



MACHAKOS UNIVERSITY

University Examinations for 2020/2021

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SIT 306: DATA COMMUNICATIONS AND NETWORKS

DATE: 9/8/2021

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

Answer question ONE and any other TWO questions

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Define the following general terms used in network protocols:-

- i) Peers (2 marks)
- ii) IDU (2 marks)
- iii) SDU (2 marks)
- iv) PDU (2 marks)

b) Explain two well-known data transport protocols provided by the Internet Transport Layer. (6 marks)

c) Use the IEEE 802.3 Ethernet and IEEE 802.11 WiFi LAN Technologies, to answer the questions that follow:-

- i) What is the Data link Layer service model provided by each of these LAN technologies? (2 marks)
- ii. Highlight the difference between the two LAN technologies (4 marks)
- iii) Which of these two LAN technologies has the higher bit error rate, and why? (3 marks)
- iv) Which LAN technology provides better support for mobile users, and how? (3 marks)

d) Explain two methods regarding Communication between any two devices. (4 marks)

QUESTION TWO (20 MARKS)

- a) Explain how a client computer determines what source port number to assign to a UDP header? (3 marks)
- b)
 - i. Discuss why a cable installation can experience attenuation (4 marks)
 - ii. Describe the four steps to take during pre-cabling preparation. (4 marks)
- c) Describe the steps and factors to consider when setting up a peer-to-peer network. (9 marks)

QUESTION THREE (20 MARKS)

- a) Identify the commonly used Internet application that was developed first (2 marks)
- b) Explain the purpose of using a source port number in a TCP communication? (4 marks)
- c) Analyse three types of Broadband Wireless technology that have minimized the challenges of Cable modem subscribers. (6 marks)
- d) Highlight the Benefits of VPN in WANs (8 marks)

QUESTION FOUR (20 MARKS)

- a) Describe the **working of a DNS**? (6 marks)
- b) Explain any two other features of WiFi technology that are not available (or even possible) in Ethernet LANs. (6 marks)
- c) Describe Why WANs Are Necessary in communications industry (8 marks)

QUESTION FIVE (20 MARKS)

A recent proposal from researchers at Machakos University (MU) is to get rid of traditional traffic lights at Nairobi City intersections, and instead use the wireless communication capabilities of future self-driving cars to dynamically negotiate and regulate vehicular traffic flow through intersections. By doing so, they claim that they can improve traffic flow, and reduce urban commute times by about 30%.

- a) Explain why this approach is a good idea or a bad idea? (1 mark)
- b) Describe the technical challenges that will come with this new approach (5 marks)
- c) Explain How these challenges could be overcome (5 marks)
- d) What other potential challenges (technical or non-technical) are likely with this new approach? (5 marks)
- e) Describe how the challenges in (iv) could be overcome (4 marks)