

- 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) What is PCM signal ? What is its importance in communication ?
 - (b) Draw the basic block diagram of any communication system.
 - (c) What type of multiplexing do you think is being used in cable TV system to transmit many TV signals on a single cable ? Explain.
 - (d) Classify and explain the various noises that affect communication.
 - (e) Explain VSB transmission.

2. (a) An amplitude modulated waveform has a form – 12
 $X_c(t) = [10(1 + 0.6 \cos 2000\pi t + 0.4 \cos 4000\pi t) \cdot \cos 20,000\pi t]$
 - (i) Sketch the amplitude spectrum of $X_c(t)$.
 - (ii) Find the power content of each spectral component including carrier.
 - (iii) Find the total power and sideband power.
 - (iv) What is the modulation index ?
- (b) Explain with the help of diagram ISB techniques of transmission. 8

3. (a) State the various methods of FM generation and explain any one. 12
- (b) 25 MHz carrier is modulated by a 400 Hz audio sine wave. If the carrier voltage is 4V and maximum deviation is 10 KHz, write the equation of this modulated wave for (i) FM and (ii) P.M. If the modulating frequency is now changed to 2 KHz, all else remaining constant, write new equation for (iii) FM and (iv) P.M. 8

4. (a) Explain the functioning of a superhetrodyne A.M. receiver with the help of neat block diagram and waveforms. Why AGC is required in a receiver. 10
- (b) Explain the working of a Foster-Seely phase discriminator with the help of a neat circuit diagram. 10

5. (a) Explain the following in relation to propagation of radio waves – 10
 (i) Virtual height (ii) Maximum usable frequency (iii) Fading (iv) Skip distance (v) Critical frequency.
- (b) Draw the block diagram and compare Delta modulation and Adaptive Delta modulation. 10

6. (a) Compare and contrast – 10
 (i) Wide band FM and Narrow band FM.
 (ii) A.M. system with F.M.
- (b) Explain with neat waveforms PAM, PWM, PPM generation and detection. 10

7. Write a note on any **four** : 20
 - (a) S.S.B. generation
 - (b) Companding curve
 - (c) Noise Triangle in FM system
 - (d) Pre-emphasis and de-emphasis circuit
 - (e) Time division multiplexing.