Analog Communication
(ECE-203 E, DEC-2005)

Note: Solve any five questions.

1. a) A receiver having equivalent noise resistance of 2500Ω and input resistance of 500Ω is connected to an antenna of 50Ω. Compute the noise figure and equivalent noise temperature of the receiver.
   b) Describe the method of measurement of noise figure of a receiver using a diode generator.
2. a) What is noise figure? Describe the method to calculate noise figure of a receiver or amplifier by treating the entire circuit as a two port network.
   b) What is noise bandwidth? Explain the frequency domain representation of noise.
3. a) With the help of necessary figures and equations describe the AM waveform generation, modulation index, sidebands produced, bandwidth and power relations in an AM system.
   b) A radio transmitter radiates 10 k W with the carrier unmodulated and 11.25 Kw when the carrier is modulated by a sinusoidal voltage. Calculate the modulation index. Another sine wave is capable of producing 30% modulation. If both sine waves simultaneously modulate the carrier, determine the total radiated power.
4. a) Enumerate various square law modulation methods.
   b) With the help of circuit diagram and various wave shapes describe the square law diode modulation system.
   c) Describe the functioning of suppressed carrier balanced modulator circuit using four diodes.
5. a) Explain the spectrum of a phase modulated waveform.
   b) Make a detailed comparison between the expressions for phase modulated and frequency modulated voltages
   c) With the help of noise triangle explain the effect of noise on carrier.
6. a) Give salient features of WBFM system.
   b) Give the typical applications of WBFM.
   c) Explain the FM management method by variation of a reactive element.
7. a) Draw the block diagram of a radio transmitter and explain the functioning of each constituent stage.
   b) Explain the principle of operation of a harmonic generator.
   c) With the help of block diagram describe the working of volume compressor.
8. a) Explain the method for tracking and alignment of receiver for single tune dialing.
   b) With the help of a block diagram explain the working of a super heterodyne receiver with AFC system.
   c) What do you understand by the term diversity reception? Explain the space diversity reception system.