



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN ELECTRICAL & ELECTRONICS ENGINEERING

EEE 4513: DATA COMMUNICATION

END OF SEMESTER EXAMINATION

SERIES: APRIL 2025

TIME: 2 HOURS

DATE: April 2025

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions.

Answer question **ONE** and **ANY TWO** questions.

Do not write on the question paper.

QUESTION ONE (30 MARKS)

- (a) With the aid of appropriate diagrams describe the following data network functions [6 Marks]
- (i) Routing
 - (ii) Forwarding
- (b) Outline TWO reasons for using layered network architecture [4 Marks]
- (c) With the aid of diagrams describe the Internet Protocol stack (layers). [8 Marks]
- (d) Relative to layered network architecture, describe the concept of encapsulation [4 Marks]
- (e) Describe the FOUR sources of packet delay. [8 Marks]

QUESTION TWO (20 MARKS)

- (a) With the aid of appropriate sketches describe the following application architectures. [8 Marks]
- i) Peer-to-peer
 - ii) Client server
- (b) What are the roles of the sender and receiver in a UDP checksum? [6 Marks]
- (c) Outline the roles of port numbers in a device connected to a data network [4 Marks]
- (d) Distinguish between congestion control and flow control in data networks [2 Marks]

QUESTION THREE (20 MARKS)

- (a) With the aid of a block diagram describe the input port functions of a data network device [8 Marks]
- (b) Describe the two Shortest Path IGP Routing Algorithms used in data networks [4 Marks]
- (c) Given a campus network prefix of 125.36.0.0/16 create 5 subnets to accommodate a minimum of 250 hosts each [8 Marks]

QUESTION FOUR (20 MARKS)

- (a) Describe the following Autonomous System (AS) terminologies. [6 Marks]
- (i) Stub As
 - (ii) Multihomed stub AS
 - (iii) Transit AS

- (b) Distinguish between intra-AS routing and inter-AS routing as employed in routing and autonomous systems [6 Marks]
- (c) With the aid of a block diagram describe the high level view of generic router architecture [4 Marks]
- (d) Considering a large network scenario describe the basic idea of Subnetting [4 Marks]

QUESTION FIVE (20 MARKS)

- (a) With the aid of a well labeled block diagram describe where the link layer is implemented in data networks [8 Marks]
- (b) In relation to data delivery in data networks, describe in detail the concepts of, [8 Marks]
- (i) Error detection
 - (ii) Error recovery
- (c) Compare and contrast the following connecting devices. [4 Marks]
- (i) Switch
 - (ii) Router