

Fifth Semester B.E. Degree Examination, June/July 2011

Analog Communication

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. Explain the following terms and find the relation between them :
 - i) Joint probability of events A and B (06 Marks)
 - ii) Conditional probability of events A and B (06 Marks)
- b. List the properties of Gaussian process. (06 Marks)
- c. A white noise $w(t)$, whose PSD is $\frac{\eta}{2}$, is passed through an n^{th} order Butterworth low pass filter. Determine an expression for the noise equivalent band width of this filter.
 - i) What is the limiting value of the noise equivalent bandwidth as $n \rightarrow \infty$? (08 Marks)
 - ii) What is the output noise power if $n = 1$ if $\frac{\eta}{2} = 10^{-12}$ volts²/Hz, (noise power spectral density) $f_0 = 4$ KHz (cut off frequency of the filter)? (08 Marks)
- 2 a. Explain the generation of AM wave using switching modulator with equivalent equation, waveform and spectrum before and after filtering process. (10 Marks)
- b. Show that a square law device can be used to detect AM wave. (06 Marks)
- c. Find the ratio of maximum average power to unmodulated cosine power in AM wave. (04 Marks)
- 3 a. Explain the generation of DSBSC wave using ring modulator. (08 Marks)
- b. What is quadrature rule effect? How it can be eliminated? (06 Marks)
- c. With a neat diagram explain quadrature carrier multiplexing. (06 Marks)
- 4 a. Explain the generation of SSB wave using phase discrimination method with the help of a neat functional block diagram. Bringout merits and demerits of this modulation scheme. (08 Marks)
- b. Explain the generation of VSB wave. (06 Marks)
- c. Describe AM radio (06 Marks)

PART – B

- 5 a. Briefly explain and justify the following with reference to frequency modulation:
 - i) Bandwidth
 - ii) Modulation index
 - iii) NBFM and WBFM. (10 Marks)
- b. Derive an expression for the spectrum of FM wave with sinusoidal modulating signal. (10 Marks)
- 6 a. Explain FM generation using direct method. (07 Marks)
- b. Explain with a suitable functional diagram the generation of WBFM starting from NBFM with relevant equation (no need for derivations). (08 Marks)
- c. Explain FM detection using PLL. (05 Marks)

- 7 a. A modulating signal $5\cos 2\pi 15 \times 10^3 t$, angle modulates a carrier $A\cos \omega_c t$. Find the modulation index and bandwidth for FM system. Determine the change in the bandwidth and modulation index if FM is reduced to 5 KHz. (12 Marks)
- b. Determine the noise equation bandwidth for a RC low pass filter shown in Fig.Q7(b).

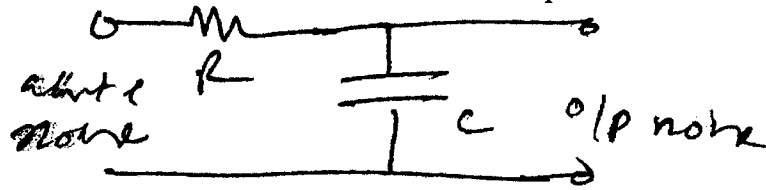


Fig.Q7(b)

(08 Marks)

- 8 a. Define noise figure and explain its significance. (07 Marks)
- b. Find the expression for figure of merit for DSBSC receiver. (13 Marks)
