FACULTY OF ENGINEERING

B.E. 3/4 (ECE) I – Semester (New) (Main) Examination, Nov. / Dec. 2012

Subject : Analog Communication

Time : 3 hours   Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (10 x 2.5 = 25 Marks)

1. What is modulation? Explain the need for modulation.
2. What is Hilbert transform and give the properties of Hilbert transform?
3. Distinguish between narrow band FM and wide band FM.
4. Give the FM spectrum in terms of Bessel functions.
5. Compare Tuned Radio Frequency and super heterodyne receivers.
6. Calculate the image rejection of a receiver having an RF amplifier and an IF of 450 kHz, if the Q of the relevant coils are 65 at an incoming frequency of 1200 kHz.
7. A receiver is connected to an antenna whose resistance is 50Ω has an equivalent noise resistance of 30Ω. Calculate the receiver's noise figure in decibels and its equivalent noise temperature.
8. Explain noise in two-port network.
9. Compare AM and PAM.
10. State and explain sampling theorem.

PART – B (10 x 5 = 50 Marks)

11.a) Explain the generation and demodulation of DSB-SC.
   b) A certain transmitter radiates 9kW with the carrier unmodulated and 10.125kW when the carrier is sinusoidally modulated. Calculate the modulation index. If another wave, corresponding to 40% modulation is transmitted simultaneously, determine the total radiated power.

12.a) Explain Foster-Seeley discriminator for FM demodulation.
   b) In an FM system, when the audio frequency is 500 Hz and the AF voltage is 2.4v, the deviation is 4.8 kHz. If the AF voltage is now increased to 7.2v, what is the new deviation. If the AF voltage is raised to 10v while the AF is dropped to 200 Hz, what is the deviation? Find the modulation index in each case.

13.a) Discuss the major factors influencing the choice of intermediate frequency of a receiving system.
   b) When a super heterodyne receiver is tuned to 555 kHz, its local oscillator provides the mixer with an input at 1010 kHz. What is the image frequency? The antenna of this receiver is connected to the mixer via tuned circuit whose loaded Q is 40. What will be the rejection ratio for the calculated image frequency.

14.a) Derive an expression for SNR in FM systems.
   b) The noise figure of an amplifier is 5dB and its input S/N ratio is 55dB. Find the output S/N ratio.

15.a) With the help of waveforms, explain the generation and demodulation of PPM.
   b) Compare PAM, PWM and PPM modulation schemes.

16.a) Explain the representation of Narrow bond noise in terms of in-phase and quadrature phase components.
   b) Explain the concept of instantaneous phase and frequency.

17. Write short notes :
   a) Automatic gain control
   b) Vestigial side band modulation
   c) Equipment noise temperature and noise bandwidth

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