501

B. E. (Fifth Semester) EXAMINATION, June, 2009

(Common for CS, EC, EI & IT Engg.)

DATA COMMUNICATION

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt any *five* questions. All questions carry equal marks. Assume any missing data.

1. (a) Differentiate between synchronous and asynchronous communication with suitable examples.

    (b) Assuming a synchronous transmission control scheme, explain how character and frame synchronization are achieved :

    (i) with character-oriented transmission.

    (ii) with bit-oriented transmission.

2. (a) Explain Shannon-Fano encoding and Huffman coding theorem with suitable examples.

    (b) A message comprising of different characters which are transmitted over a data link. The relative frequency of occurrence of each character is :

    $A = 0 \cdot 1$, $B = 0 \cdot 25$, $C = 0 \cdot 05$, $D = 0 \cdot 32$, $E = 0 \cdot 01$, $F = 0 \cdot 07$, $G = 0 \cdot 2$

Derive the entropy of the message and derive the suitable set of code words using Shannon-Fano coding.

3. (a) Explain under what condition circuit switching is better than packet switching.

   (b) Derive the following terms as they apply to pocket switching routing algorithm :

      (i)   Directory

      (ii) Random

      (iii) Flooding

4. (a) Explain the various line disciplines used for data transmission between two stations with their timing calculations. Give suitable applications of each.

   (b) Define the following :

      (i)   Data rate

      (ii) Topology

      (iii) Duplexity

5. (a) Describe a conceptual view of ISDN.

   (b) What are the advantages of digital technology over analog technology ?

   (c) Define Shannon and Nyquist on channel capacity.

   (d) What do you mean by digital access ?

6. (a) Explain the TCP protocol with their frame structure. Describe each field frame in brief.

   (b) Define the following :

      (i)   Piggybacking

      (ii) Code converters

      (iii) Protocol converters

7. (a) Describe the principle of operation of CSMA/CD in LAN.

   (b) Explain the working of token ring channel allocation in LAN.

8. Write short notes on any *two* of the following :

   (a) Multiplexing

   (b) RS-449

   (c) Data compression

   (d) High speed modems