(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

SUPPLEMENTARY EXAMINATIONS 2021/2022 ACADEMIC YEAR

FOURTH YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE IN ELECTRICAL AND COMMUNICATION ENGINEERING

COURSE CODE: ECE 422
COURSE TITLE: DATA COMMUNICATIONS & COMPUTER NETWORKS

DATE: Friday, 7th October, 2022 **TIME:** 9-11am

INSTRUCTIONS TO CANDIDATES

Question ONE (1) is compulsory
Answer Any Other TWO (2) questions

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over.

QUESTION ONE (30 MARKS)

1(a)(i) Discuss any two methods used for error correction.

(ii) Discuss the differences between synchronous and asynchronous data transmission.

(10 marks)

(b)(i) With the aid of a diagram, discuss the communication between the different subsystems in a personal computer.

(ii) Name two bridges found on a personal computer motherboard and discuss their functions

(10 marks)

(c) (i) Discuss the principle of differential Manchester code.

(ii) With the aid of a diagram, describe a circuit that can be used to convert binary code to differential Manchester code.

(10 marks)

QUESTION TWO (20 MARKS)

2. (a) (i) Discuss two schemes used to represent colour images.

(ii) With the aid of a diagram, discuss error detection process using block coding

(10 marks)

(b) (i) What is the error detection and correction capability of a coding scheme with a Hamming distance of 7?

(ii) Describe the protocol used to get the hardware addresses of a host on a local area network.

(10 marks)

QUESTION THREE (20 MARKS)

3 (a) (i) What is the valid range of class A network address?

(ii) What is the class C address range in Decimal and in binary?

(iii) What is the hamming distance?

(10 marks)

(b) (i) Describe the protocol used to find the hardware address of a local host?
(ii) Name and describe the various layers in the TCP/IP protocol.
(iii) What are the functions of a VLAN?

(10 marks)

QUESTION FOUR (20 MARKS)

4(a) (i) Assume that you have 10 users plugged into a hub running 10 Mbps half-duplex. If there is a server running also at half duplex and is connected to a switch running at 10 Mbps which is connected to the hub, how much bandwidth does each host have to the server? Explain.

(ii) Describe operation of slotted aloha multiple access scheme.

(10 marks)

(b)(i) Which protocol does Ping use?

(ii) Which protocol does DHCP use at the transport layer?

(iii) Which Wireless Local Area Network (WLAN) allows up to 54 Mbps data connection at 2.4GHz?

(10 marks)