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**University Examinations 2014/2015**

STAGE 4 EXAMINATION FOR DIPLOMA IN INFORMATION TECHNOLOGY

**CIT 2283: NETWORK DESIGN AND SETUP**

 **DATE: APRIL 2015 TIME: 11/2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. (i) What is meant by duplex communication system (1 Mark)

(ii) Differentiate between half-duplex communication and full-duplex communication system

 (2 Marks)

(iii) Give one example of each of the communication systems in (ii) above (2 Marks)

1. (i) Define the term modulation in reference to communication systems (1 Mark)

(ii) Discuss two reasons for modulating signals before transmission (2 Marks)

1. (i) Draw a diagram showing the layers of the transport control protocol/internet protocol (TCP/IP) and discuss the functions of any two layers of this protocol (5 Marks)

(ii) State any two applications of the TCP/IP protocol suite (2 Marks)

1. (i) Use a diagram to discuss the line-of-sight signal propagation method (4 Marks)

(ii) Discuss two major impairments of line-of-site propagation (2 Marks)

(iii)Differentiate between analogue and digital signals (1 Mark)

1. (i) List six factors to be considered when selecting a network transmission medium

(3 Marks)

 (ii) Which network utility is used to determine the network route data is taking to a

 destination (1 Mark)

 (iii) Discuss the process of sharing files on a network (4 Marks)

**QUESTION TWO (15 MARKS)**

1. (i) Use suitable diagrams to discuss the characteristics of the following types of

 communication channels:

1. Coaxial cable (3 Marks)
2. Twisted pair cable (3 Marks)

 (ii) State one application of each of the channels in (i) above (2 Marks)

1. (i) State two differences between local area network (LAN) and a wide area network

 (WAN) (2 Marks)

(ii) Use schematic diagram to discuss the structure and operation of the tree network

 topology (3 Marks)

1. Name four factors affecting performance of a network (2 Marks)

**QUESTION THREE (15 MARKS)**

Suppose you have been appointed to design the network to be deployed in three buildings on Meru University of Science and Technology (MUST). Building AB1 contains a dedicated computer room containing 10 very high performance dedicated servers. The servers provide services to students and staff who may need to gain access from the internet as well as from the university’s own network.

Building AB2 contains the offices of 14 lecturers and 6 administrators who only use medium power desktop computers located on fixed desks. Building AB3 contains two lecture rooms and a lounge/coffee shop. The lecture rooms have a desktop computer at the front for use by the lecturers, but some lecturers prefer to use their own laptops or tablet computers.

All the students use laptops to take notes and keep in touch with their friends. An underground duct exists between building ABI and building AB2 which are only 30 metres apart. Building AB3 is 30 meters from building AB1 but no duct exists and installing one is not possible.

1. What type of network should be deployed in the building that houses the dedicated computer room and what equipment should be installed (4 Marks)
2. What type of network should be deployed in the second office building and what equipment should be installed (3 Marks)
3. What type of network should be deployed in the teaching building and what equipment should be installed (3 Marks)
4. What type of network connections should be used to link the building together and where and how should be university’s internet connection be made (5 Marks)

**QUESTION FOUR (15 MARKS)**

1. Discuss fibre optic transmission media using a well labeled diagram, stating the advantages and disadvantages of it over other wired transmission media (5 Marks)
2. State five categories of UTP cable stating what they transmit and the speed of transmission in each category (5 Marks)
3. Define the following:
4. Thoughput
5. Topology
6. Attenuation
7. Crosstalk
8. Gateway (5 Marks)

**QUESTION FIVE (15 MARKS)**

1. Briefly explain three data transfer modes (6 Marks)
2. Explain the three configuration types of Network Interface Cards (NIC) (6 Marks)
3. Explain three possible ways of resolving IP address conflicts (3 Marks)