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Fifth Semester B.E. Degree Examination, Dec.2016/Jan.2017
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. A random variable has probability density function given by
    $fx^{(x)} = 2e^{-2x}$ for $x \geq 0$
    find the probability that it will take a value between 1 and 3. **(05 Marks)**
    b. Explain the mean, correlation and covariance functions. **(09 Marks)**
    c. Explain the Gaussian process and also mention the properties of the Gaussian process. **(06 Marks)**

2. a. Explain the operation of the switching modulator with circuit diagram, and waveform. **(07 Marks)**
    b. Explain the operation of the ring modulator with circuit diagram and relevant waveforms. **(08 Marks)**
    c. With relevant diagram explain the operation of the coherent detection of DSBSC modulated waves. **(05 Marks)**

3. a. With relevant diagrams, explain the operation of the quadrature carrier multiplexing transmitter scheme and receiver scheme. **(08 Marks)**
    b. Mention the advantages and disadvantages of the SSB system. **(05 Marks)**
    c. With relevant diagram explain the operation of the phase discrimination method for generating an SSB modulated wave. **(07 Marks)**

4. a. Explain the importance of vestigial sideband modulation with the spectrum of the VSB modulated wave. **(05 Marks)**
    b. With block diagram approach, explain the operation of the frequency division multiplexing system. **(08 Marks)**
    c. Explain the operation of the super heterodyne receiver with relevant block diagram. **(07 Marks)**

PART – B

5. a. When a 50.4 MHz carrier is frequency modulated by a sinusoidal AF modulating signal, the highest frequency reached is 50.405 MHz. Calculate:
    i) The frequency deviation produced.
    ii) Carrier swing of the wave. **(05 Marks)**
    iii) Lowest frequency reached.
    b. With block diagram approach explain the operation of the indirect frequency modulation using Armstrong method briefly. **(09 Marks)**
    c. Explain the method of generating direct FM using suitable circuit. And also write the relevant expressions. **(06 Marks)**

6 a. With circuit diagram, explain the operation of the balanced slope detector. Plot the characteristics of the same.   **(07 Marks)**

    b. With relevant block diagram, explain the operation of the FM stereo multiplexing system.   **(08 Marks)**

    c. Explain the linear model of phase locked loop with relevant expressions.   **(05 Marks)**

7 a. Explain briefly on the following: i) Shot noise; ii) Thermal noise.   **(06 Marks)**

    b. A receiver with a noise figure of 10dB is fed by a low noise amplifier that has a gain of 60dB and a noise temperature of 80K. Calculate the noise temperature of the receiver and overall noise temperature. Assume temperature 25°C.   **(06 Marks)**

    c. Explain the cascade connection of two port networks with block diagram and relevant expressions.   **(08 Marks)**

8 a. With block diagram approach explain the noise in DSBSC receivers with model of DSBSC receiver using coherent detection.   **(06 Marks)**

    b. Find the figure of merit when the depth of modulation is i) 100% ii) 50% iii) 30%.   **(06 Marks)**

    c. Explain the pre-emphasis and De-emphasis in frequency modulation with circuits and graphs.   **(08 Marks)**

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