



MACHAKOS UNIVERSITY

University Examinations for 2016/2017

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

**FIRST YEAR SECOND SEMESTER EXAMINATION FOR DEGREE IN
BACHELOR OF SCIENCE IN COMPUTER SCIENCE**

SCO 105: DATA COMMUNICATION TECHNOLOGIES

DATE: 2/6/2017

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

Answer Questions ONE and Any Other Two Questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Distinguish Baseband and Broadband technologies in data communication (2 marks)
- b) State THREE fundamental characteristics on which the effectiveness of data communication depends on? (3 marks)
- c) Explain FIVE components of data communication. (5 marks)
- d) Define a protocol and explain key components of a protocol (3 marks)
- e) Explain any two types of Collision Domains in Ethernets. (4 marks)
- f) Explain the following Types of Switching techniques. (6 marks)
 - i. Circuit switching
 - ii. Packet switching
 - iii. Message switching
- g) Explain how Virtual Circuit Switched Communications Work (4 marks)
- h) State any THREE popular ARQ mechanisms (3 marks)

QUESTION TWO (20 MARKS)

- a) Explain the THREE criteria necessary for an effective and efficient network (3 marks)
- b) Using a well labeled diagram, Explain OSI model and responsibilities of each layer.
(14 marks)
- c) State any THREE levels of addresses used in an internet employing the TCP/IP protocols
(3 marks)

QUESTION THREE (20 MARKS)

- a) State any TWO typical protocols in each of the following TCP/IP layers (6 marks)
 - i. Application layer
 - ii. Transport layer
 - iii. Network layer
- b) Discuss the following routing algorithms: (4 marks)
 - a. Dijkstra's Algorithm
 - b. Bellman-Ford Algorithm
- c) Distinguish Transmission time from propagation time as used in Flow Control protocols
(4 marks)
- d) Explain the functions of each of the following networking devices (6 marks)
 - i. Hubs
 - ii. Repeaters
 - iii. Gateways

QUESTION FOUR (20 MARKS)

- a) Briefly discuss the operation of an ATM network and state three advantages. (5 marks)
- b) Explain the following data link flow control protocols (6 marks)
 - i. Stop and Wait
 - ii. Fragmentation
 - iii. Sliding Window flow control
- c)
 - i) Explain briefly High-level Data Link Control (HDLC) (3 marks)
 - ii) State any Three data transfer modes of HDLC (3 marks)
 - iii) State Three types of frames HDLC uses (3 marks)

QUESTION FIVE (20 MARKS)

- a) Discuss the following wireless networks (4 marks)
- i. Bluetooth
 - ii. Wireless LAN
 - iii. Wimax
 - iv. GSM
- b) List the design issues of datalink layer (4 marks)
- c) Compare the following LAN technologies (12 marks)
- i. Ethernet
 - ii. 10BaseT
 - iii. 100BaseT
 - iv. 1000BaseT
 - v. 100BaseTX
 - vi. 100BaseFX