

(3 Hours)

[Total Marks : 100

- N.B.** (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume **suitable data** if required.

1. Answer the following : (Any **four**) — 20
- (a) Explain why FM is more immune to noise.
 - (b) Write a note on TDM.
 - (c) Explain double spotting in radio receivers.
 - (d) With the help of diagram explain quantization.
 - (e) Explain the need of modulation and classify the different types of modulation techniques.
2. (a) State advantages of SSB over DSB. Explain any one method to generate SSB. 10
(b) State advantages and disadvantages of digital transmission. With neat block diagram explain the operation of single channel, simplex PCM transmission system. 10
3. (a) State and prove sampling theorem. 10
(b) Draw a neat block diagram of super-heterodyne radio receiver and explain the function of each block with waveforms. 10
4. (a) Draw the block diagram of linear delta modulator with suitable waveforms and explain its working. 10
(b) Define FM and derive equation of FM wave. 10
5. (a) Explain generation and demodulation of PWM signal with the help of suitable diagrams. 10
(b) Explain noise figure measurement using 'diode noise generator' method. 10
6. (a) Draw the schematic diagram of high – power AM DSBFC modulator and explain the operation. 10
(b) Explain the following with reference to radio receivers :— 10
- (i) Sensitivity
 - (ii) Selectivity
 - (iii) Fidelity
 - (iv) Dynamic range
7. (a) Draw the following data waveforms for the bit stream 11001010. 10
- (i) Unipolar NRZ
 - (ii) Bipolar NRZ
 - (iii) Unipolar RZ
 - (iv) Bipolar RZ
 - (v) Bipolar RZ-AMI
- (b) For an angle modulated carrier $V_c = 6 \cos (2\pi 110 \text{ MHz } t)$ with 75 kHz frequency deviation due to the information signal and a single frequency interfering signal $V_n = 0.3 \cos (2\pi 109.985 \text{ MHz } t)$, determine — 10
- (i) Frequency of the demodulated interference signal
 - (ii) Peak phase and frequency deviations due to the interfering signal.
 - (iii) Voltage signal-to-noise ratio at the output of the demodulator.