Center for Distance and Continuing Education
University Of Kelaniya – Sri Lanka

Bachelor of Science (General) Degree (External)
Academic Year 2019 – Semester II
Computer Science
COSC 17533 - Data Communication and Networks

No. of Questions: **Five (05)** No. of Pages: **Three (03)** Time: **Two and Half (02 1/2) hours**

Answer **All Questions.**

Question 1

a)

i. What is Data Communication?

ii. List five (05) components of a data communication system and describe any three (03) them.

iii. Briefly describe four (04) fundamental characteristics that influence the effectiveness of a data communications system.

iv. What is the difference between half-duplex and full-duplex transmission modes?

b)

i. Briefly describe the advantages of a multipoint connection over a point-to-point connection.

ii. Briefly describe Local Area Network (LAN), Wide Area Network (WAN) and Metropolitan Area Network (MAN).

iii. State two advantages and two disadvantages of Ring Topology.

c)

i. Define the protocol in Data Communication. What are the key elements of a protocol?

ii. List five (05) types of protocol.

Question 2

a)

i. Differentiate digital and along signals as used in information transmission.

ii. Define bit rate and baud rate in signals.

iii. Briefly explain the three types of transmission impairment.

b) Encode the bit stream

11000000001010000010

i. Using bipolar AMI encoding scheme, assuming that the polarity of the first 1 is negative.

ii. Using B8ZS encoding scheme, assuming that the polarity of the first 1 is positive.

iii. Using HDB3 encoding scheme, assuming that the number of 1s so far is odd and the polarity of the first 1 is negative.

c)

i. What is the purpose of using constellation diagram in Analog transmission? Briefly explain.

ii. Briefly explain the three (03) sampling methods that can be used in Pulse Amplitude Modulation (PAM).

iii. Describe the mechanism of following techniques.

A. Amplitude Modulation (AM)

B. Frequency Modulation (FM)

Question 3

a)

i. What is meant by "Address Space" in logical addressing?

ii. List IP ranges of class A, B, and C. Show the Netid and the Hostid of IP address in each class using suitable examples.

iii. What is the difference between boundary level masking and non-boundary level masking?

iv. Find the error in each of the following IPv4 addresses.

A. 111.60.022.38

B. 11101.22.255.1

C. 221.34.7.8.20

b) Find the number of sub networks which can be created for the following cases.

A. IP address 125.34.12.56, Mask 255.255.0.0

B. IP address 132.43.67.31, Mask 255.255.254.0

c) Consider the following IP4 address.

10010100 10000100 00011111 00000111

i. Convert the above IP4 address to the dotted-decimal notation.

ii. What is the class of the above address?

iii. Describe the netid and hostid of the above address.

Question 4

a)

i. How does guided media differ from unguided media?

ii. State two (02) advantages and two (02) disadvantages of the guided media over unguided media.

b)

i. Describe briefly the significance of the twisting in twisted- pair cable.

ii. List two(02) unshielded Twisted Pair Connectors and two Coaxial Cable Connectors.

iii. How does Baseband transmission differ from Broadband transmission?

iv. A noisy channel has a signal-to-noise ratio of 31 and a bandwidth of 15 MHz Calculate the maximum bit rate and the number of signal levels supported by this channel.

c)

i. What is meant by omnidirectional waves and unidirectional waves?

ii. How does ground propagation differ from sky propagation and life-of-sight propagation?

Question 5

a)

i. Categorize the layers of the TCP/IP Protocol Suite in terms of the network support layers and the user support layers.

ii. State five responsibilities of the Physical Layer in the Open Systems Interconnection (OSI model).

iii. Briefly describe Translation and Encryption, which are considered as responsibilities of the Presentation layer.

b)

i. What is the difference between Address Resolution Protocol (ARP) and the Reverse Address Resolution Protocol (RARP)?

ii. "User Datagram Protocol (UDP) is unreliable and connectionless". Explain this statement briefly.

c)

i. What is meant by Multiplexing?

ii. State the main purpose of performing Multiplexing.

iii. Describe briefly the demultiplexing process of the Frequency Division Multiplexing (FDM).