

# CBCS SCHEME

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## Fourth Semester B.E. Degree Examination, June/July 2019 Principles of Communication Systems

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Explain the generation of DSB-SC wave using ring modulator. (06 Marks)  
b. Explain briefly on the following :  
i) Frequency discrimination method (06 Marks)  
ii) Phase discrimination method for SSB generation. (06 Marks)  
c. A broadcast transmitter radiates 20 kilowatts when the modulation percentage is 75. How much of this is carrier power? Also calculate the power of each sidebands. (04 Marks)

OR

- 2 a. Explain the working of envelope detector. (06 Marks)  
b. With a neat block diagram. What a note on quadrature carrier multiplexing. (06 Marks)  
c. Explain how costas receivers can be used for demodulating the DSB – SC signal. (04 Marks)

### Module-2

- 3 a. Define angle modulation and explain important advantages of modulated waves. (06 Marks)  
b. With a block diagram. Explain the working of a FM stereo multiplexing. (06 Marks)  
c. A sinusoidal modulating wave of amplitude 5V and frequency 1KHz is applied to a frequency modulator. The frequency sensitivity of the modulator is 50 and calculate :  
i) The frequency deviation ii) Modulation index. (04 Marks)

OR

- 4 a. Explain narrowband frequency modulation. (05 Marks)  
b. Explain nonlinearity and its effect in frequency modulation system. (05 Marks)  
c. Explain the linear model of phase locked loop with relevant expression. (06 Marks)

### Module-3

- 5 a. Explain the following terms :  
i) Moments ii) central moments iii) mean iv) covariance. (08 Marks)  
b. Explain the properties of joint distribution function. (04 Marks)  
c. The random variable 'y' is the function of another random variable 'X' such that  $y = \cos(X)$  and 'X' is uniformly distributed in the interval  $(-\pi, \pi)$  i.e.,  
$$f_x(x) = \frac{1}{2\pi} \quad -\pi < x < \pi$$
$$= 0 \quad \text{otherwise}$$
Find out the mean value of 'y'. (04 Marks)

OR

- 6 a. Explain the following of their properties :  
 i) Autocorrelation function (05 Marks)  
 ii) Cross correlation function. (05 Marks)
- b. Explain briefly about sources of noise. Explain thermal noise. (06 Marks)
- c. Define and derive noise equivalent bandwidth, and also calculate the mean square noise across capacitor. (05 Marks)

**Module-4**

- 7 a. With neat diagram, explain about AM noise receiver and obtain the figure of merit. (08 Marks)
- b. With neat diagram, explain a DSB-SC receiver using coherent detection. Show that figure of merits for such receiver is unity. (08 Marks)

OR

- 8 a. Find the figure of merit when the depth of modulation of AM system when :  
 i) 100% ii) 50% iii) 30%. (06 Marks)
- b. Explain the pre-emphasis and de-emphasis in frequency modulation with circuit and graph. (06 Marks)
- c. Write short notes on capture effect. (04 Marks)

**Module-5**

- 9 a. Give the comparison of analog signals and digital signals use in communication system. (04 Marks)
- b. With neat block diagram, explain the generation of PAM waves. (06 Marks)
- c. With neat diagram, explain concept of time division multiplexing. (06 Marks)

OR

- 10 a. With diagram, explain the generation of PPM waves. (08 Marks)
- b. Explain channel vocoder with its neat diagram. (08 Marks)

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