T.E. (Computer) (Semester – I) Examination, 2010
DATA COMMUNICATIONS
(2003 Course)

Time : 3 Hours   Max. Marks : 100

Instructions : *i) Answer **any three** questions from **each** Section.*
            *ii) Answers to the **two** Sections should be written in **separate** books.*
            *iii) **Neat** diagrams must be drawn **wherever** necessary.*
            *iv) Figures to the **right** indicate **full** marks.*
            *v) Assume **suitable** data, **if necessary**.*

SECTION – 1

1. a) A 10 KW carrier wave is amplitude modulated at 80% depth of modulation by a sinusoidal modulating signal. Calculate the sideband power, total power and Transmission efficiency of the AM wave.   **4**

   b) Describe with an example the relationship and its significance between FM and PM.   **6**

   c) Describe in short what is Quadrature Amplitude Modulation (QAM). What are its advantages ?   **6**

OR

2. a) Describe the terms ASK, FSK, PSK. What is the significance of these types of Modulation system ?   **6**

   b) Describe in short the TDM and FDM techniques along with their suitable applications.   **6**

   c) What is Wide band FM (WBFM) ? What is the bandwidth supported ?   **4**

3. a) What is the significance of Quantization in A/D Conversion. What is Uniform Quantization ? What is the drawback associated with it and how to overcome this drawback ? **10**

   b) Describe NRZ, NRZI, Manchester and Differential Manchester line coding technique with suitable example. **8**

OR

4. a) Explain in detail Delta Modulation. Draw block diagrams of delta modulator and demodulator. What are its advantages over PCM ? **10**

   b) Explain what is sampling theorem and its significance from the signal reconstruction point of view. **2**

   c) A signal m (t) of Bandwidth B = 4 KHz is transmitted using a binary companded PCM with $\mu = 100$. Compare the case of L = 64 with the case of L = 256 from the point of view of transmission bandwidth and the output SNR. **6**

5. a) An analog signal having 8 KHz bandwidth is sampled at 2.5 times the nyquist rate and each sample is quantized into one of the 256 levels. Assuming that successive samples are statistically independent

   i) What will be the information rate of the source ?

   ii) What is the data rate or signaling rate ? **8**

   b) Describe the terms code rate, hamming weight of a code word, code efficiency and hamming distance. **8**

OR

6. a) What is CRC ? Compute the polynomial check sum for a Frame 1101011011 using the generator $G(x) = X^4 + X + 1$. **8**

   b) Explain minimum distance dmin of linear block code. What is its significance in error detection and correction ? **8**

SECTION – 2

7. a) Draw and explain the TCP/IP protocol stack. What is the difference between IP and TCP protocol ?   **6**

   b) An organization has decided to design a LAN to support 30 users. Describe the various components required in this design. Also draw the topology of this network.   **8**

   c) Differentiate between Frame relay and ATM.   **4**

   OR

8. a) Describe the various half duplex operational parameters of Ethernet.   **8**

   b) Draw and explain in short the Ethernet Frame Structure.   **6**

   c) What is SONET ? Where it is used ? What is the data rate supported by STS-1 ?   **4**

9. a) Draw and explain the block diagram of T1 carrier system. How many voice channels are supported ?   **8**

   b) Differentiate between circuit switching and packet switching (at least 4 points).   **8**

   OR

10. a) What is UTP cable and where it is used ? Also comment on the various categories of UTP cable.   **8**

   b) Describe the terms refraction and reflection associated with fiber optic cable.   **4**

   c) Describe various categories of coaxial cables with their suitable applications.   **4**

11. a) What is flow control ? Describe the sliding window flow control technique.   **8**

   b) Explain why CSMA/CD protocol can not be used in wireless LAN. What is the alternative solution adapted ?   **8**

   OR

12. a) What is framing ? What are the various framing techniques ? Which framing technique is widely used ?   **8**

   b) Draw and explain the HDLC protocol Frame format.   **8**