

B.Tech II Year II Semester (R13) Supplementary Examinations May/June 2017

**ANALOG COMMUNICATION SYSTEMS**  
(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**  
(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- Define modulation.
  - State the difference between single side band and vestigial side band transmission system.
  - Differentiate phase and frequency modulation.
  - What are the applications of phase locked loop?
  - Define signal to noise ratio.
  - What is thermal noise?
  - What is meant by figure of merit of a receiver?
  - What is the purpose of preemphasis and deemphasis in FM?
  - Define channel capacity of the discrete memory less channel.
  - What is entropy?

**PART – B**  
(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- 2 Analyze the concepts of AM modulation and derive the equation of an AM wave. Also draw the modulated AM wave for various modulation index.

OR

- 3 Explain about balanced modulator to generate DSB-SC signal.

**UNIT – II**

- 4 Derive the expression for the frequency modulated signal. Explain what is meant by narrowband FM and wideband FM.

OR

- 5 An angle modulated signal with carrier frequency  $\omega_c = 2\pi \times 10^5$  is described by the equation  $\phi_{EM}(t) = 10 \cos(\omega_c t + 5 \sin 3000 t + 10 \sin 2000 \pi t)$ .
- Find the power of the modulated signal.
  - Find the frequency deviation  $\Delta f$ .
  - Find the deviation ratio  $\beta$ .
  - Estimate the bandwidth of  $\phi_{EM}(t)$ .

**UNIT – III**

- 6 Explain noise in FM and PM systems.

OR

- 7 Explain the following:
- Time domain representation of narrow band noise.
  - Quadrature representation of narrow band noise.

**UNIT – IV**

- 8 Explain pulse position modulation in detail.

OR

- 9 Write short notes on: (i) Sensitivity. (ii) Selectivity. (iii) Fidelity in radio receiver measurements.

**UNIT – V**

- 10 (a) A discrete source emits one of five symbols once every millisecond. The symbol probabilities are  $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}$ , and  $\frac{1}{16}$  respectively. Find the source entropy and information rate?
- (b) A binary source is emitting an independent sequence of 0's and 1's with probabilities 'p' and '1-p' respectively. Plot the entropy of the source versus 'p' ( $0 < p < 1$ ).

OR

- 11 Discuss source coding theorem, give the disadvantages of channel coding in detail.

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