B.E. Fifth Semester (Computer Technology) (C.B.S.)

Data Communication

P. Pages : 2 **NKT/KS/17/7348**

Time : Three Hours * 0 0 5 4 * 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. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data wherever necessary.
10. Illustrate your answers wherever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) A sine wave is offset by $\frac{1}{6}$ cycle with respect to time O. What is it's phase in degrees and radians? **6**

b) Differentiate between **7**
i) Periodic signals and Aperiodic signals.
ii) Baseband and broadband transmission.

OR

2. a) Explain simplex, Half duplex and full duplex communication with example. **6**

b) A non periodic composite signal has a bandwidth of 200kHz, with a middle frequency of 140kHz and peak amplitude 20V. Draw the frequency domain of the signal. **4**

c) Differentiate between serial & parallel transmission. **3**

3. a) What is line coding? Explain its characteristics? **4**

b) Digital data 11001100101110 is to be transmitted. Draw the resulting waveforms for the following methods and give the explanation for each. **10**
i) 2B1Q ii) Polar NRZ – I
iii) Polar RZ iv) Manchester
v) Pseudoternary

OR

4. a) Explain in detail three techniques of digital to digital conversion. **8**

b) What is the Nyquist sampling rate for each of the following signals? **6**
i) A low pass signal with bandwidth of 200kHz.
ii) A band pass signal with bandwidth of 200 kHz if the lowest frequency is 100 kHz.

5. a) Explain cellular Telephony. What is frequency reuse concept? **7**

b) Explain satellite communication. **6**

OR

6. a) Explain the purpose of cladding in optical fiber. Explain advantages and disadvantages of optical fiber. **6**

b) A light signal is travelling through a fiber. What is the delay in the signal if the length of the fiber-optic cable is 10m, 100m and 1000m (Assume a propagation speed of $2 \times 10^8 \text{m}$) **7**

7. a) What is spread-spectrum? Explain FHSS with suitable diagram. **6**

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. **8**
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?

OR

8. a) Distinguish between multi level TDM. Multi slot TDM and pulse stuffed TDM. **7**

b) We need to transmit 100 digitized voice channels using a pass band channel of 20 kHz. What should be the ratio of bits/Hz If we use no guard band? **7**

9. a) Explain HTTP & WWW with suitable diagram. **7**

b) Explain the characteristics of Real time Interactive Audio/Video. **6**

OR

10. a) Explain RTP protocol of Network layer in detail. **6**

b) Explain LZW with example. **7**

11. a) Explain in detail Run-Length Encoding. **7**

b) How the JPEG and MPEG differ in nature. **6**

OR

12. a) Draw the Huffman trees for the given data and device the Huffman code. **8**

Letters	a	b	c	d	e	f
Frequency of occurrence	45	13	12	16	9	5

b) What is relative encoding? Explain with an example. **5**

****