Code No: EC05032

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IV B.Tech I Semester Regular Examinations, November 2008
ANALOG COMMUNICATIONS
(Electronics & Communication Engineering)

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Explain operation of square law detector with circuit diagram and waveforms.

   (b) An AM transmitter has un-modulated carrier power of 10 KW. It can be modulated by sinusoidal modulating voltage to a maximum depth of 40%, without overloading. If the maximum modulation index is reduced to 30% what is the extent up to which the un modulated carrier power can be increased to avoid over loading. [8+8]

2. Considering the modulating and carrier waves as sinusoids, Explain the single tone modulation and demodulation of DSB-SC wave with necessary expressions, waveforms and spectrums and explain how only one side band is necessary for transmission of information. [16]

3. (a) An SSB signal is de-modulated by using a synchronous de-modulator. The local carrier has phase error. Determine the effect of error on de-modulation. What will be the effect of this error, if input is DSB-SC in place of SSB?

   (b) Determine the percentage power saving when carrier wave and one of the side bands are suppressed in an AM wave modulated to a depth of

      i. 100%
      ii. 50%. [8+8]

4. Explain demodulation of FM signal with the help of PLL. [16]

5. (a) Derive the expression for figure of merit of AM system for large case.

   (b) Given an analog base band communication system with additive white noise having power spectral density $\frac{\eta}{2}$ and a distorting channel having the frequency response. The distortion is equalized by a receiver filter having the frequency response
   $H_c(w) = \frac{1}{1+Jw/w}$
   $H_{eq}(w) = \begin{cases} \frac{1}{H_c(w)} & 0 \leq |w| \leq w \\ 0 & otherwise \end{cases}$ Obtain an expression for the output SNR.
   [16]

6. (a) Classify radio transmitters in detail.

   (b) Compare low level modulation and high level modulation of radio transmitters. [16]

7. (a) Draw the block diagram of a superhet receiver designed to receive FM signals and explain its working.

(b) A broadcast superhet receiver does not employ RF stage and has loaded Q of the antenna coupling circuit at mixer as 125. the IF used is 455KHz. Find the image frequency and IFRR at 1000 KHz, 1500 KHz and 10 MHz. [16]

8. (a) What is the fundamental difference between pulse modulation, on the one hand, and frequency and amplitude modulation on the other?

(b) What is pulse width modulation? What other names does it have? How is it demodulated? [16]

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