

- N.B. :** (1) Question No. 1 is compulsory.
 (2) Answer any four out of remaining six questions.
 (3) Assume any suitable data wherever required but justify the same.
 (4) Answer to questions should be grouped and written together.

1. (a) For a 16-ary PCM system if 10
 $P_1 = P_2 = P_3 = P_4 = 0.1$
 $P_5 = P_6 = P_7 = P_8 = 0.05$
 $P_9 = P_{10} = P_{11} = P_{12} = 0.075$
 $P_{13} = P_{14} = P_{15} = P_{16} = 0.025$
 Calculate the entropy and information rate assume $f_m = 3$ KHz.
- (b) Define code word, code rate and hamming weight. Also write short note on Hamming Code. 10
2. (a) Explain block diagram of M-ary PSK and find the Eculidean distance for 8-ary PSK. 10
 (b) Compare ASK, PSK and FSK systems. 10
3. (a) Explain match filter and optimum receiver. 10
 (b) Explain delta modulation and adaptive delta modulation and compare them. 10
4. (a) Explain the following terms :— 10
 (i) Information and information rate
 (ii) Entropy
 (iii) Shannons theorem and
 (iv) Channel Capacity.
- (b) Define and explain various multiplexing techniques used in communication systems. 10
5. (a) Explain with block diagram PM modulation and demodulation technique. 10
 (b) Draw and explain superheterodyne receiver for amplitude modulation. What are the various characteristics of the receiver ? 10
6. (a) Explain (i) Noise triangle 10
 (ii) Pre emphasis
 (iii) De emphasis in FM system.
- (b) Explain the concept of image frequency and double spotting. 10
7. Write short notes on :— 20
 (a) Various noise parameters
 (b) Mouse in communication system
 (c) Intersymbol interference
 (d) QAM.