

2122
B.E. (Electrical and Electronics Engineering)
Fifth Semester
PC-EE-504: Communication Systems

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

1. Answer the following:-

(10x1)

- a Define noise temperature.
- b What is a bit level decision?
- c Define carrier recovery.
- d What is baud rate?
- e Define minimum shift keying.
- f Mention salient features of Delta Modulation.
- g Define spectral efficiency.
- h Mention two methods of SSB transmission techniques.
- i Which FSK has no phase discontinuity?
- j What is a matched filter?

(Section – A)

2. a Assume a modulating signal has bandwidth (W), the carrier amplitude (A) and the single-sided power spectral density (N_0 , white Gaussian noise). Compute noise power at the output of the de-emphasis filter. (4)
- b What is figure of merit of an AM system? Discuss frequency spectrum of an AM signal. (3)
- c For the following Angle Modulated signal. (3)

$$\phi_{EM}(t) = 4 \cos(2\pi 10^6 t) + 2 \sin(2\pi 10^3 t) + 4 \sin(4\pi 10^3 t)$$

Determine (i) Bandwidth using Carson's rule (ii) Frequency deviation ratio (iii) If, Angle Modulated signal is an FM signal with a given frequency deviation of $4\pi 10^3$ Rad/Second/volt, determine the message signal.

3. a Evaluate noise performance of the FM system. (6)
- b Mention the merits of the DSB-SC modulation scheme. Explain, how the ring modulator for the generation of DSB-SC wave acts as a demodulator circuit? (4)
4. a Explain, how noise affects the AM system? (3)
- b Explain the function of Pre-Emphasis and De-Emphasis techniques with justifications. (7)

(Section – B)

5. a Draw and explain the simplified block diagram of a PSK modulator. (6)
- b Discuss the working principle of the Delta Modulator. (4)
6. a A PCM system features an uniform quantization, 2^n levels and an input signal $m(t) = A_m [\cos(\omega_m t) + \sin(\omega_m t)]$. Determine the value of n such that the output SNR is about 62 dB. Assume the dynamic range of the quantizer matches that of the input signal. (3)
- b Explain the following terms (3)
 - (i) Optimal decision function (ii) Maximum likelihood decision
- c Draw block diagram of the Basic Linear Equalization System and explain the function of each sub-block. (4)
7. Write short notes on the followings: (5x2)
 - (i) Digital Modulation Tradeoffs (ii) Digital Multiplexers

x-x-x