PVP 12

Code: EC4T5

II B.Tech - II Semester – Regular Examinations - JUNE 2015

ANALOG COMMUNICATIONS
(ELECTRONICS AND COMMUNICATION ENGINEERING)

Duration: 3 hours Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1 a) Describe the modulation of AM wave using square law Device. 7 M

b) An amplitude modulated amplifier provides an output of 106 watts at 100% modulation. The internal loss is 20Watt. 7 M

i) What is the un modulated carrier power?

ii) What is the sideband power?

2 a) With a neat circuit diagram, explain the principle of envelope detection of an amplitude modulated wave. 7 M

b) What are the carrier frequency requirements in a Radio Transmitter? Explain. 7 M

3 a) Explain the operation of DSB-SC generation with expressions & sketches. 7 M

b) Consider the wave obtained by adding a non coherent carrier $A_c \cos(2\Pi f_c t + \Phi)$ to DSB-SC wave $m(t) \cos(2\Pi f_c t)$ where m (t) is the message waveform. This waveform is applied to an ideal envelope detector. Find the resulting detector out put. Evaluate the output for. 7 M

i) $\Phi = 0$ and

ii) $\Phi \neq 0$ and $|m(t)| << A_c/2$.

4 a) Why is SSB modulation not suitable for video signals? Give an expression for the SSB-SC signal in the time domain, indicating the relationship between the in phase and the quadrature phase components. 7 M

b) Explain the synchronous demodulation of an AM-SSB-SC signal. 7 M

5 a) With the help of a block diagram, describe the indirect (Armstrong) method of generating FM Signal. 7 M

b) Given the single tone FM signal
$s(t)= 20\cos[(2\pi*10^6 t)+2.0\sin(2\pi*10^4 t)]$ 7 M

i) Sketch the FM spectrum at the carrier and the first three sideband terms.

ii) What is the bandwidth using Carson's rule?

The required Bessel function values are: $J_0=0.224$, $J_1=0.577$, $J_2=0.353$ and $J_3=0.129$.

6 a) Explain with necessary diagrams and mathematical expressions how the FM will be demodulated using a Balanced frequency discriminator. List the factors causes distortion at the output of above discriminator. 7 M

b) A carrier wave of frequency 100MHz is frequency modulated by a sinusoidal wave of amplitude 20 Volts and frequency 100KHz. The frequency sensitivity of the modulator is 25KHz per volt. Determine the approximate bandwidth of the FM signal using Carson's rule. 7 M

7 a) Derive figure of merit for FM system using balanced frequency discrimination detector. 10 M

b) Why is Pre-emphasis and De-emphasis used in FM system? Explain. 4 M

8 a) How to obtain PWM from PPM? Explain the various components in the block diagram. 7 M

b) Compare FDM with TDM. 7 M