USN | | | | | | | | | | 10EC53

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.
      iii) Lowest frequency reached.   (05 Marks)
   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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