



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (CLOUD COMPUTING AND INFORMATION SECURITY)

SCO 105: DATA COMMUNICATION TECHNOLOGIES

DATE: 2/2/2022

TIME: 2.00-4.00 PM

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. (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. (8 marks)
- c) What are the advantages of Layered model (4 marks)
- d) Compare and contrast the OSI model and the TCP/IP model (2 marks)
- e) 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) 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)
 - i. Hubs
 - ii. Repeaters
 - iii. 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)
 - i. Stop and Wait
 - ii. Fragmentation
 - iii. 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 (3 marks)

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 (6 marks)
- c) Three physical topologies associated with LANs are: the bus, ring and star topologies. Describe **each one**, highlighting their strengths and weaknesses from a reliability point of view. (9 marks)