



DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY

University Examinations 2021/202

YEAR 2 SEMESTER II ORDINARY EXAMINATION FOR BACHELOR OF SCIENCE IN TELECOMMUNICATION INFORMATION ENGINEERING

ETI 2206: NETWORK DESIGN AND MANAGEMENT

DATE: APRIL 2022

TIME: 2 HOURS

Instructions: Answer Question ONE and Any Other TWO.

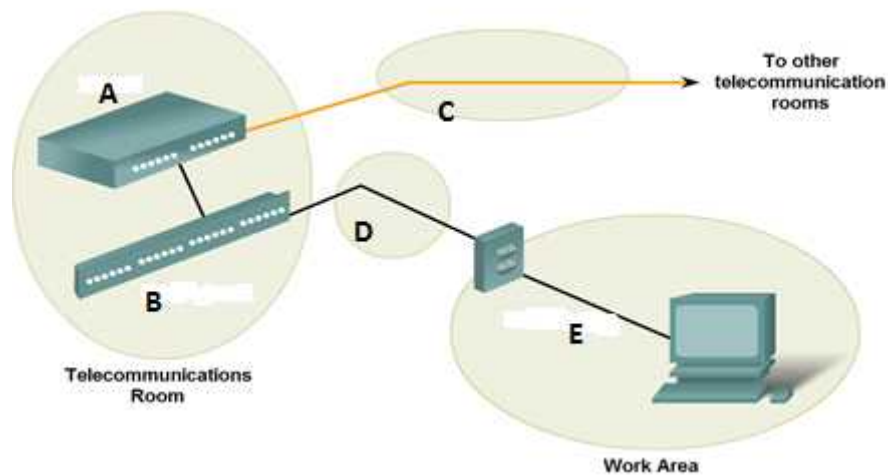
Question 1: (30 Marks)

(a) Explain the following concepts:

- i. WAN
- ii. Protocol
- iii. Data centre
- iv. Internet
- v. Attenuation

(5 marks)

(b) Identify the device or cabling region labelled *A* to *E* in the LAN diagram below:



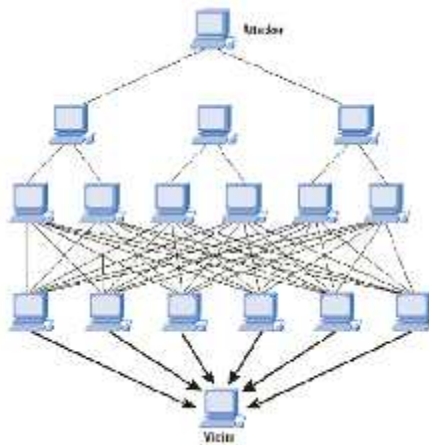
(5 marks)

(c) Referring to the table below, compare implementation issues of working with wireless and wired media:

(5 marks)

Implementation issues	Wireless Media	Wired Media
Bandwidth support		
Distance / Coverage area		
Interference		
Security		
Cost		

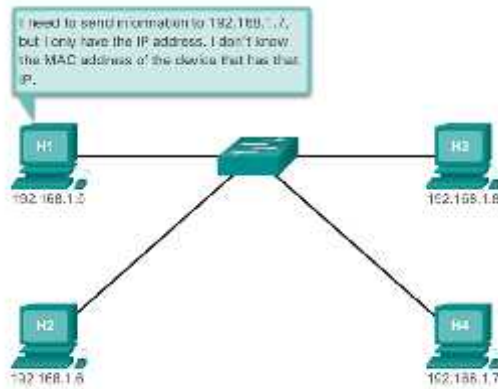
- (d) Is it possible for an application to enjoy reliable data transfer even when the application runs over UDP? Explain. (4 marks)
- (e) The diagram below represents an example of a network attack. Describe the nature and the intent of such an attack. (5 marks)



- (f) Briefly discuss, citing FOUR relevant examples, how a computer network is beneficial to an institution such as Dedan Kimathi University. (4 marks)
- (g) Distinguish between end devices and intermediary devices (give examples in each case) (2 marks)

Question 2:(20 Marks)

- (a) Explain why UTP cabling is a popular choice for implementing LAN cabled networks. (3 marks)
- (b) With the aid of diagrams, explain FOUR different ways in which end devices are interconnected in networks. (4 marks)
- (c) Which protocol is used to resolve the scenario shown below? Explain how this protocols works.



- (e) Discuss the pros and cons of server-based networks as compared to peer to peer networks (3 marks)
- (f) Explain the process of setting up a wireless LAN. List the components/devices used. (4 marks)
- (6 marks)

Question 3: (20 Marks)

- (a) Explain FIVE possible reasons a user may be getting this message while trying to access the Internet.



- (b) Using the ping command is an effective way to test connectivity. (5 marks)
- i. What command is used to ping the local host? (1 marks)
 - ii. What does the test in (i) above confirm? (2 marks)
 - iii. List the protocol involved in a ping test and briefly explain how it works (2 marks)
- (c) Rosa Obote runs an IT firm in Nyeri that specializes in development of business software solutions for small and medium enterprises. There was a recent Internet-initiated security breach in the organisation's LAN that resulted in loss of data and disruption of services. Explain FIVE different approaches Rosa can take to protect her business from future attacks. (10 marks)

Question 4: (20 Marks)

You have been appointed as the ICT director of Nyeri County and tasked with the responsibility to plan, design and implement a computer network for the county government's offices.

- (a) Discuss FOUR main LAN design goals to consider when implementing the network (8 marks)

- (b) Discuss the importance of testing the following parameters after UTP cable installation:
- i. Wire map
 - ii. Cable length
 - iii. Crosstalk
- (6 marks)
- (d) Briefly explain THREE factors to consider when choosing network devices for the network
- (3 marks)
- (e) Discuss THREE types of security threats that face such a network
- (3 marks)

Question 5: (20 Marks)

- (a) Discuss, using suitable examples and explaining their role in the network, the FOUR major components of a network
- (8 marks)
- (b) Given the IP address 192.168.0.0/16, design an IP addressing scheme for the following network below as per requirements in each subnet:

<i>Subnet</i>	<i>Network address</i>	<i>Host addresses range</i>	<i>Broadcast address</i>	<i>Subnet mask</i>
<i>Student LAN (600 hosts)</i>				
<i>Faculty LAN (60 hosts)</i>				
<i>Admin LAN (6 hosts)</i>				

(12 marks)