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06EC53

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
   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 $\eta/2$, is passed through an n^{th} order Butterworth low pass filter. Determine on expression for the noise equivalent band width of this filter.
   i) What is the limiting value of the noise equivalent bandwidth as $n \to \infty$?
   ii) What is the output noise power if n = 1 if $\eta/2 = 10^{-12}$ volts^2/Hz, (noise power spectral density) f_o = 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 low 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 $A\cos w_c t$. 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).

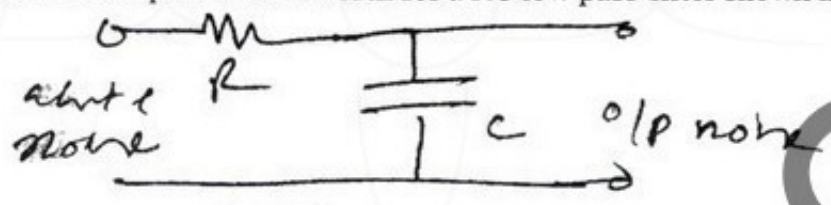

Fig.Q7(b) **(08 Marks)**

8 a. Define noise figure and explain its significance. **(07 Marks)**

b. Find the expression for figure of merit for DSBSC receiver. **(13 Marks)**

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