Code: EC4T5

II B.Tech - II Semester – Regular/Supplementary Examinations – April 2017

ANALOG COMMUNICATIONS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer *all* the questions.   All questions carry equal marks

11 x 2 = 22

1.

  a) Define modulation. List different types of modulation.
  b) A 45 volts (rms) sinusoidal carrier is amplitude modulated by a 30 volts (rms) sinusoidal base band signal. Find the modulation index of the resulting signal.
  c) Give the frequency domain representation of DSB-SC wave. What is the percentage power saving if DSB-SC wave is used instead of DSB-FC?
  d) Explain about the phase error and frequency errors in the coherent detection of DSB-SC.
  e) Find the percentage of power saved in SSB when compared with AM system.
  f) What are the advantages of VSB and mention its applications?
  g) Explain the relationship between frequency and phase modulation.

h) Determine the bandwidth occupied by a sinusoidal frequency modulated carrier for which the modulation index is 2.4 and modulating signal frequency is 3kHz.

i) List any four differences between AM and FM modulation techniques.

j) Compare TDM and FDM.

k) Explain the super heterodyne principle.

PART – B

Answer any ***THREE*** questions.   All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) Explain the generation of AM wave using square law Modulator.   8 M

   b) Explain the method of AM detection using envelope detector.   8 M

3. a) The modulating signal f(t) in an DSB-SC system is a multiple tone signal given by $f(t)=A_1 \cos \omega_1 t + A_2 \cos \omega_2 t + A_3 \cos \omega_3 t$. The signal f(t) modulates a carrier $A_c \cos \omega_c t$. Plot the single sided trigonometric spectrum and find the bandwidth of the modulated signal. Assume that $\omega_3 > \omega_2 > \omega_1$ and $A_3 > A_2 > A_1$.   10 M

b) Calculate the total power in the modulated wave in the following forms: i) DSBFC. ii) DSBSC when a 300W carrier is modulated to a depth of 75 percent.   6 M

4. a) Define Frequency Modulation. Derive the expression for wide band FM signals with necessary equations.   8 M

b) Explain about foster seeley discriminator.   8 M

5. a) Explain super heterodyne receiver with neat block diagram.   8 M

b) Derive the expression for figure of merit of AM systems.
          8 M

6. a) Explain single polarity and double polarity PAM.   8 M

b) Compare different pulse modulation techniques.   8 M