

 **DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY**

University Examinations 2013/2014

**FIRST / THIRD** YEAR **SEMESTER** II EXAMINATION FOR THE DEGREE OF **BACHELOR OF SCIENCE IN BUSINESS INFORMATION TECHNOLOGY / BACHLOR OF SCIENCE IN INFORMATION TECHNOLOGY / BACHELOR OF SCIENCE** **IN COMPUTER SCIENCE**

CBT 2109 / BIT 2108 / ICS 2306: COMPUTER NETWORKS

**DATE: DECEMBER 2013 TIME: 2 HOURS**

***Instructions: Answer Question 1 and Any Other Two.***

## Question 1: (30 Marks)

(a) Differentiate between the following terms:

 i. Queuing delay and Processing delay

 ii. Half duplex and Full duplex

(4 marks)

(b) Given the IP address 172.16.83.20/28, what is the broadcast address?

(2 marks)

(c) Explain the following considerations with regards to design of a network:

 ii. Functionality

 ii. Scalability

 (4 marks)

(d) What is the role of standards in networking? List any TWO examples.

(4 marks)

(e) What is a hotspot? Briefly explain how it works.

(4 marks)

(f) Briefly discuss THREE considerations when subscribing for an Internet

connection.

(3 marks)

(g) Using a diagram, illustrate and briefly explain the structure of a UTP cable.

(3 marks)

(h) Explain THREE benefits of a computer network.

(3 marks)

(i) A network has become slow as more users are added. All users connect to a 24-port hub. Recommend a possible solution, and give reason(s).

(3 marks)

### Question 2: (20 Marks)

(a) Suppose you wanted to do a transaction from a remote client to a server as fast as possible. Which Transport layer protocol would be preferable? Briefly outline THREE reasons.

(4 marks)

(b) Illustrate and briefly explain the TCP connection establishment process.

(3 marks)

(c) Briefly outline the following features of a TCP segment:

 i. Window size

 ii. Acknowledgment number

 iii. Padding

(6 marks)

(d) Consider the command prompt screen shot show below:



1. Which network utility is responsible for this output? What information does it provide?

(2 marks)

1. Explain the output of the screen shot.

(3 marks)

(e) What is the significance of port addressing in network communications?

(2 marks)

#### Question 3: (20 Marks)

#### You have recently joined the ICT staff team of a leading institution of higher education. Plans are in place to set up a wireless network for use by staff and students.

1. Outline FOUR benefits of wireless networks

(4 marks)

1. Using an illustration, compare and contrast the data transfers and coverage area of FOUR wireless networking standards.

 (4 marks)

1. Using a diagram, show the components of a wireless LAN are set up. Briefly explain the devices used and the WLAN operation mode.

 (6 marks)

1. Discuss THREE strategies adopted to enhance security of wireless networks.

(6 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 the considerations with regard to network planning:

1. Gathering users’ requirements and expectations.
2. Analysing requirements.
3. Documenting the logical and physical network implementation.

(6 marks)

1. Given the IP address 172.16.0.0/16, design an IP addressing scheme for the network based on the following requirements:

|  |  |
| --- | --- |
| Subnet | Network hosts |
| Administration  | 600 |
| Human Resource (HR) | 200 |
| Finance | 50 |

(12 marks)

1. Why is function and placement of servers important in optimising LAN bandwidth and performance?

 (2 marks)

### Question 5: (20 Marks

(a) Which network utility is responsible for the output shown below? Explain how it works and comment on the information provided.



 (5 marks)

(b) Discuss the factors of consideration when selecting networking components in the following LAN cabling areas:

 i. Work area

 ii. Horizontal cabling

 iii. Telecommunication room

1. Backbone cabling

 (8 marks)

(c) Illustrate how the components in the LAN cabling areas (refer to 5(b)) interconnect.

(4 marks)

1. Discuss the functionality of the Data link layer in the OSI model.

(3 marks)