

III B.Tech. I Semester Regular Examinations, November -2005
COMMUNICATION ENGINEERING
(Electronics & Control Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What are advantages and disadvantages of FM over AM.
(b) The single-tone modulating wave $m(t) = A_m \cos 2\pi f_m t$ is used to generate the following Vestigial Side Band modulated wave
 $s(t) = aA_m A_c \cos[2\pi(f_c + f_m)t] + A_m A_c(1 - a) \cos[2\pi(f_c - f_m)t]$ where a is a constant. Find the in-phase and quadrature components of the VSB modulated wave. For what value of constant 'a', $s(t)$ reduces to a DSB-SC modulated wave. [8+8]
2. (a) What are the various types of angle modulation and compare them.
(b) With the help of suitable diagrams explain the Armstrong method of generating FM wave. [8+8]
3. (a) Explain the classification of radio transmitter based on the frequency range involved?
(b) Explain the classification of radio transmitter based on the type of service involved? [8+8]
4. (a) Differentiate between simple, delayed and amplified AGC and explain their action with the help of simple circuit blocks.
(b) Discuss briefly similarities and differences between FM and AM receivers.
(c) Write in detail about the limiter used in FM receiver. [6+6+4]
5. Write notes on:
(a) Fading and diversity reception.
(b) Amplitude limiter. [8+8]
6. (a) What is Pulse-width Modulation? What other names does it have? How is it demodulated?
(b) Distinguish between Natural and flat-top Sampling.
(c) Explain the principle of basic transistor PAM modulator with a circuit. [8+4+4]
7. (a) Illustrate the waveforms of the three basic forms of signaling binary information
 - i. ASK
 - ii. FSK

iii. PSK

[16]

8. (a) What are the parallel interfaces? What is the difference between serial interface and parallel interface?
- (b) What is centronics parallel interface and Explain control, data and status lines for it?

[8+8]

III B.Tech. I Semester Regular Examinations, November -2005
COMMUNICATION ENGINEERING
(Electronics & Control Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What are the disadvantages of SSB-SC over normal AM. And compare AM and FM.
(b) Explain the frequency discrimination method for generating an SSB modulated wave. [8+8]
2. (a) Explain how the frequency modulation is generated using Armstrong system with neat block diagram. In which circumstances can we dispense with the mixer?
(b) When the modulation frequency in FM system is 400 Hz and modulating voltage is 2.4v the modulating index is 60. Calculate the maximum deviation. What is the modulation index when the modulating frequency is reduced to 250Hz and the modulating voltage is simultaneously raised to 3.2V? [10+6]
3. (a) Explain how frequency stability is achieved in modern transmitter.
(b) Describe with aid of suitable diagram, the principal method of SSB generation.
(c) Describe the advantages of a SSB SYSTEM for high frequency point to point communication and explain why it is unsuitable for broadcasting. [5+5+6]
4. (a) Differentiate between simple, delayed and amplified AGC and explain their action with the help of simple circuits blocks.
(b) Discuss briefly similarities and differences between FM and AM receivers.
(c) Write in detail about the limiter used in FM receiver. [6+6+4]
5. (a) Define thermal noise, shot noise, noise figure, and Noise temperature.
(b) Derive the Noise figure of cascaded stage of amplifiers
(c) A Mixer circuit having a noise figure of 16dB is preceded by an amplifier having a noise figure of 9 dB and a power gain of 25 dB what is the overall noise figure? [6+6+4]
6. (a) What is Pulse Modulation? Classify pulse modulation systems.
(b) State and explain Sampling Theorem. [8+8]
7. (a) Draw the block diagram of PCM system and explain in detail the functions of each block.
(b) In what way it differs to other pulse modulation methods. [10+6]

8. Explain what is meant by the term data transparency, and how it may be achieved using

(a) character stuffing.

(b) zero bit insertion.

Describe the different types of physical transmission media that are used to transmit data [8+8]

III B.Tech. I Semester Regular Examinations, November -2005
COMMUNICATION ENGINEERING
(Electronics & Control Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What is the need for modulation? Derive the relation between the output power of an Am transmitter and depth of modulation.
(b) The output current of 60% modulated AM generator is 1.5A. To what values will this current rise if the generator is modulated additionally by another audio wave whose modulation index is 0.7? What will be the percentage power saving if the carrier and one of the sidebands are now suppressed? [8+8]
2. (a) Draw the complete block diagram of the Armstrong frequency modulation system and explain the function of the mixer and multipliers. In what circumstances can we dispense with the mixer?
(b) The equation of an angle-modulated voltage $v(t) = 10 \sin(10^8 t + 3 \sin 10^4 t)$ what form of angle modulation is this? Calculate the carrier and modulating frequencies, the modulation index and deviation and power dissipated in a 100-ohm resistor. [8+8]
3. (a) Explain the requirements of carrier frequency for a radio transmitter.
(b) Explain the operation of amplitude modulated transmitter using modulation at high carrier power level. [8+8]
4. (a) What are the advantages of Superheterodyne receiver as compared to a TRF receiver?
(b) Explain clearly what is meant by image frequency in a superheat receiver and how it can be eliminated.
(c) Define conversion transconductance of a mixer. With the help of a typical circuit diagram, explain the working of a separately excited mixer. [6+6+4]
5. (a) Explain the source of shot noise and get the expression for its power density spectrum.
(b) The noise figure of an amplifier is 7 db. Calculate the equivalent amplifier noise referred to the input for a bandwidth of 500 MHz. [8+8]
6. (a) A narrow band signal has a bandwidth of 10kHz centered on a carrier frequency of 100kHz. It is proposed to represent this signal in discrete time form by sampling its inphase and quadrature components individually. What is the minimum sampling rate can be used for this representation?
(b) Explain the working of PAM modulator. [8+8]

7. (a) Discuss the advantages of M-ary signaling scheme compared with the binary scheme.
- (b) Draw the block diagram of binary PSK transmitter and explain the operation. [8+8]
8. With the brief description of the application and limitation of the following types of transmission media.
- (a) Two wire open lines
- (b) Twisted Pair lines
- (c) Co-axial cable lines
- (d) Optical fiber [16]

★ ★ ★ ★ ★

III B.Tech. I Semester Regular Examinations, November -2005
COMMUNICATION ENGINEERING
(Electronics & Control Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Sketch the time domain and frequency domain representation of
 - i. carrier
 - ii. signal
 - iii. standard AM,
 - iv. DSB-SC and SSB-SC for single tone modulation.
- (b) Using the message signal $m(t) = \frac{1}{1+t^2}$. Determine and sketch the modulated waves for the following methods for modulation.
 - i. Amplitude Modulation with 50 percent modulation.
 - ii. Single side band with only the lower side band transmitted. [8+8]
2. (a) Find the carrier and modulating frequencies, the modulating index and the maximum deviation of the FM wave represented by the equation $u(t) = 15 \sin(6\pi 10^9 t + 6 \sin 1350 t)$. What power will this FM wave dissipate in a 20-ohm resistor?
- (b) Derive the expression for the instantaneous value of an FM voltage and define modulation index and also expression for bandwidth.
3. (a) Explain the operation of ISB transmitter with block diagram. Where it is used?
- (b) What is the function of crystal filters in SSB transmitter?
- (c) State and explain with respect to 'Q', various types of filters used to separate side bands? [4+6+6]
4. (a) Give a block diagram of a typical frequency modulated broadcast receiver and explain each block.
- (b) Write about squelch circuit and BFO. [10+6]
5. (a) Write brief notes on the sources of noise, that arise in electronic equipment.
- (b) Describe how the power spectral density varies with frequency in each case. [8+8]
6. (a) Draw the conceptual diagram of multiplexing-demultiplexing and explain.
- (b) Distinguish between sampling and quantization. [8+8]
7. (a) Discuss the advantages of M-ary signaling scheme compared with the binary scheme.

- (b) Draw the block diagram of binary PSK transmitter and explain the operation. [8+8]
8. (a) Compare RS-423 with RS-422.
- (b) How is X.21 able to eliminate most of the control circuits of the EIA standard?
- (c) What is the difference between balanced and unbalanced circuits. [6+4+6]
