C

Question Paper Code: 53405

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2024

Third Semester

Electronics and Communication Engineering

15UEC305- ANALOG COMMUNICATION

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Vestigial side band used in   CO1- R

    (a) TV transmission   (b) radio transmission

    (c) mobile phone communication   (d) wireless internet

2. An 80 MHz carrier is frequency modulated by a sinusoidal signal of 1V   CO2-App
    amplitude and the frequency sensitivity is 100 Hz/V. Find the
    approximate bandwidth of the FM waveform if the modulating signal has
    a frequency of 10 kHz.

    (a) 22 KHz   (b) 220 KHz   (c) 20.2 KHz   (d) 110 KHz

3. The principles of autocorrelation is used   CO3- R

    (a) in random signals   (b) square wave signals

    (c) triangular wave signals   (d) sine wave signals

4. Capture effect is present in   CO4- U

    (a) SSB Receivers   (b) AM receivers   (c) DSB receivers   (d) FM receivers

5. Sampling is a process of converting a continous signal into   CO5- R

    (a) discrete signal   (b) random signal   (c) sine wave signal   (d) triangular wave signal

PART – B (5 x 3= 15Marks)

6. Compute the bandwidth of the amplitude modulated signal given by   CO1- App

    S(t) = 23[1+ 0.8cos(310t)]cos(230000πt)

7. Illustrate the relationship between FM and PM with Block diagrams   CO2-U

8. Define a random variable .Specify the sample space and the random variable for a coin tossing experiment.   CO3- U

9. Determine the range of tuning of a local oscillator of a super hetero dyne receiver $f_{LO} > f_c$ .The broadcast frequency range is 540 KHz to 1600 KHz assume f_{IF} = 455 KHz   CO4- U

10. Explain quantization process.   CO5- U

PART – C (5 x 16= 80Marks)

11. (a) A carrier of 8 MHz with peak value of 6 V is amplitude modulated by a 10 K Hz sine wave signal with amplitude 4 volts . determine the modulation index and draw the amplitude spectrum.   CO1- U   (16)

Or

(b) (i) Compare and contrast various Amplitude Modulation systems.   CO1- Ana   (8)

(ii) Discuss any two methods of generating a SSB signal.   CO1- U   (8)

12. (a) A frequency modulated signal is given by $x_c(t) = 10 \cos [2\pi \times 10^8 t + 5\sin 2\pi \times 200t]$
Determine
   (i) The Carrier frequency
   (ii) The modulating signal frequency
   (iii) The peak frequency deviation
   (iv) The modulation index β_f CO2- U   (16)

Or

(b) (i) Write about the basic principles of FM detection and explain about ratio detector.   CO2- U   (10)

(ii) How can you generate FM from PM and PM from FM?   CO2- U   (6)

13. (a) (i) Summarize the different types of random process and give the definitions   CO3-App   (12)

(ii) State and prove any two properties of Gaussian process.   CO3- U   (4)

Or

(b) (i) Briefly explain about noise measurements.   CO3- U   (12)

(ii) An amplifier operating over the frequency range from 18 to 20 MHz has a 10KΩinput resistor. What is the rms noise voltage at the input to this amplifier if the ambient temperature is 27˚C?   CO3-App   (4)

14. (a) With a neat block diagram, explain the operation of a Super heterodyne receiver.   CO4- U   (16)

Or

(b) Discuss the effects of noise on the carrier in a FM receiver with suitable mathematical derivations.   CO4- Ana   (16)

15. (a) Explain the various analog pulse communication system describing their advantages and drawbacks. .   CO5- U   (16)

Or

(b) Explain the process of quantization and obtain an expression for signal to quantization ratio in the case of a uniform quantizer   CO5- U   (16)

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