

Data Communication

P. Pages : 2

Time : Three Hours

**NKT/KS/17/7349**

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Assume suitable data whenever necessary.
 9. Illustrate your answers whenever necessary with the help of neat sketches.
 10. Use of non programmable calculator is permitted.

1. a) Differentiate between 6
 - i) Analog Vs. Digital Signal
 - ii) Asynchronous Vs. Synchronous Communication
 - b) A Non - periodic composite signal has a band width of 200 KHz with a middle frequency of 150 KHz and peak amplitude 20 V. Draw the frequency domain of the signal. 4
 - c) Two periodic signals has bandwidth of 800 Hz with lowest frequency 100 Hz. Find highest frequency & draw frequency spectrum. The peak amplitude is 10 K for lowest and highest frequency. 3
- OR**
2. a) List and explain three different techniques in serial transmission and explain the difference. 6
 - b) Explain simplex, half-duplex and full duplex communication with example. 7
 3. a) What is line coding? Explain its characteristics? 6
 - b) Digital data 110011001 is to be transmitted. Draw the resulting waveforms for the following methods and give the explanation for each. 8
 - i) Unipolar NRZ
 - ii) Polar RZ
 - iii) Manchester
 - iv) AMI
- OR**
4. a) Define carrier signal. The telephone line has 4 KHz bandwidth. What is the maximum number of bits we can send using each of the following techniques? let $d = 0$. 8
 - i) ASK
 - ii) PSK
 - iii) QAM
 - iv) FSK
 - b) Explain in detail three techniques of digital to digital conversion. 6
 5. a) What do you mean by line - of - sight propagation? Also compare and contrast the dish antenna and horn antenna. 7

- b) Differentiate between guided and unguided transmission media. 6
- OR**
6. a) Explain the purpose of cladding in optical - fiber. Explain advantage and disadvantage of optical - fiber. 7
- b) Explain in brief. 6
- i) Twisted pair cable
- ii) Coaxial cable
7. a) What is spread spectrum? Explain FHSS with suitable diagram. 6
- b) Write a short notes on **any two**. 8
- i) TDM ii) FDM
- iii) WDM
- OR**
8. a) 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 : 8
- i) What is the size of frame in bits?
- ii) What is the frame rate?
- iii) What is the duration of a frame?
- iv) What is data rate?
- b) Explain process of Interleaving in TDM. 6
9. a) Explain characteristic of real time interactive Audio/Video. 7
- b) Explain the following **any one** : 6
- i) HTTP
- ii) RTP
- OR**
10. a) Draw the block diagram of JPEG encoder and explain it. 7
- b) Write a short notes on Video Compression Techniques. 6
11. Write a short notes on : 13
- i) Run length encoding with example.
- ii) Huffman coding with example.
- OR**
12. a) What is lossless compression? Explain Lempel - Ziv Encoding technique for compression in detail? 7
- b) Explain MPEG Video Compression in detail. 6
