Fifth Semester B. E. (C. T.) (C. B. S.) Examination

DATA COMMUNICATION

Time : Three Hours] [Max. Marks : 80

N. B. : (1) All questions carry marks as indicated.
(2) Solve Six questions as follows :
Que. No. 1 OR Que. No. 2.
Que. No. 3 OR Que. No. 4.
Que. No. 5 OR Que. No. 6.
Que. No. 7 OR Que. No. 8.
Que. No. 9 OR Que. No. 10.
Que. No. 11 OR Que. No. 12.
(3) Due credit will be given to neatness and adequate dimensions.
(4) Illustrate the answers with necessary figures / drawings wherever necessary.
(5) Use of Drawing instruments is permitted.
(6) Use of Non programmable Calculator is permitted.
(7) Assume suitable data wherever necessary.

1. (a) Distinguish between baseband transmission and broadband transmission in detail. 6

(b) A periodic composite signal contains frequencies from 10 to 30 KHz, each with an amplitude of 10 V. Draw the frequency spectrum and explain it. 7

OR

2. (a) What is the length of a bit in a channel with a propagation speed of 2×10^8 m/s if the channel bandwidth is

(a) 1 Mbps ?

(b) 10 Mbps ?

(c) 100 Mbps ? 7

(b) Is the frequency domain plot of an alarm system discrete or continuous ? Why ? 6

3. (a) Define scrambling and give its purpose. 6

(b) Calculate the baud rate for the given bit rate and type of modulation

(i) 2000 bps, FSK,

(ii) 4000 bps, ASK,

(iii) 6000 bps, QPSK,

(iv) 36000 bps, 64-QAM. 7

OR

4. (a) What is the result of the scrambling the sequence 11100000000000 using one of the following sequence of scrambling techniques ? Assume that the last non zero signal level has been positive

(i) B8ZS.

(ii) HDB3 (The number of non zero pulses is odd after last substitution) 7

(b) Which of the three analog to analog conversion techniques (AM, FM or PM) is the most susceptible to noise ? Defend your answer. 6

5. (a) Calculate the bandwidth of the light for following ranges (assume propagation speed 2×10^8 m) :

(i) 1000 to 1200 nm.

(ii) 1000 to 1400 nm. 4

(b) What is the difference between omnidirectional and unidirectional waves ? 3

(c) What is the position of the transmission media in the OSI or the Internet model ? 4

(d) What is the significance of twisting in twisted-pair cable ? 3

OR

6. (a) A beam of light moves from one medium to another medium with less density. Critical angle is 60^0. Do we have refraction or reflection go each of the following incident angles ? Show the bending of the light ray in each case

(i) 40^0 (ii) 60^0 (iii) 80^0. 7

(b) Explain Cellular Telephony in detail. 7

7. (a) Distinguish between multilevel TDM, multiple slot TDM and pulse-stuffed TDM. 7

(b) Four channels, two with a bit rate of 200 Kbps and two with 150 Kbps, are to be multiplexed using multiple slot TDM with no synchronization bits. Answer the following :—

(i) What is the size of a frame in bits ?

(ii) What is the frame rate ?

(iii) What is the duration of a frame ?

(iv) What is the data rate ? 7

OR

8. (a) Define the analog and digital hierarchy used by telephone companies and list different levels of a hierarchy. 7

(b) Distinguish between link and channel in multiplexing. 3

(c) Define FHSS and explain how it achieves bandwidth spreading. 4

9. (a) How is HTTP similar to SMTP ? 3

(b) Describe the relationship between Java and an active document. 3

(c) Explain www in detail. 4

(d) What is a URL and what are its components ? 3

OR

10. (a) How the compression of audio and video can be done ? 4

(b) What does CGI stands for and What are its functions ? 3

(c) Explain digitizing audio and video. 3

(d) What is proxy server and how is it related to HTTP ? 3

11. (a) Explain different image compression techniques used for data compression. 7

(b) Differentiate between JPEG and MPEG in detail. 6

OR

12. (a) Explain in detail Lempel – Ziv Encoding Technique. 7

(b) Construct a variable length coding for the string of data 50, 25, 15, 40, 75. Explain its advantages in detail. 6