

Roll No. \_\_\_\_\_

**Total No. of Pages : 02**

**Total No. of Questions : 09**

**B.Tech.(Electronics Engg.) (2012 Onwards) (Sem.-4)**

**B.Tech.(ECE)/(ETE) (2011 Onwards)**

## ANALOG COMMUNICATION SYSTEMS

**Subject Code : BTEC-401**

**Paper ID : [A1189]**

**Time : 3 Hrs.**

**Max. Marks : 60**

**INSTRUCTION TO CANDIDATES :**

1. **SECTION-A is COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

## SECTION-A

**1. Write briefly :**

- Define noise and noise figure.
- A single side band signal contains 1KW. How much power is contained in the side bands and how much in the carrier?
- Write basic difference between low level and high level modulation.
- What do you mean by double spotting?
- Briefly explain the PLL direct FM transmitter.
- What is FM Capture effect?
- Where we use Vestigial side band transmission technique and why?
- Why we apply pre-emphasis circuit in FM before transmission?
- Justify Square law equation of AM.
- Find the Nyquist rate and the Nyquist interval for the continuous time signal

$$x(t) = 6 \cos(50 \pi t) + 20 \sin(300 \pi t) - 10 \cos(100 \pi t)$$

### SECTION-B

2. Give performance comparison of three sampling techniques.
3. Explain the RC phase-shift method for generating FM.
4. Explain the FM Quadrature Demodulator with the help of suitable block diagram.
5. For a balanced modulator using FET, prove mathematically that carrier is completely suppressed.
6. How will you set time constant for envelope detector?

### SECTION-C

7. a) An AM voltage is represented by the expression :  
$$V = 5(1 + 0.6 \cos(6280t)) \sin(2\pi \times 1000000t) \text{ volts}$$

Calculate :

  - i) Modulation depth
  - ii) Modulating frequency
  - iii) RMS value of LSB
  - iv) Power dissipated in  $1\text{K}\Omega$  resistance
- b) With the help of diagram and wave forms, explain FLAT-TOP sampling.
8. a) What is Image frequency? How Image frequency rejection is done in radio receivers?
- b) Distinguish between simple AGC and delayed AGC.
9. a) An SSB transmission contains 10KW. This transmission is to be replaced by a standard Amplitude modulated signal with the same power content. Determine the power content of the carrier and each of the side bands, when percent modulation is 80%.
- b) With the help of block diagram, explain each block of superheterodyne receiver.