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B.E. / B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

ELECTRONICS AND COMMUNICATIONS ENGINEERING BRANCH

FIFTH SEMESTER

EC371 – COMMUNICATION THEORY AND SYSTEMS

Time: 3 hr (REGULATIONS 2004) Max Mark: 100

Answer ALL Questions

Part – A (10 X 2 = 20 Marks)

1. A certain transmitter radiates 9KW with the carrier unmodulated and 10.125 KW when the Carrier is sinusoidally modulated. Calculate the modulation index.
2. List the advantages of SSB modulation technique.
3. Draw the basic reactance modulator circuit.
4. What is the bandwidth required for an FM signal in which the modulating frequency is 2KHz and the maximum deviation is 10KHZ.
5. Why Pre-emphasis and De-emphasis circuits are used in FM technique?
6. A receiver connected to an antenna whose resistance is 50Ω has an equivalent noise resistance of 30Ω. Calculate the receiver's noise figure in decibels and its equivalent noise temperature.
7. State sampling theorem for band limited signals of finite energy.
8. What is the function of compander?.
9. List the advantages of Pulse code modulation scheme.
10. Draw the waveform for the digital signal [1100101], while it is transmitted with Manchester coding format.

Part – B (5 X 16 = 80 Marks)

11. (i). With neat diagram, explain the operation of Balanced Modulator circuit and derive its output . (8)
(ii). With suitable sketch, explain the functions of superheterodyne receiver? (8)

12. (a). Explain the Foster-Seeley Discriminator with neat diagrams and derive its output.

(or)

(b). (i). Describe the Narrow-band frequency modulation with relevant diagrams. (8)
(ii). Explain how PLL can be used for FM demodulator. (8)

13. (a).(i). Discuss the External noises associated in a receiver systems. (10)

(ii). An Amplifier operating over the frequency range from 18 to 20 MHz, has a 10K Ω input resistor. What is the rms noise voltage at the input to this amplifier if the ambient temperature is 27°C? (2)

(iii). The first stage of a two stage amplifier has a voltage gain of 10, a 600Ω input resistor, a 1600Ω equivalent noise resistance and a 27K Ω output resistance. For the second stage, these values are 25.81KΩ, 10K Ω and 1MΩ respectively. Calculate the equivalent input noise resistance of this two stage amplifier. (4)

(or)

(b). (i). Explain the noise performance in AM receivers and derive the figure of merit. (8)

(ii). Explain FM threshold effect with necessary diagrams. (8)

14. (a). (i). Describe the different types of sampling process involved in digital communications. (8)

(ii). With neat block diagrams, explain the operation of pulse-position modulation. (8)

(or)

(b).(i). Explain the process involved in Quantization and derive the signal to noise ratio of uniform quantization. (8)

(ii). Discuss the generation and detection of Pulse-amplitude modulation. (8)

15. (a). (i). With neat block diagram, explain the operation of Pulse code modulation technique. (8)

(ii). Explain the concept of Time Division Multiplexing in detail. (8)

(or)

(b).(i). Discuss the noise associated with delta modulation scheme and how it can be controlled in adaptive delta modulation. (8)

(ii). Describe the adaptive subband coding technique with relevant diagrams. (8)