

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions from remaining **six** questions.
 (3) Assume **suitable** data whenever **necessary**.
 (4) **Figures to right** indicate **full marks**.

1. Attempt any **four** of the following : 20
 - (a) Classify and explain the various noises that affect communication.
 - (b) DSB-FC (A.M.) is wastage of power and band width. Justify.
 - (c) Explain diagonal clipping and double spotting in relation to an A. M. radio receiver.
 - (d) Explain F.M. noise triangle.
 - (e) What is companding ? Explain with typical companding curves ?

2. (a) Compare the following amplitude modulated systems. 12
 DSB-FC, DSB-SC, SSB, VSB.
 (b) Draw the block diagram of ISB system and explain the function of each block. 8

3. (a) Draw the block diagram of phase cancellation SSB generator and explain how the carrier and unwanted side band are suppressed. What change is necessary to suppress the other side band ? 10
 (b) Explain the following : 10
 - (i) Signal to Noise ratio and its significance.
 - (ii) Noise factor, Noise figure and Noise temperature.

4. (a) Explain the principle of obtaining F.M. from P.M. Draw the block diagram of Armstrong frequency modulation and explain the function of each block. 10
 (b) A F.M. wave is represented by the following equation :

$$V = 10 \sin[5 \times 10^8 t + 4 \sin 1250 t]$$
 Find :
 - (i) Carrier and modulating frequencies 4
 - (ii) Modulation index and maximum frequency deviation 4
 - (iii) The power dissipated by this FM wave in a 5Ω resistor. 2

5. (a) Draw the block diagram of A.M. transmitter and describe the function of each block. 10
 (b) Explain F.M. receiver with neat block diagram and waveforms. 10

6. (a) State and prove sampling theorem for low pass band limited signal. 10
 (b) Define the following in relation to propagation of radio waves : 10
 - (i) Virtual height
 - (ii) Maximum usable frequency
 - (iii) Skip distance
 - (iv) Fading
 - (v) Line of sight.

7. Write a note on :

(a) FDM

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(b) Adaptive Delta Modulation

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(c) PWM generation.

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