Q.2a. With the help of block diagram, explain the salient feature of a data communication model.

Ans Sec 1.3, Fig 1.3, Page 10,11, Text book I

b.Discuss service primitive types for confirmed and unconfirmed services with the help of sequence diagrams.

Ans Sec 2.4, Fig 2.10, Page 37 to 39 Text book I

c.Define the key features of a protocol.

Ans Sec 2.1,Page 25 Text book I

Q.3a. Given a channel capacity of 20 Mbps, The bandwidth of the channel is 3MHz. What signal to noise ratio is required to achieve this capacity?

3(a) . Channel capacity $c = 20 \times 10^6 = B\log_2\left(1+\frac{S}{N}\right)$

$\rightarrow$ 2M

$B = 3 \times 10^6$

Ans $\frac{S}{N} = \underline{1011}$ $\rightarrow$ 3M

b.Explain the degradation of signal quality due to attenuation and delay distortion.

Ans Sec 3.3, Page 73,74, 75 Text book I

c.Describe the characteristics of optical fiber which distinguish them from twisted pair or co-axial cable.

Ans Sec 4.1, Page 100,101, Text book I

Q.4a. Explain the various digital signal encoding schemes with relevant waveforms.

Ans Sec 5.1, Fig 5.2, Page 128,129,130, Text book I

b.Given the generator polynomial as $(x^4 + x + 1)$ and the message bits 1101101, obtain the CRC code.

(b) $x^4 + x + 1 \rightarrow 10011$

Remainder 1001

CRC code ⇒ 11011011001

→ 5M
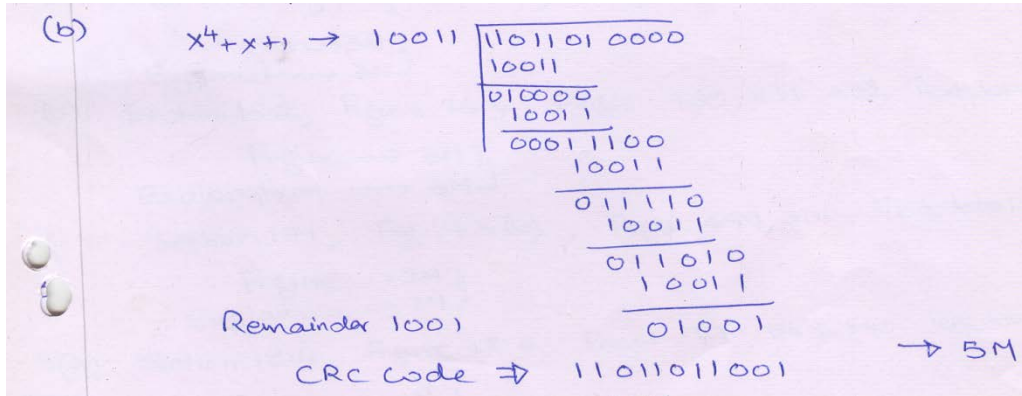
c. Differentiate between full duplex and half duplex transmission.
Ans Sec 6.5, Page 187, 188, Text book I

Q.5 a. With suitable illustration, explain stop- and –wait ARQ.

Ans Sec 7.2, Fig 7.5, Page 202, 203 Text book I

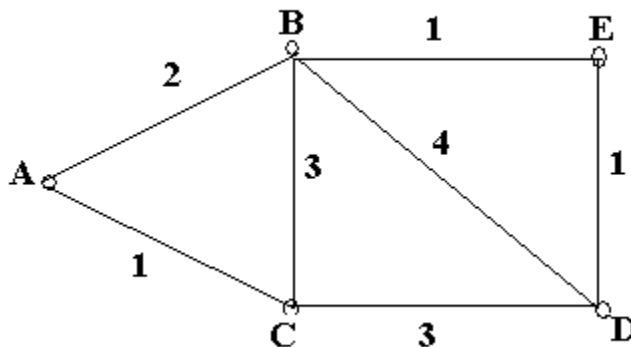**b.** **Describe synchronous TDM with relevant diagrams.**

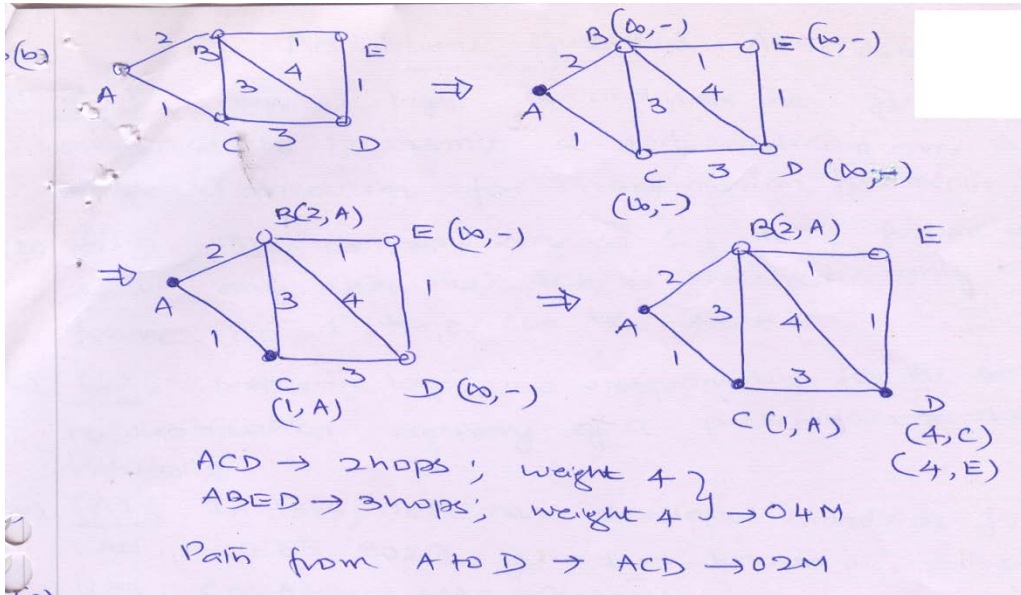Ans Sec 8.2, Fig 8.6, Page 232, 233, 234, Text book I

Q.6 **a. Discuss the switching technique used for virtual circuit approach.**

Ans Sec 10.4, Fig 10.9, 10.10, Page 290,291,292 Text book I

b. Find the shortest path from A to D for the network shown. (6)

ACD → 2 hops ; weight 4
ABED → 3 hops ; weight 4 } → 04M

Path from A to D → ACD → 02M

c. **Explain how congestion occurs in a network?**

Ans Page 356, Text book I

Q.7 **a.** **Discuss the spanning tree approach to prevent loop of bridges.**

Ans Sec 15.4, Fig 15.11, Page 446,447,448Text book I

b.Explain gigabit Ethernet configuration with an example.   **(6)**

Ans Sec 16.2, Fig 16.4, Page 469,470,471 Text book I

c. **Explain adhoc networking with a diagram.**

Ans Sec 17.12, Fig 17.3(b), Page 499,500 Text book I

Q.8 **a.** **Explain the function of each field in IPv4 header.**   **(8)**

Ans Sec 18.4, Fig 18.6, Page 547,548,549 Text book I

b.Differentiate between IPv4 and IPv6.

Ans Sec 18.4, Fig 18.5, Page 548,560 Text book I

c. A class B network has a subnet mask of 255.255.240.0 What is the maximum number of hosts per subnet?

Ans -

(c) In class B, Lower 16 bits are subnet & host fields. Upper 16 bits are for net ID and class B prefix.

Lower 16 bits 240.0 ⇒ 1111 0000 . 0000 0000

Host Numbers

0 to 4095 = 4096 →03M

All 0's & 1's are reserved.

Max No. available = 4096-2 = 4094 →01M

Q.9   a. Draw the TCP header format and brief the function of each field.

Ans Sec 20.2, Fig 20.10, Page 645 to 648, Text book I

b. Discuss the basic e-mail operation with a diagram illustrating SMTP mail flow.

Ans Sec 22.1, Fig 22.1, Page 710 to 712, Text book I

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