R19

II B. TECH II SEMESTER REGULAR EXAMINATIONS, AUG/SEP - 2021
ANALOG AND DIGITAL COMMUNICATIONS
(Electronics and Communication Engineering)

Time: 3 hours   Max. Marks: 60

Note: Answer **ONE** question from each Unit (**5 × 12 = 60 Marks**)
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UNIT - I

1. a) The input to an envelope detector is a single tone AM signal $X_{AM}(t) = A(1+m\cos w_m t)\cos w_c t$ where m is a modulation index, $0 < m < 1$ and $w_c >> w_m$. Show that if the detector output is to follow the envelope of $X_{AM}(t)$ it is required that at any time t_0 is [6M]

$$\frac{1}{RC} \geq \omega_m \left(\frac{m\,Sin\,\omega_m t_0}{1 + m\,Cos\,\omega_m t_o} \right).$$

   b) Explain the generation of DSB-SC with a neat circuit diagram of balanced ring modulator. [6M]

(OR)

2. a) Demonstrate Tuned Radio Frequency receiver with neat block diagram. [6M]

   b) What is the significance of AGC circuit? Differentiate between simple, delayed and amplify AGC and explain the function with the help of neat diagram. [6M]

UNIT – II

3. a) With a neat block diagram explain the indirect method of FM generation. [6M]

   b) What is the significance of Pre-Emphasis and De-Emphasis and explain in detail with neat sketch. [6M]

(OR)

4. a) Examine the signal to Noise Ratio for SSBSC. [8M]

   b) Outline the Threshold effect in Angle Modulation. [4M]

UNIT – III

5. a) Classify Pulse Modulation Techniques and define each technique with suitable waveforms. [8M]

   b) Describe the advantages of digital communication systems over Analog Communications. [4M]

(OR)

6. a) Define companding and explain different techniques in companding. [6M]

   b) Demonstrate in detail about Time Division Multiplexing. [6M]

UNIT –IV

7. a) With a neat sketch explain about the BPSK modulator with phasor diagrams. [6M]

   b) Explain coherent reception of FSK in detail with relevant waveforms. [6M]

(OR)

8.   a)   Outline the M-ary QAM Modulator with neat sketch.   [6M]

    b)   Determine the probability of error for Matched filter.   [6M]

UNIT –V

9.   a)   State and prove the properties of Entropy.   [6M]

    b)   A code is composed of dots and dashes. Assume that the dash is three times   [6M] as long as the dot and has one-third the probability of occurrence.

      (i)   Calculate the information in a dot and that in a dash.

      (ii)   Calculate the average information in the dot-dash code.

      (iii) Assume that a dot lasts for 10ms and that this same time interval is allowed between symbols. Calculate the average rate of information transmission.

(OR)

10.   a)   An analog signal band limited to 10HKz quantize 8-levels of PCM System   [6M] with probability of 1/4, 1/5, 1/4, 1/10, 1/20, 1/10, 1/20 and 1/10 respectively. Solve the entropy and rate of information.

    b)   A discrete memory less source has an alphabet of five symbols with their   [6M] probabilities are 0. 5, 0.15, 0.15, 0.15, 0.05 respectively. Determine the Huffman code for this source and efficiency of this code.

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