network reference model by emphasizing the importance of layers for functional communication requirements. (5 Marks)

b) Name and briefly discuss the seven layers of the OSI model.
(11 Marks)

c) Define a Network Interface Card (NIC) and discuss four of its functions.
(4 Marks)

Question 5 (20 Marks)

- a) Briefly discuss the advantages and disadvantages of both packet switching and circuit switching as used in computer networks.
(6 Marks)
- b) Define Media Access Control techniques and discuss any three media access control techniques used in computer networking stating which network architecture is applicable to each technique. (6 Marks)
- c) Name and briefly define five applications that are found on the application layer of TCP/IP.
(4 Marks)
- d) Differentiate a gateway from a default gateway as used in networks.
(4 Marks)