

(3 Hours)

[Total Marks : 80

- N.B. : (1) Question No. 1 is compulsory.
(2) Attempt any three questions from the remaining questions.
(3) Assume suitable data, if necessary.
(4) Figures to right indicate full marks.

1. Solve any four :—

- (a) Explain pre-emphasis and De-emphasis.
(b) Explain the following (i) Shot noise (ii) Equivalent Noise temperature.
(c) A single tone FM signal is given by $V_{FM}(t) = 10 \sin(16\pi \times 10^6 t + 20 \sin 2\pi \times 10^3 t)$
Find (a) Maximum frequency deviation
(b) BW of FM by using Carson's rule.
(d) What are the drawbacks in DM system and how these drawbacks can overcome.
(e) Explain the need for modulation.
2. (a) Explain the basic principle, working of Transmitter and receiver and BPSK. Also draw the BPSK Waveform for the following binary signal 10110110. 10
(b) Draw the data formats (linecodes) of any five for the given binary signal 10101101. 10
3. (a) Explain PWM generation and regeneration method. 10
(b) Describe PCM and also explain the PCM encoder and decoder with block diagram. 10
4. (a) Explain Foster seeley discriminator and Compare the performance of Foster seeley and Ratio detector. 10
(b) A sinusoidal carrier has an amplitude of 20v and a frequency of 200kHz. It is amplitude modulated by a sinusoidal voltage of amplitude 6v and frequency 1kHz. Modulated voltage is developed across a 80Ω resistance. 10
(i) Write the equation for the modulated wave.
(ii) Determine the modulation index.
(iii) Draw the spectrum of modulated wave.
(iv) Calculate the total average power.
5. (a) Explain the generation and demodulation of SSBSC. 10
(b) State and prove the following properties of Fourier Transform. 10
(i) Time Shifting
(ii) Differentiation in Time domain.

6. Answer any four :—

- (a) QPSK (d) Image frequency and its rejection
(b) PCM-TDM (e) Sampling theorem.
(c) Friss formula