

(4)

15. Describe the procedure of CSMA/CA with proper flow chart. Explain the frame format of the MAC sublayer in standard ethernet. 8+7

16. What is the need of logical addressing? An ISP is granted a block of addresses starting with 190.100.0.0/16 (65,536 addresses). The ISP needs to distribute these addresses to three groups of customers as follows :

(a) The first group has 64 customers; each needs 256 addresses

(b) The second group has 128 customers; each needs 128 addresses

(c) The third group has 128 customers; each needs 64 addresses

Design the sub-blocks and find out how many addresses are still available after these allocations. 3+12

[Internal Assessment : 30]

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The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer **any five** of the following questions : 2×5=10

1. Calculate the required bandwidth in a communication channel when the signal power is 100 W and noise power is 10 W and the information transmission rate is 10kbps.
2. What is the difference between an MAC address and an IP address?
3. Write the difference between frame and packet.

(2)

4. Why is flow control mechanism required?
5. What is redundancy?
6. What is the significance of block coding technique?
7. What do you mean by ARQ? Explain.
8. What is the need for classless addressing?

Answer *any four* of the following questions :

15×4=60

9. (a) What is network topology?
(b) Compare different network topologies.
(c) A noiseless 4kHz channel is sampled every 1 msec. What is the maximum data rate? How does the maximum data rate change if the channel is noisy, with a signal-to-noise ratio of 30 dB? 2+8+5
10. Describe different types of networks. Explain PAM and PCM with proper diagram. 9+6
11. (a) What is line coding?
(b) Sketch the Manchester and differential Manchester encoding for the bit stream : 0001110101 and 0101010101.

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- (c) A bit string, 0111101111101111110, needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing? 2+10+3
12. (a) Describe different multiplexing techniques.
(b) A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is $x^3 + 1$. Show the actual bit string transmitted. Suppose that the third bit from the left is inverted during transmission. Show that this error is detected at the receiver's end. 9+6
13. (a) Explain how errors are detected using checksum with proper example.
(b) Sixteen-bit messages are transmitted using a Hamming code. How many check bits are needed to ensure that the receiver can detect and correct single-bit errors? Show the bit pattern transmitted for the message 1101001100110101. Assume that even parity is used in the Hamming code. 8+7
14. Explain the mechanism for normal, data lost and ACK lost in selective repeat ARQ technique. Describe the frame format of HDLC. What is piggy backing? 9+5+1

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(Turn Over)