12425

3 Hours / 70 Marks   Seat No.

Instructions : (1) All Questions are *compulsory.*

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

Marks

1. Attempt any FIVE of the following :   **10**

(a) Draw a suitable diagram of half duplex & full duplex communication system.

(b) List any two applications for the frequency range 3 GHz to 30 GHz of EM spectrum.

(c) State any two applications of full duplex communication system.

(d) Write down the mathematical equation of AM wave (No Derivation).

(e) State any two advantages of DCM.

(f) State the types of guided media used for electronic communication.

(g) List two applications of fiber optic cable.

2. Attempt any FOUR of the following :   **12**

(a) Draw a labelled block diagram of electronic communication system.

(b) Give the comparison between AM and FM (any three points).

(c) Explain the concept of De-emphasis with neat sketch.

(d) List different types of pulse modulation. Draw waveform of PWM.

(e) Compare serial and parallel transmission modes (any three points).

3. **Attempt any FOUR of the following :** 12

(a) List down the types of noise in communication system. Explain any one in brief.

(b) State the need of modulation in communication system. State any two advantages of it.

(c) A super-heterodyne radio receiver with IF of 455 KHz is tuned to 800 KHz. Find its image frequency and local oscillator frequency.

(d) Explain adaptive delta modulation with the help of diagram / waveform.

(e) Draw block diagram of delta modulation. Also state any two advantages of it.

4. **Attempt any THREE of the following :** 12

(a) A 500 Watts carrier is modulated to a depth of 80%, calculate :

   (i) Total power in AM wave

   (ii) Power in sidebands

(b) Find the bandwidth of commercial FM transmission if frequency deviation $\delta = 75$ KHz and modulating frequency is 15 KHz.

(c) State aliasing effect. Draw neat diagram showing aliasing effect and explain how it can be overcome.

(d) Explain PLL as FM demodulator with suitable diagram.

(e) State the necessity of antenna. Define following terms w.r.t. antenna :

   (i) Radiation pattern

   (ii) Polarization

5. **Attempt any THREE of the following :** 12

(a) Define demodulation. Explain diode detector to detect AM signal.

(b) Explain block diagram of FM receiver & draw its waveform.

(c) If TV signal having 4.5 MHz BW is transmitted using 8-bit binary PCM, determine :

(i) Maximum SNR & (ii) Bit rate

(d) Compare PAM, PPM and PWM (any four points).

(e) List down the application of the following antenna :

(i) Reflector (ii) Microstrip

(iii) Array (iv) Wire antenna

6. **Attempt any TWO of the following :** 12

(a) Explain the effect of modulation index on AM wave with waveform values of

(i) $m < 1$ (ii) $m = 1$ (iii) $m > 1$

(b) Draw FM waveform with appropriate labelling :

(i) Modulating signal of 100 Hz, 1 V_{p-p}

(ii) Modulating signal of 200 Hz, 1 V_{p-p} with carrier frequency of 1 KHz.

(c) Compare Delta modulation and adaptive delta modulation basis of following points :

(i) Basic concept (ii) Waveform

(iii) Noise level (iv) Advantage

(v) Bandwidth (vi) Application