Q.2 a. Describe OSI reference model of a computer network with a diagram. Discuss the function of each layer. **(6)**

Answer: **Refer section 2.3, Figure 2.6, pages 33 & 34 of Text Book-I**

b. Draw the block schematic of a communications model and explain the function of each block. **(6)**

Answer: **Refer section 1.2, Figure 1.2(a), pages 7 & 8 of Text Book-I**

c. Draw the sequence diagrams of a confirmed service and a non- confirmed service. **(4)**

Answer: **Refer section 2.4, Figure 2.10(a) & (b), page 38 of Text Book-I**

Q.3 a. A telephone line carrier frequencies between 300 and 3400Hz. The signal to noise ratio for the telephone line is 35dB. Calculate the theoretical bit rate of the line. **(6)**

Answer:

Channel capacity, $C = B \log_2(1+SNR)$ → 01M

$(SNR)_{dB} = 35dB = 10 \log_{10}(SNR)$

S/N ratio = 3162.3 → 02M

$\therefore C = (3400-300) \log_2(1+3162.3)$

$= 36.043$ Kbps → 03M.

b. Explain the two modes of operation with fiber optic cables with suitable illustrations. **(6)**

Answer: **Refer section 4.1, Figure 4.4, pages 101 & 102 of Text Book-I**

c. Illustrate the effect of bandwidth on a digital signal with suitable diagrams. **(4)**

Answer: **Refer section 3.1, Figure 3.8, page 64 of Text Book-I**

Q.4 a. Discuss ASK and FSK techniques with suitable waveforms. Compare its performance. **(8)**

Answer: **Refer section 5.2, Figure 5.7, pages 137, 138 & 139 of Text Book-I**

b. Explain the following characteristics to distinguish data link configurations.
(i) Topology (ii) Half duplex and full duplex **(4+4)**

Answer: **Refer section 6.5, Figure 6.9, pages 186 to 188 of Text Book-I**

Q.5 a. Describe Go-back-N ARQ error control protocol with a suitable diagram. **(8)**

Answer: **Refer section 7.2, Figure 7.6(a), pages 202 to 205 of Text Book-I**

b. What do you mean by statistical Time division multiplexer? Explain with suitable diagrams. **(8)**

Answer: **Refer section 8.3, Figure 8.12, pages 242, 243 of Text Book-I**

Q.6 a. Compare datagram circuit and Virtual circuit switching techniques with the help of timing diagrams. **(8)**

Answer: **Refer section 10.5, Figure 10.12, pages 295, 296 of Text Book-I**

b. Discuss the mechanisms employed for congestion control with a suitable diagram. **(8)**

Answer: **Refer section 13.2, Figure 13.5, pages 361 to 364 of Text Book-I**

Q.7 a. Describe and explain the usage of a bridge to connect two LANs with the help of diagrams. **(8)**

Answer: **Refer section 15.4, Figures 15.8 & 15.9, pages 441 to 443 of Text Book-I**

b. Draw the IEEE 802.3 frame format and explain the function of each field. **(8)**

Answer: **Refer section 16.2, Figures 16.3, pages 464 to 466 of Text Book-I**

Q.8 a. What are the different classes of IP addressing? Explain with IPv4 address formats. **(6)**

Answer: **Refer section 18.4, Figures 18.7, pages 549 to 550 of Text Book-I**

b. Convert IP address whose hexadecimal representation is C22F1582 to dotted decimal notation. To what class this address belongs to? What is the net ID and host ID? **(6)**

Answer: **Refer section 18.4, Figures 18.7, pages 549 to 550 of Text Book-I**

Explanation

$[C22F1582]_{16} = [1100\ 0010\ 0010\ 1111\ 0001\ 0101\ 1000\ 0010]_2$

$= [194 . 47 . 21 . 130]$

→ 3M

1100 0010 0010 1111 0001 0101 1000 0010

Prefix ← Net ID → ← Host ID →

c. Explain address resolution protocol (ARP). **(4)**

Answer: Refer section 18.4, pages 555 to 556 of Text Book-I

Q.9 a. Draw the TCP header format and explain the function of each field. **(8)**

Answer: Refer section 20.2, 20.10 Figures 20.10, pages 645 to 648 of Text Book-I

b. Differentiate between TCP & UDP. **(4)**

Answer: Refer section 20.2, 20.4, pages 643, 662 of Text Book-I

c. Write an explanatory note on e-mail service. **(4)**

Answer: Refer section 22.1, pages 710 to 712 of Text Book-I

TEXT BOOK

Data and Computer Communications, Eight Edition (2007), William Stallings, Pearson Education Low Price Edition