

MCA 3rd Sem-2019

Time: 3 Hours

Full Mark: 70

(Answer all questions and the figures in the right hand margin indicates marks)

1.
 - a) State and explain the characteristics of data communication system. [4]
 - b) For n device in a network, what is the number of cable link required for a mesh, ring, bus, and star topology? [4]
 - c) What are the three criteria necessary for an effective and efficient network? [3]
 - d) What are the advantages of networking in term of resource sharing, up gradation cost, security and manageability in workgroup applications? [3]

OR

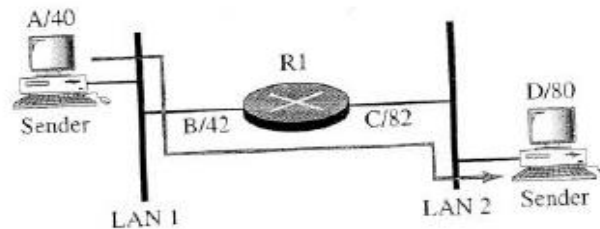


Fig. -1

- e) In fig. 1 assume that the communication is between a process running at the computer A/40 (Logical address/Physical address) with the port address i and a process running at computer D/80 (Logical address/Physical address) with port address j. show the content of packet and frames at the network, data link, and transport layer of each hop. [5]
 - f) Explain the bus type topology and ring type topology networks. Compare their performance. [5]
 - g) What are headers and trailers, and how do they get added and removed? [2]
 - h) If the data link layer can detect error between hops, why do you think we need another checking mechanism at the transport layer? [2]
2.
 - a) What is relationship between period and frequency? [2]
 - b) If the peak voltage value of a signal is 30 times the peak voltage value of the noise, what is the SNR? What is the SNR_{dB}? [4]
 - c) Discuss transmission impairment. [8]
- OR
- d) What does the Shannon capacity have to do with communications? [4]
 - e) We have a channel with 5 KHz bandwidth. If we want to send data at 150 Kbps, what is the minimum SNR_{dB}? What is SNR? [4]
 - f) Briefly describe the characteristics of network performance. [6]
3.
 - a) A file contain 3 million bytes. How long does it take to download this file using 100-Kbps channel? 10-Mbps channel? [2]
 - b) Write different methods for Digital signal transmission. [6]
 - c) Sketch NRZ-I, Manchester, and Differential Manchester encoding for data bit stream: 100101011101. [6]

OR

- a) Compare and contrast PCM and DM. [6]
- b) Define baseline wandering and its effect on digital transmission. [2]
- c) What is the result of scrambling the sequence 11100000000000 using following scrambling techniques? Assume that the last non-zero signal level has been positive. [6]
 - I. B8ZS
 - II. HDB3 (The of non-zero pulses is odd after the last substitution)

4.

- a) What is QAM? Why it is better than PSK? [7]
- b) Define analog to analog conversion. [7]

OR

Define different technique of digital-to-analog conversion. Which of the technique is most susceptible to noise? Defend your answer. [14]

5.

- a) What is multiplexing? Explain different techniques of multiplexing. [10]
- b) Distinguish between synchronous and statistical TDM. [4]

OR

Define spread spectrum and its goals. Explain two spread spectrum techniques. How DSSS and FHSS archives bandwidth spreading. [14]