Hall Ticket No | | | | | | | | | | | Question Paper Code: AEC005

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech IV Semester End Examinations (Regular) - May, 2018

Regulation: IARE – R16

ANALOG COMMUNICATIONS

Time: 3 Hours **(ECE)** **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Define a system. Explain in detail about classification of systems. **[7M]**
   (b) State auto correlation and cross correlation. Prove any two properties of cross correlation. **[7M]**

2. (a) Define the following **[7M]**
      i. Signal bandwidth
      ii. System bandwidth
      iii. Transfer function of an LTI system
   (b) Determine the convolution of the following signals by graphical method **[7M]**
      i. x (t) = e^{-2t} u (t)
      ii. h(t) = e^{-4t} u (t).

UNIT – II

3. (a) Explain the demodulation of AM wave using envelope detector with necessary block diagram and waveforms. **[7M]**
   (b) Explain the noise performance of Double Side Band Suppressed Carrier (DSBSC) system and obtain its figure of merit. **[7M]**

4. (a) Explain the generation of Double Side Band Suppressed Carrier (DSBSC) wave using balanced modulator with necessary block diagram, waveforms and mathematical expressions. **[7M]**
   (b) An audio frequency signal m(t)= 10Sin(2π500t) is used to amplitude modulate a carrier of c(t)= 50sin($5\pi10^5$t). Calculate **[7M]**
      i. Modulation index
      ii. Side band frequencies
      iii. BW required
      iv. Total power delivered to the load of 600Ω.

UNIT – III

5. (a) What is the significance of VSB signal and where does it find its application? Draw the frequency response of a VSB modulation and give its justification. **[7M]**

   (b) What is quadrature null effect and how it can be eliminated. **[7M]**

6. (a) Explain the generation of Single Side Band modulated signal using phase discriminator method with neat block diagram, waveforms and necessary mathematical expressions. **[7M]**

   (b) Explain the noise performance of Single Side Band modulation system. **[7M]**

UNIT – IV

7. (a) Explain the generation of Frequency Modulation (FM) waves using indirect method (Armstrong method) **[7M]**

   (b) A carrier wave of frequency 100MHz and amplitude of 5V is frequency modulated by a sine wave of amplitude 20V and frequency 100 KHz. The frequency sensitivity of the modulator is 25 KHz/volt. Determine the approximate power, bandwidth of FM wave and write FM wave equation. **[7M]**

8. (a) Classify the frequency modulation based on modulation index (β) parameter and Compare Narrow band FM and Wide band FM . **[7M]**

   (b) What is Pre-emphasis and De-emphasis. Explain with neat diagrams. **[7M]**

UNIT – V

9. (a) What are the types of sampling techniques and explain about Flat top sampling with neat diagram and waveforms. **[7M]**

   (b) With neat block diagram explain the working principle of Tuned Radio Frequency (TRF) receiver. **[7M]**

10. (a) Explain in detail about super heterodyne AM reciever and what is need of automatic gain control (AGC) in receivers. **[7M]**

    (b) Describe the receiver characteristics of following **[7M]**

    i. Selectivity
    ii. Fidelity
    iii. Sensitivity
    iv. Intermediate frequency
    v. Image frequency rejection ratio

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