5E3129-Q

5E3129-Q

B. Tech. (Sem. V) (Main/Back) Examination, December - 2011
Electrical Engg.
5EE6.2 Principal of Communication System

Time : **3** Hours]

[Maximum Marks : **80**
[Min. Passing Marks : **24**

Instructions to Candidates :

*Attempt any **five questions** selecting **one question** from **each** unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination. *(Mentioned in form No. 205)*

1. _____NIL_____   2. _____NIL_____

UNIT - I

1   (a)   Explain thermal noise, also give the calculation of noise in reactive circuit.

8

(b)   A receiver has an overall gain A, an output resistance R_L, and a bandwidth of, and an absolute operating temperature T. If the receiver's input resistance is equal to the antenna resistance Ra, derive formulae for the noise figure of this receiver.

8

OR

1   (a)   Give the overview of the thermal noise. Also show that the equivalent parallel impedance of a tuned circuit is its equivalent resistance for noise

8

(b)   Derive the formulae for equivalent noise temperature in terms of noise figure.

8

UNIT - II

2   (a)   The equation of a carrier signal is given by $e_c = E_c \sin(W_c t + \Phi)$ and that of modulating signal $e_m = E_m \cos W_m t$.. Derive an equation for the modulated signal and modulation index for amplitude modulation. Also derive the relation between total power of modulated signal, carrier signal power and modulation signal.

                    8

   (b)   Explain with a neat diagram, the working of a balanced modulator.

                    8

OR

2   (a)   Draw the block diagram of an SSB transmitter using the filter system. Why must filter have such sharp cut off outside the sideband. Also prove that balanced modulator produces an output consisting of sidebands only with the carrier removed.

                    8

    (b)   Derive the relation between output power of an AM transmitter and depth of modulation and plot it as a graph for the values of the modulation index from zero to maximum.

                    8

UNIT - III

3   (a)   Draw the circuit diagram of frequenty modulation detector and describe its operation.

                    8

    (b)   What determines the bandwidth used by any given FM communication system ? Why are two different types of bandwidth used in frequency modulated transmissions ?

                    8

OR

3   (a)   Draw the block diagram of basic PLL system and explain its ability to track the frequency changes in the input signal.

                    8

    (b)   What is pre-emphasis ? Why it is used ? Sketch a typical pre-emphasis circuit and explain why de-emphasis must be used also.

                    8
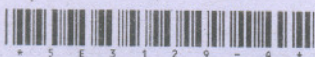
UNIT - IV

4 (a) Derive the formulae for SNR of synchronous, demodulation of AM and show that for AM when the noise is small compared to the signal, the performance of the envelope detector is identical to that of the synchronous detector.

8

(b) Explain the noise analysis of DSB-SC receiver using coherent detection and derive the expression of figure of merit.

8

OR

4 (a) Calculate the SNR of DSB-SC and SSB-SC systems.

8

(b) Show thst DSB-SC and SSB-SC systems yield the same output SNR for a given transmitted power and transmission bandwidth.

8

UNIT - V

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

8

(b) What is pulse width modulation ? How is it demodulated ?

8

OR

5 State and prove sampling theorem. Explain flat top sampling technique.

16