



KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

FIRST SEMESTER 2022/2023
[SEPTEMBER-DECEMBER, 2022]

BIT 310: NETWORK DESIGN AND MANAGEMENT

STREAM: Y3S1

TIME: 2 HOURS

DAY: MONDAY, 9:00 – 11:00 AM

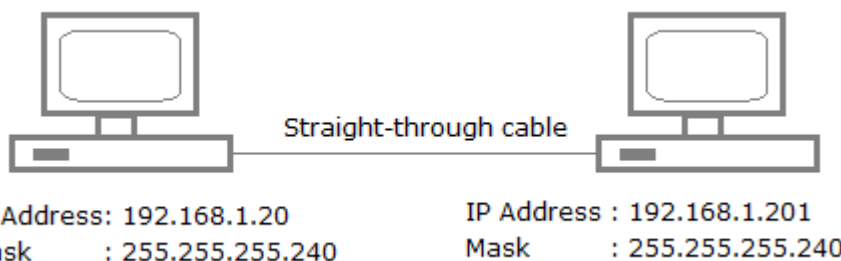
DATE: 05/12/2022

INSTRUCTIONS

1. Do not write anything on this question paper.
2. Answer question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

- a. A host has the IP address 198.22.45.173/26.
 - i. Calculate the network address, broadcast address, and valid host addresses for the IP subnet of which the host is a member of. (4 marks)
 - ii. Calculate the subnet mask in dotted-decimal notation. (2 marks)
- b. Your router has the following IP address on Ethernet0: 172.16.2.1/23. Describe range of valid host IDs that can be given to devices attached on the LAN interface of the the router. (4 marks)
- c. A network administrator is connecting hosts A and B directly through their Ethernet interfaces, as shown in the illustration. Ping attempts between the hosts are unsuccessful. Describe what should be done to provide connectivity between the hosts (4marks)



- d. With help of a diagram illustration, describe the network management architecture (5 marks)

- e. As a network expert you've been contacted by one of the university in Kenya to assist them come up with a network backup policy. Considering operations that can be done on the university setup come up with a network backup policy documentation. (6 marks)
- f. Describe major considerations that should be made when choosing an organization's server NOS. (5 marks)

QUESTION TWO (20 MARKS)

- a. Discuss issue that must be considered in network user management. (5 marks)
- b. Describe the Basic Model of Police-Based Network Management. (5 marks)
- c. Discuss any 4 Reasons for implementing DHCP in a network environment. (4 marks)
- d. A host computer has been correctly configured with a static IP address, but the default gateway is incorrectly set. Which layer of the OSI model will be first affected by this configuration error? (2 marks)
- e. A router interface has been assigned an IP address of 172.16.192.166 with a mask of 255.255.255.248. Calculate the subnet IP address which it belongs? (4 marks)

QUESTION THREE (20 MARKS)

- a. You are working for a company that will be using the 192.168.1.0 /24 private IP address space for IP addressing inside their organization. They have multiple geographical locations and want to carve up the 192.168.1.0 /24 address space into subnets. Their largest subnet will need 13 hosts. Calculate the subnet mask that should you use to accommodate at least 13 hosts per subnet, while maximizing the number of subnets that can be created. (4 marks)
- b. Discuss the considerations needed in creating a server room. (3 marks)
- c. Configuration management is the administration of state in hosts or network hardware. Describe any four methods that are used to configure hosts: (6 marks)
- d. Compare and contrast SNMPv1, SNMPv2, and SNMPv3 (4 marks)
- e. Describe structured cabling as used in networking (3 marks)

QUESTION FOUR (20 MARKS)

- a) Key distribution schemes using an access control center and/or a key distribution center have central points vulnerable to attack. Discuss the security implications of such centralization. (4 marks)
- b) Explain the meaning of the following linux configuration commands
 - i. # ifconfig (2marks)
 - ii. # netstart (2marks)
 - iii. # arp -e (2marks)

- c) Describe various tools that you may use to test twisted pair and fiber cables after installation of a network. (4 marks)
- d) Explain the meaning of the following windows commands
 - i. Ipconfig (2marks)
 - ii. Ping (2marks)
 - iii. tracert (2marks)

QUESTION FIVE (20 MARKS)

- a) Describe various steps that a network administrator must follow when planning for IP address scheme to use in a network. (4 marks)
- b) Consider a busy organization, such as a newspaper, where users need constant access to software, and clients need constant access to news via a web server.
 - i. Describe the precautions you would take in securing the continued functioning of a system during a major software change or upgrade. (6marks)
 - ii. Explain how you would involve the users in this procedure. (4 marks)
- c) Discuss any six primitives that can be used to correct faults in a network. (6 marks)