



- 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 date whenever necessary.
 10. Illustrate your answers whenever necessary with the help of neat sketches.
 11. Use of non-programmable calculator is permitted.

1. a) Differentiate between. **8**
i) Base band and Broad band transmission.

ii) Periodic signal and A periodic signal.

b) A sine wave is offset by $\frac{1}{6}$ cycle with respect to time zero. What is its phase in degree and radians? **6**

OR

2. a) Explain simplex, Half Duplex and full. Duplex communication with example. **7**

b) A non-periodic composite signal has a bandwidth of 200 kHz. with a middle frequency of 140 kHz and peak amplitude 20V. Draw the frequency domain of the signal. **7**

3. What is line coding? Explain its characteristics. Digital data 11010010 is to be transmitted. Draw the resulting waveforms for the following methods : - **13**

i) Unipolar NRZ

ii) Polar NRZ

iii) Polar RZ

iv) Bipolar NRZ

v) ASK.

OR

4. a) Distinguish between data rate and signal rate. **5**

b) What is the NY quest sampling rate for each of the following signals? **8**

i) A low – pass signal with bandwidth of 200 kHz

ii) A band – pass signal with bandwidth of 200 kHz if the lowest frequency is 100 kHz.

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

- b) Explain the purpose of cladding in optical fiber. Explain the advantages and disadvantages of optical fiber. 6

OR

6. a) Explain satellite communication. 6
- b) Calculate the bandwidth of the light for the following ranges (assume propagation speed 2×10^8 m/sec). 7
- i) 1000 to 1200 nm. ii) 1000 to 1400 nm.

7. a) What is spread – spectrum? Explain FHSS with suitable diagram. 7
- b) Distinguish between synchronous and statistical TDM. 6

OR

8. a) We need to transmit 100 digitized voice channels using a pass band channel of 200 kHz. What should be the ratio of bits/Hz if we use no guard band? 6
- b) Four channels, with a bit rate of 200kbps and two with 150 kbps, are to be multiplexed using multiple slot. TDM with no synchronization bits. Answer the following : - 7
- 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?

9. a) Explain the characteristic of Real Time interactive Audio/Video 6
- b) Explain HTTP x WWW with suitable diagram. 7

OR

10. a) Explain Real time protocol. 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. 7

OR

12. a) What is data compression? Explain Image compression: JPEG. 6
- b) Frequency of occurrence of the letters is given in the following table. 8

Letters	A	B	C	D	E
Frequency	0.15	0.20	0.10	0.30	0.25

The concerned message consists of 300 characters. occurrence of the letters in message is in ascending order of alphabets : Derive

- i) A Huffman code and draw the Huffman trees. How many different Huffman codes could you create (without constructing them)?
- ii) Runlength Encoded data.
