MODULE 1 - QUESTION BANK

1. What is data communication? List and explain the five components of a data communication system, with examples. Define the key elements of a protocol.
2. Discuss the OSI-ISO layered model. Bringing out the functionalities of each layer.
3. What is data communication? What are its characteristics and components? Explain.
4. Give the comparison between LAN, MAN and WAN with an example.
5. Describe with a neat diagram. The functionalities of each layer in the TCP/IP model.
6. Explain OSI reference model with a neat figure diagram. What is a protocol? What are its key elements?
7. With neat diagram explain different topologies with their applications.
8. What are standards? Name any four standard organizations.
9. Explain OSI reference model with functions of following layers.
    i. Physical layer
    ii. Data link layer
    iii. Network layer
10. What is data communication? What are its characteristics? Explain. Define the following terms :
    i. Protocol
    ii. Internet
11. Describe with neat diagram the functionalities of each layer in the OSI model.
12. Demonstrate TCP/IP protocol suite of computer networks with a neat diagram.
13. Illustrate with a neat diagram, four basic topologies.
14. List the responsibilities of the Network layer and Transport layer.
15. List and Outline the features of physical topologies. Provide the advantages and drawbacks for each of them.
16. With a neat sketch interpret & explain TCP/IP Protocol Suite.

1 Mark

a. Define simplex data flow of Data Communication
b. How many duplex mode links are present in Mesh Topology?
c. Synchronization bits are added in _____ Layer.
d. Translation, encryption and decryption are performed by _____ Layer.
e. Set of rules that govern the data communication is defined as _____
f. The term telecommunication means _____
g. Data communication means _____
h. Star topology is used in _____
i. A bus uses _____ cabling than mesh or star topologies
j. Physical addressing is present in _____ layer

k. Define data communication
l. List the different data representations
m. List the components of data communication
n. The term telecommunication means _____
o. List the different topologies
p. In simplex mode, the communication is _____
q. Star topology is used in _____
r. Analog data is _____
s. Define peak amplitude
t. Period refers to

MODULE 2

1. An analog signal has a bandwidth of 40 kHz. If we use four levels in the signal. What is the minimum bandwidth of the digital signal?
2. Write a descriptive note on the three causes of transmission impairment.
3. Define bandwidth. A periodic signal has a bandwidth of 20 Hz. The highest frequency is 60Hz. What is the lowest frequency?
4. A signal travels through an amplifier and the power is increased 10 times. Calculate the power gained.
5. Explain three causes of transmission impairments.
6. Describe with neat waveform any two polar line coding schemes.
7. Give data rate formula suggested by Nyquist and Shannon. Low pass communication has BW of 1 m Hz. What is the Shannon capacity of the channel if SNR is 40 db? What bit rate is attained using 8-level pulses?
8. Calculate the Shannon channel capacity in the following cases: (BW 20 kHz SNR dB 40, BW =200 kHz SNR dB 6)
9. A file contains 3 million bytes. How long does it take to download this file using a 100 kbps channel?
10. Define line coding. Describe Unipolar NRZ, polar NRZ-L, Bipolar AMI and Manchester encoding by applying on the information sequence 101011100.

1 Mark

a) What is period?
b) Define frequency?
c) Range of frequencies contained in composite signal is defined as _____
d) Name of the device used in amplifying the lost energy of a signal_____
e) Name the unit of signal rate _____
a. Analog data refers to_____
b. Example of simple periodic analog signal is _____
c. Phase describes _____

f) Give formula for Nyquist bit rate: _____

MODULE 3

1 MARK:

a) Define single bit error.
b) Define burst error
c) Smallest hamming distance between all possible pairs in set of words is _____
d) To guarantee detection of upto s errors min hamming distance dmin is _____
e) The other name for divisor polynomial in a cyclic code is _____
f) What marks the beginning and end of the data link layer frame.
g) Define byte stuffing.
h) Define bit stuffing.
i) _____ is used to number the frames in stop & wait ARQ.
j) In Stop and Wait ARQ the size of send window is 1.

DATA LINK LAYER 1

1. Draw a CRC encoder and decoder for CRC code with C (7,4).Also explain how this CRC design works, with an example.
2. Explain checksum with an example.
3. Explain the different types of errors.
4. Find the codeword C(x) for the information d(x) = x3 + 1 with the generator polynomial t(x) = x3 + x + 1.
5. What is hamming distance? Explain simple parity check code C (5, 4) with d min=1. How many bits can be corrected?
6. What is internet checksum? Explain with an example.
7. What is CRC? If the generating polynomial for CRC code is x4+x3+1 and message word is 11110000 determine check bits and code word.

8. Explain CRC encoder and decoder and compute the code word given Dataword 1001 and Generator 1011.
9. Specify the steps involved in computing internet checksum at the sender and the receiver. Make use of the same and compute the checksum at the sender site and receiver site for sending the data 0x3456,0xABCC,Ox02BC,0xEEEE.(0x->hexadecimal).
10. With a neat diagram of encoder and decoder block structure, outline the features of simple parity-check code.
11. Explain how CRC is used in detecting errors for the following polynomial, g(x) = x4 + x + 1. Consider the information sequence 1101011011.
    i. Find the codeword corresponding to this sequence.
    ii. If the codeword has error in third bit. What does receiver obtain when it does its error checking?

DATA LINK LAYER-2

1. List the protocols for noisy channels. Explain stop and wait protocol for noiseless channels.
2. Define piggybacking and its usefulness.
3. List the noiseless channel protocol. Write and analyze algorithms for sender and receiver site of stop and wait protocol. Provide a neat diagrammatic design for the same.
4. Outline briefly with neat figures stop and wait ARQ.
5. Develop and Analyze Go-Back-N sender and receiver algorithm.
6. Explain the design and flow diagram of stop and wait ARQ(Noisy Channel).

7. Differentiate between character oriented protocol and bit oriented protocol frame format for framing.

8. Outline the salient features of:
    i) stop and wait protocol ii) stop and wait ARQ protocol
9. Explain selective repeat ARQ. Justify how selective repeat ARQ outperforms GoBack-N and Stop-and-Wait ARQ.

MODULE 4

1. Describe the different controlled access methods.
2. Explain 802.3 MAC frame format and frame length.
3. Explain CSMA and CSMA/CD.
4. What do you mean by channelization? Explain the protocols used for channelization.
5. 5. A network transmits 200 bit frame on a shared channel of 200 kbps. For aloha and slotted aloha, what is the
    i. Requirement to make the frame collision free?
    ii. Throughput if the system produces 1000 frames/sec?
6. Define channelization and list its three protocols?
7. What is channelization? Explain CDMA.
8. What is random access? Explain following random access protocols. i) slotted ALOHA ii) CSMA/CD
9. Explain the following random access protocols: i. CSMA ii. CSMA/CD
10. Discuss 802.3 MAC frame format. Mention the restriction imposed on minimum and maximum lengths of a 802.3 frame.
11. Explain Carrier Sense Multiple Access (CSMA) with a neat Diagram.
12. Specify the changes in the standard ethernet that led to evolution of Ethernet to be compatible with higher data rate LAN's

1 Mark

a. The vulnerable time of pure aloha is _____
b. Name any one of the three Controlled Access Methods.
c. The Number of sequences in Waish Table is _____
d. What is the bit rate of a standard ethernet _____

e. Define 1 persistence.
f. In CDMA the value that is obtained as output when we multiply two different codes _____
g. The least significant bit of the first byte of the unicast address is _____

MODULE 5

1. Determine the architecture of IEEE 802.11 with a neat diagram.
2. Analyze the concepts and functionalities of Repeater.
3. Discuss the 802.11 MAC sublayer frame format.
4. Differentiate between amplifier and repeater.
5. Explain the IEEE 802.11 architecture.
6. Explain bridges.
7. Explain the hidden and exposed station problem in IEEE 802.11.
8. Describe the MAC layers in IEEE 802.11 standard.
9. Explain Bluetooth architecture.
10. In brief explain Bluetooth layers.
11. Bring out difference between repeaters, bridges, routers and gateways.
12. Discuss Bluetooth technology.
13. Summarize the Bluetooth Architecture.
14. Briefly Explain the different types of addressing mechanisms in IEEE 802.11

1 Mark

a. Number of stations that a piconet can posses _____
b. The bridge doesn't change _____ Address in a frame.
c. Specify any one protocol defined by IEE at the MAC Sublayer _____
d. Repeater connects segments of a _____