



# MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

## SCHOOL OF ENGINEERING AND TECHNOLOGY

### DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

#### FIRST YEAR SECOND SEMESTER EXAMINATION FOR

#### BACHELOR OF SCIENCE (COMPUTER SCIENCE)

#### SCO 105: DATA COMMUNICATION TECHNOLOGIES

DATE: 14/12/2020

TIME: 8.30-10.30 AM

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#### INSTRUCTIONS

Answer question ONE and any other TWO questions.

#### QUESTION ONE (30 MARKS) COMPULSORY.

- 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.
  - i. Circuit switching
  - ii. Packet switching
  - iii. Message switching(6 marks)
- 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)
- Application layer
  - Transport layer
  - Network layer
- b) Explain at least FIVE facilities that are needed to connect to the Internet. (5 marks)
- c) Distinguish Transmission time from propagation time as used in Flow Control protocols (3 marks)
- d) Explain the functions of each of the following networking devices (6 marks)
- Hubs
  - Repeaters
  - Gateways

### **QUESTION FOUR (20 MARKS)**

- a) State the purpose of the Uniform Resource Locator (URL) in the Internet. Name the two basic parts of a URL address. (3 marks)
- b) Explain the following data link flow control protocols (9 marks)
- Stop and Wait
  - Fragmentation
  - Sliding Window flow control
- c) i Define the term High-level Data Link Control (HDLC) (2 marks)
- ii State any Three data transfer modes of HDLC (3 marks)
- iii State Three types of frames HDLC uses (3marks)

### **QUESTION FIVE (20 MARKS)**

- a) State any FIVE factors affecting the speed of the Internet (5 marks)
- b) List the design issues of datalink layer (3 marks)
- c) Compare the following LAN technologies (12 marks)
- Ethernet
  - 10BaseT
  - 100BaseT
  - 1000BaseT
  - 100BaseTX
  - 100BaseFX