

OR

- 6 a. Mathematically write the expression and define briefly for :
 i) Conditional probability ii) Mean. (06 Marks)
- b. Explain the shot noise with relevant expression. And also explain the white noise with power spectral density and auto correlation function. (08 Marks)
- c. An amplifier is fed from a 100Ω , $15\mu\text{V}$ rms sinusoidal signal source. Its equivalent input noise resistance and equivalent input short current are 250Ω and $6\mu\text{A}$, respectively. Calculate the individual noise voltages at the input and the input signal to noise ratio. Assume noise bandwidth is 10MHz and temperature is 30°C . (06 Marks)

Module-4

- 7 a. Explain the noise in DSBSC receivers using model of DSBSC receiver using coherent detection. (08 Marks)
- b. Explain the significance of pre-emphasis and de-emphasis in FM system with circuit, relevant graph and derivation. (08 Marks)
- c. Find the figure of merit when the depth of modulation is :
 i) 100% ii) 150% iii) 30%. (04 Marks)

OR

- 8 a. Explain the noise in FM receivers. Derive an expression for "Figure of Merit" for FM receiver. (08 Marks)
- b. Explain the FM threshold effect with nature of graph representing the relationship between P and $(\text{SNR})_0$. And also explain the FM threshold reduction with block diagram and relevant graph. (08 Marks)
- c. An AM receiver operating with a sinusoidal wave and 80% modulation has an output signal to noise ratio of 30dB. Calculate the corresponding carrier to noise ratio. (04 Marks)

Module-5

- 9 a. Why digitize analog signals? Explain the sampling process with CT and DT signals. (08 Marks)
- b. With block diagram approach. Explain pulse amplitude modulation. Draw the suitable (relevant) waveforms. (08 Marks)
- c. For a PAM transmission of voice signal with $W = 3\text{KHz}$, calculate B_T . if $f_s = 8\text{KHz}$ and $\tau = 0.1T_s$. (04 Marks)

OR

- 10 a. With suitable PPM generator circuit and relevant waveforms explain the operation of pulse position modulation. (08 Marks)
- b. Write on applications to vocoders, considering speech model used in voice coders and block diagram of vocoder. (08 Marks)
- c. An analog waveform with bandwidth 15Hz is to be quantized with 200 levels and transmitted via binary PCM signal. Find the rate of transmission and bandwidth required. If 10 such signals are to be multiplexed find the bandwidth requirement. (04 Marks)

CMRIT LIBRARY
BANGALORE - 560 037