



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## UNIVERSITY EXAMINATIONS 2023/2024

FIRST YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF BUSINESS INFORMATION TECHNOLOGY, BACHELOR OF SCIENCE IN DATA SCIENCE, BACHELOR OF SCIENCE IN COMPUTER SCIENCE, BACHELOR OF SCIENCE IN COMPUTER SECURITY AND FORENSIC, BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY, BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY, BACHELOR OF EDUCATION ARTS, BACHELOR OF EDUCATION SCIENCE AND BACHELOR OF SCIENCE IN INFORMATION SCIENCE

AND

THIRD YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF TECHNOLOGY IN ELECTRICAL AND ELECTRONIC ENGINEERING, BACHELOR OF SCIENCE IN MATHEMATICS AND BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE

### CIT 3152/EET 3371: DATA COMMUNICATION AND NETWORKS/ DATA COMMUNICATION AND COMPUTER NETWORKS

DATE: APRIL 2024

TIME: 2 HOURS

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**INSTRUCTIONS:** Answer Question ONE and any other TWO questions.

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#### QUESTION ONE (30 MARKS)

- a) Discuss four benefits of using computer networks (4 Marks)
- b) Distinguish between the following terms (4 Marks)
  - i. Passive nodes vs active nodes
  - ii. Topology vs architecture



MUST is ISO 9001:2015 and



ISO/IEC 27001:2013 CERTIFIED

- c) With reference to OSI reference model explain the encapsulations at the bottom 4 layers (4 Marks)
- d) Describe the distinguishing features of the following devices: (4 Marks)
  - i. Hubs vs switches
  - ii. Routers vs bridges
- e) Discuss any four media access control mechanisms (4 Marks)
- f) Illustrate and explain three channel transmission modes (4 Marks)
- g) Distinguish between packet switching vs circuit switching (4 Marks)
- h) UDP is an unreliable protocol but this may however not be a bad thing. Explain (2 Marks)

**QUESTION TWO (20 MARKS)**

- a) Discuss the distinguishing features of peer-to-peer vs client/server architectures (4 Marks)
- b) Discuss any four network security threats and recommend solutions (4 Marks)
- c) Illustrate and explain the fields within an Ethernet II frame (4 Marks)
- d) Discuss any two error correction features during data transmission (4 Marks)
- e) Explain the role of the TTL field within an IPv4 packet (4 Marks)

**QUESTION THREE (20 MARKS)**

- a) Discuss the features of the following channels: (4 Marks)
  - i. Synchronous verses asynchronous
  - ii. Duplex verses simplex
- b) Explain three transmission impairments common in copper transmission media and recommend solutions (4 Marks)
- c) Distinguish between the following and give examples of where each is applied (4 Marks)
  - i. Modulation verses encoding
  - ii. Parallel verses serial transmission
- d) In a network system, sometimes a physical topology may not necessarily transmit logically as expected. Explain such a scenario. (4 Marks)
- e) With one examples, for each explain the role of DCE and DTE equipment in an enterprise network (4 Marks)



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

- a) Discuss the similarities and differences between IEEE 802.3 and IEEE 802.5 (4 Marks)
- b) Explain two differences between Traditional LAN and VPN (4 Marks)
- c) Illustrate and explain the distinguishing features between coaxial and twisted pair wires (4 Marks)
- d) Explain the distinguishing features of IPV6 compared to IPV4 (4 Marks)
- e) Distinguish between unicast vs multicast addresses (4 Marks)

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

- a) Explain the limitations of CSMA/CD compared to CSMA/CA (4 Marks)
- b) Using a table explain the features of class A, B and C addresses (4 Marks)
- c) Discuss the role of the following: (4 Marks)
  - i. ICMP
  - ii. DNS
  - iii. DHCP
  - iv. SNMP
- d) Discuss the feature of wireless transmission in contrast to wired transmission medium network operating systems in contrast to PC NOS (4 Marks)
- e) Using example, Explain the reasons for Standards in Data Transmission Devices and Protocols (4 Marks)

