

Code No: V0425/R07

SET - 1

II B.Tech II Semester, Regular Examinations, Apr - 2011

ANALOG COMMUNICATION
(Electronics and Communications Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) What is Amplitude modulation? show that the power required to transmit the AM wave is $P_t = (1 + m^2 / 2) P_c$. Where P_t – Total Power, P_c – Carrier Power, m – Modulation Index (8M)
b) Explain the principle of square law detector with a neat circuit diagram (8M)
2. a) Explain the generation of double side band suppressed carrier (DSB-SC) modulation. Write the necessary equations. (8M)
b) Discuss the effect of frequency and phase error in demodulation of DSB-SC wave using synchronous detector (8M)
3. a) Explain filter method of generating SSB waves (8M)
b) Compare SSB, DSB and VSB from the view point of generation, bandwidth requirement, power distribution and area of application (8M)
4. a) Explain the working of Armstrong method for FM generation with the help of neat block diagram. (8M)
b) Explain the balanced slope detector method for FM demodulation. (8M)
5. a) Derive an expression for output SNR for FM demodulator (12M)
b) Distinguish between pre-emphasis and de-emphasis with necessary figures (4M)
6. a) Explain the working of reactance tube type FM transmitter with a neat block schematic (8M)
b) Discuss the carrier frequency requirements of a radio transmitter (8M)
7. a) Draw the block diagram of FM receiver and Explain its working (8M)
b) Explain the following terms (8M)
i) Sensitivity, ii) Selectivity, iii) Image frequency and its rejection
8. a) Bring out the differences between TDM and FDM. (8M)
b) Explain the generation of PWM, with suitable circuit and waveforms. (8M)

Code No: V0425/R07

SET - 2

II B.Tech II Semester, Regular Examinations, Apr - 2011

ANALOG COMMUNICATION
(Electronics and Communications Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

-
1. a) Derive an expression for AM wave and draw its frequency Spectrum (8M)
b) The signal $v(t) = (1+m \cos \omega_m t) \cos \omega_c t$ is detected using a diode envelope detector. Sketch the detector output when $m = 2$ (8M)
 2. a) Explain the generation of DSB-SC wave using Ring modulator circuit. (8M)
b) Show that squaring circuit will not permit the generation of a local oscillator signal capable of demodulating an SSB-SC signal. (8M)
 3. a) Explain the generation of SSB-SC using phase shift method (8M)
b) Explain the principle of VSB transmission. Compare VSB with SSB and AM in terms of power requirement, Band width and area of applications (8M)
 4. a) A sinusoidal voltage with amplitude of 100V and a frequency of 100 MHz is frequency modulated by a sinusoidal signal of 20 kHz to generate a frequency deviation of 80 kHz. Find the amplitude of the carrier signal and all sidebands up to fourth sideband present in the modulated signal. Draw the spectrum. (8M)
b) Explain the working of Foster seelay discriminator for FM demodulation (8M)
 5. a) Derive an expression for output SNR for DSB-SC demodulator (12M)
b) Explain the threshold effect in FM (4M)
 6. a) Explain the working of phase modulated FM transmitter with a neat block diagram. (9M)
b) Discuss the effect of feedback on the performance of AM transmitter (7M)
 7. a) Discuss the factors influencing the choice of Intermediate frequency for a radio receiver (8M)
b) Mention the merits of delayed AGC as compared with sample AGC. (8M)
 8. a) Describe the principle of PAM generation (8M)
b) Describe the demodulation of PWM (8M)

Code No: V0425/R07

SET - 3

II B.Tech II Semester, Regular Examinations, Apr - 2011
ANALOG COMMUNICATION
 (Electronics and Communications Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. a) An amplitude modulated amplifier provides an output of 106 watts at 100% modulation. The internal loss is 20watts.
 - i) What is the unmodulated carrier power
 - ii) What power output is required from the modulator. (Baseband signal)
 - iii) if the percentage modulator is reduced to 75% how much output is needed from the modulator (8M)
- b) Explain about Frequency division multiplexing with a neat block diagram. (8M)

2. a) Draw the circuit diagram of balanced modulator and show that it produces the DSB-SC wave. (8M)
- b) Show that a synchronous demodulator can demodulate an AM signal $x_{AM}(t) = [A + m(t)] \cos \omega_c t$ regardless of the value of A. (8M)

3. a) Draw the block diagram of phase cancellation SSB generator and explain how the carrier and an unwanted side band are suppressed (10M)
- b) Compare SSB with DSB-SC and conventional AM. (6M)

4. a) A signal tone FM signal is Given by $e_{FM}(t) = 10 \sin(16\pi \times 10^6 t + 20 \sin 2\pi \times 10^3 t)$ v
 Find the modulation index, modulation frequency deviation, carrier frequency and the power of FM signal (8M)
- b) Draw the block diagram of PLL technique for demodulating an FM signal and explain its working (8M)

5. a) Prove that for single tone modulation, FM is superior to PM by a factor of 3 from the SNR point of view. (8M)
- b) What is meant by pre emphasis and de-emphasis? Discuss the need for them in FM system with necessary schematics and expressions. (8M)

6. a) Draw a neat block diagram of an AM transmitter and explain the function of each block (9M)
- b) Discuss the frequency stability in FM transmitter (7M)

7. a) What are the advantages of a superhetrodyne receiver as compared to a TRF receiver. (4M)
- b) Explain clearly about image frequency and how it can be eliminated (6M)
- c) What are the considerations in the choice of IF in a Superhet receiver (6M)

8. a) Explain about TDM with a neat figures (8M)
- b) Describe with suitable circuit the scheme of demodulation of PPM signals (8M)

Code No: V0425/R07

SET - 4

II B.Tech II Semester, Regular Examinations, Apr - 2011

ANALOG COMMUNICATION
(Electronics and Communications Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) Explain the generation of AM using square law modulator. (8M)
 b) The input to an envelope detector is a single tone AM signal
 $x_{AM}(t) = A(1 + m \cos \omega_m t) \cos \omega_c t$ Where m is a constant, $0 < m < 1$ and $\omega_c \gg \omega_m$. Show that if the detector output is to follow the envelope of $X_{AM}(t)$, it is required that at any time to

$$\frac{1}{RC} \geq \omega_m \left(\frac{m \sin \omega_m t_0}{1 + m \cos \omega_m t_0} \right)$$
 (8M)
2. a) Prove that the balanced modulator produces an output consisting of side bands only with the carrier removed. (8M)
 b) Explain the demodulation of DSB-SC by using COSTAS Loop with a neat block diagram. (8M)
3. a) Explain how coherent detection accomplishes the demodulation of SSB signal (8M)
 b) Discuss the need for VSB and explain with a necessary block schematic how vestigial side band signal is generated using phase discrimination method (8M)
4. a) Derive equation for FM carrier from the fundamentals. Also differentiate FM and PM. (10M)
 b) Distinguish between Narrow band FM and wideband FM. Mention their specific applications. (6M)
5. a) Derive an expression for output SNR for SSB-SC synchronous detector system. (12M)
 b) Explain the principle of pre emphasis (6M)
6. a) Draw the block diagram of an AM transmitter for high level modulation and explain its working (9M)
 b) Discuss the frequency stability in FM transmitter briefly (7M)
7. a) Explain the working of superhetrodyne receiver with a neat block diagram. (8M)
 b) Explain about Tracking in superhetrodyne receiver. (8M)
8. a) Distinguish between single polarity PAM and double polarity PAM. Explain the generation of single polarity PAM. (8M)
 b) Explain how the demodulation of PPM is carried out. (8M)