KOLEJ UNIVERSITI POLY-TECH MARA KUALA LUMPUR

FINAL EXAMINATION
DIPLOMA IN COMPUTER SCIENCE

COURSE	**:**	**DATA COMMUNICATION CONCEPTS**
COURSE CODE	**:**	**TNW2033**
DURATION	**:**	**2 HOURS**

INSTRUCTIONS TO CANDIDATES :

1. This question paper consists of **FOUR (4)** questions.
2. Answer **ALL** questions in the Answer Booklet provided. The mark for each question is explicitly indicated.
3. Please check to make sure that this examination pack consists of :
   i. The Question Paper
   ii. An Answer Booklet
4. Do not bring any material into the examination hall.
5. Please write your answer using permanent ink**.**

MYKAD/ PASSPORT NO : _____

ID. NO. : _____

LECTURER : _____

SECTION : _____

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

This question paper consists of 4 printed pages including the front page

QUESTION 1

a. Identify the **FIVE (5)** components of a data communication system.

(5 Marks)

b.

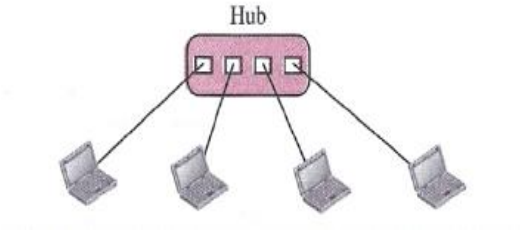

Figure 1: Network Topology

i. Identify the type of topology shown in Figure 1.

(1 Mark)

ii. Summarize an advantage for the above network topology.

(2 Marks)

c.

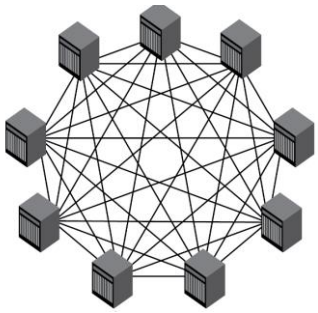

Figure 2: Mesh Topology

i. Calculate the number of cables needed for the network shown in Figure 2 . (4 marks)

ii. Calculate the number of ports needed by each device shown in Figure 2.

(3 Marks)

d. Briefly explain **TWO (2)** categories of transmission medium.

(4 Marks)

e. Outline **THREE (3)** advantages of optical fiber over twisted-pair and coaxial cable.

(6 Marks)

(Total : 25 Marks)

QUESTION 2

a. List **TWO (2)** characteristics of analog signal.

(2 Marks)

b. Draw an analog signal with the following characteristics: *Frequency* of 6Hz, *Amplitude* 5v and *Phase* 0 degree in:

iii. Time-domain Plot

(6 Marks)

iii. Frequency-domain Plot

(3 Marks)

c. A signal has a bandwidth of 200 Hz. The highest frequency is 1000 Hz. What is the lowest frequency? Draw the spectrum if the signal contains all integral frequencies of the same amplitude (10V).

(6 Marks)

d. Encode the bit stream 10100111 using:

i. Bipolar AMI encoding

(4 marks)

ii. Manchester encoding

(4 marks)

(Total : 25 marks)

QUESTION 3

a. Draw a diagram to show how damaged frame is retransmitted if ***Go-Back-N ARQ*** is used.

i. The sender sends 2 frames to the receiver (f0 and f1) to the receiver.
ii. The receiver receives all frames and sends an acknowledgement to the sender.
iii. The sender sends another 2 frames to the receiver (f2 and f3) but f2 is in error.
iv. The receiver sends a negative acknowledgement to the sender.

(11 Marks)

b. Draw a diagram to show how lost frame is retransmitted if ***Selective Reject ARQ*** is used.

i. The sender sends 4 frames to the receiver (f0, f1, f2, f3) but f2 is lost in the transmission.
ii. The receiver sends a negative acknowledgement to the sender.

(9 Marks)

c. Differentiate between broadband and baseband and draw a diagram to support your answer.

(5 Marks)

(Total : 25 Marks)

QUESTION 4

a. List **TWO (2)** categories of multiplexing.

(2 Marks)

b. Given the following information, find the minimum bandwidth for the path:
FDM Multiplexing
4 devices, each requiring 2500 Hz
200 Hz guard band for each device (4 Marks)

c. Given the following information, find the maximum bandwidth for the path:
Total available bandwidth = 3200 Hz
3 signal sources
100 Hz guard band for each device.

(4 Marks)

d. Draw the **synchronous TDM** frames showing the character data if given the following information:
Four signal sources.

Source 1 message	:	W E
Source 2 message	:	L O V E
Source 3 message	:	D A T A
Source 4 message	:	C O M M

(11 marks)

e. Wireless LAN is a local area network that uses high frequency radio signals to transmit and receive data over distances of a few hundred feet. Briefly explain **TWO (2)** advantages of Wireless LAN implementation.

(4 Marks)

(Total : 25 Marks)

(TOTAL : 100 MARKS)

END OF QUESTION PAPER