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B.E / B.Tech (Part Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

ELECTRONICS AND COMMUNICATION ENGINEERING

Semester III

PTEC8301 Communication Theory

(R 2013)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Determine the Fourier transform and Hilbert Transform of Cos2t.
2. Give one commercial service that uses the VSB modulation technique. Justify the selection of VSB for that application.
3. An angle modulated signal is given as $s(t)=20\cos[2\pi f_c t+4\sin(200\pi t)]$. Determine whether this is FM or PM signal. Explain.
4. Write the basic concept of stereo FM.
5. Justify that thermal noise can be modeled as Gaussian Noise.
6. A random stationary process X(t) has the power spectral density S(f).Determine the power spectral density of Y(t)=X(t)-X(t-T)
7. An AWGN of power spectral density 1 μW is fed through a filter with frequency response $H(f)=2/3$; $|f| < 50$ kHz

   $= 0$; Elsewhere.

   Calculate the noise power at the output of the filter.
8. Define the term noise equivalent temperature .
9. List the noises associated with the linear Delta Modulation process.
10. What is meant by non Uniform Quantization? Where is it required?

Part – B (5 x 16 = 80 marks)

11. i) List the properties of Gaussian Process. (8)

    ii) The power spectral density of a random process X(t) is given in Figure1. (8)
    A. Determine the and sketch the auto correlation function $R_x(t)$ of X(t).
    B. Determine the DC and AC power contained in X(t).

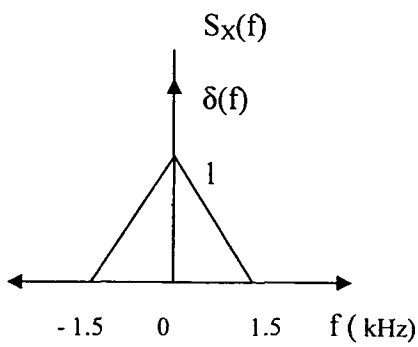

Figure.1

12. a) i) Explain the operation of envelope detector. (8)

ii) An AM signal is generated by modulating the carrier f_c=90MHz by the signal m(t)=sin3000πt+0.5cos1500πt.The AM signal s(t)=100[1+m(t)]cos $2\pi f_c t$ is fed to a 50 Ω load.

A. Determine the average power in the carrier and in the sidebands.
B. Find the modulation index and peak power delivered to the load.
C. Draw the spectrum of the message, carrier and modulated signal. (8)

(OR)

b) i) Explain the operation of super heterodyne receiver with neat block diagram. Draw the time domain signal at the output of each block. (12)

ii) What is meant by image frequency? How can we reduce it? (4)

13. a) i) An angle modulated signal is given as s(t)=20cos[$2\pi f_c t$+4sin(200πt)].Determine the average transmitted power, peak phase deviation, peak frequency deviation. and the band width of transmission. (8)

ii) Explain the generation of FM signal in the direct method. (8)

(OR)

b) Explain the FM demodulation process using frequency discrimination process.

14. a) Obtain the expression for the output power spectral density of the FM receiver and hence comment on the figure of merit of FM receiver.

(OR)

b) i) Explain the role of pre emphasis and de emphasis in the FM communication system. Draw the frequency response of both the filters. (10)

ii) An amplifier is defined of three stages with gain 50 dB, 23 dB and 15 dB. The noise figures of the stages are 7 dB, 13 dB and 12 dB respectively. Determine the overall noise figure and the noise equivalent temperature. (6)

15. a) With neat block diagram explain the PCM system in detail.

(OR)

b) i) Describe Frequency Division Multiplexing scheme with a typical example. (8)

ii) Explain the DPCM scheme with neat block diagram. (8)
