Roll No. ....

Total No. of Pages : 3

BT-3/D06   8472

Analog Communication

Paper—ECE-203E

Time—Three Hours]   [Maximum Marks—100

Note :— Attempt *five* questions in all, selecting at least *one* question from each Section.

SECTION –I

1. (a) A receiver having overall voltage gain A, output resistance R_L & bandwidth B operates at temperature T °K. The receiver input resistance is R_T and it is fed from an antenna having resistance R_a. Derive a formula for noise power N_o. Also find the value of noise figure F in terms of R_a, R_T and R_{eq}, where R_{eq} is the equivalent noise resistance excluding R_T.   10

    (b) The noise output of a resistor is amplified by a noiseless amplifier having gain of 60 and bandwidth of 90 kHz. A meter connected to the output of the amplifier reads 1.2 mV rms. (i) If the resistor is operated at 17 °C what is its resistance ? (ii) If the bandwidth of the amplifier is reduced to 10 kHz, its gain remaining constant, what will the meter read now ?   10

2. (a) What are the various sources of noise ?   5

    (b) Define noise bandwidth. What is the relation between noise bandwidth B_N and noise power P_o at the output of a system ?   7

    (c) Give the mathematical representation of noise.   8

8472   1   (Contd.)

SECTION—II

3. (a) What is modulation ? Why is it required to modulate a signal before transmission ? 5

   (b) Find an expression for the instantaneous voltage of an amplitude modulated signal. Draw the waveforms for amplitude modulated signal; also describe the power relations involved in AM. 10

   (c) Compare DSBSC – AM and SSB –AM. 5

4. (a) With the help of suitable diagrams and waveforms describe the square law diode modulation system. 10

   (b) Explain the working of a linear diode detector. 5

   (c) The rms value of a carrier voltage after amplitude modulation to a depth of 40% by a sinusoidal modulating voltage is 55 V. Calculate the rms value of carrier voltage when it is modulated to a depth of 80%. 5

SECTION—III

5. (a) In a FM system if mf is doubled by halving the modulating frequency, what will be the effect on maximum deviation ? 5

   (b) Explain the spectrum of a frequency modulated signal and compare it with that of amplitude modulated signal. 15

6. (a) What is the principle of operation of slope detectors ? Explain in detail the working of a balanced slope detector. 10

   (b) What is pre-emphasis and why is it required ? 5

   (c) Differentiate between WBFM and NBFM. 5

SECTION—IV

7. (a) Draw and explain the complete block diagram of Armstrong frequency modulation system. In what circumstances can we dispense with the mixer ? 10

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Section-I

1. (a) A receiver having overall voltage gain A, input resistance R_a, bandwidth B, operates at temperature T. The output resistance is R_L and it is fed from an antenna of resistance R_a. Derive a formula for noise power...

(b) Explain radio telephone transmitter highlighting its special features like volume compressors, VODAS and privacy devices.   10

8. (a) Discuss the merits of delayed AGC as compared to simple AGC. Show AGC curves to illustrate the comparison and explain how delayed AGC may be obtained an applied.   10

(b) Explain with block diagram the functioning of a TRF receiver.   10

2. (a) What are the various sources of noise ?

(b) Define noise bandwidth. What is the relation between noise bandwidth B and the noise power P_n at the output of the system ?

(b) Give the mathematical representation of noise.