

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 121601

Roll No.

**B.TECH.**

**Theory Examination (Semester-VI) 2015-16**

**ANALOG & DIGITAL COMMUNICATION**

*Time : 3 Hours*

*Max. Marks : 100*

**Note: - Attempt all the questions. Each question carries equal marks.**

**1. Attempt all parts of this Section: (2×10=20)**

- (a) What is Modulation?
- (b) Explain capture effect in FM receivers.
- (c) What is noise? Noise is difficult to eliminate but its effect can be minimize, justify.
- (d) Define Channel Capacity.
- (e) What is Entropy? How is it useful in determining information ?
- (f) List the Spread Spectrum Techniques.
- (g) Explain VSB modulation method.

- (h) What is Radio transmitter? What are different blocks used in the transmission of radio signal?
- (i) Define Inter Symbol Interference (ISI).
- (j) What is Shanon Limit for Information Capacity?

**2. Attempt any five parts of the following: (10×5=50)**

- (a) What is sampling theorem? What is the relevance of Discrete Fourier Transform in relation to Nyquist criterion?
- (b) What is pulse code modulation ? Using suitable diagram explain the quantization of signals.
- (c) Draw and Explain the block Diagram of TDM system. Also list the basic problems involved in design of a digital Multiplexer?
- (d) Write a short note on Shannon-Fano Coding.
- (e) Explain the working of Delta modulation. How does Adaptive Delta Modulation improve the performance of Delta Modulation?
- (f) Find the carrier and modulating frequencies, the modulation index and the maximum deviation of the F.M. wave represented by the voltage equation  $V = 12 \sin (6 \times 10^8 t + 5 \sin 1250 t)$ . What power will this F.M. wave dissipate in a  $10 \Omega$  resistor?

(g) Evaluate the auto correlation and cross correlation function of in phase and quadrature components of the narrowband noise at the coherent detector input for

(i) The DSB-SG system

(ii) The SSB system for Lower Side Bands

**Attempt any two parts of the following:**

(15×2=30)

3. An AM amplifier provides an output of 106 W at 100 % modulation. The internal loss is 20 W :

(i) What is un-modulated carrier power?

(ii) What is the side band power ?

4. The function given below represents which type of signal ?

$$f(t) = \cos(\omega_c t) + 0.3 \cos(2\pi f_m t) \sin(2\pi f_m t).$$

Sketch its phasor diagram at  $t = 0$ .

5. Draw the block diagram of an SSB-SC transmitter employing sideband suppression filter and explain.