

M. Sc. ELECTRONICS
Third Semester
ELECTRONIC COMMUNICATION SYSTEM
(MSE-13)

Duration: 3Hrs.

Full Marks: 70

Part-A (Objective) = 20
Part-B (Descriptive) = 50

(PART-B: Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

Answer any five of the following questions

1. What is modulation? Why is it important? Derive the single tone amplitude modulation signal $s(t)$. 2+3+5=10
2. An AM transmitter radiates 9kw power when the carrier is unmodulated and 10.125Kw when the carrier is sinusoidally modulated. Find the modulation index, percentage of modulation. Now if another sine wave corresponding to 40% modulation is transmitted simultaneously, then calculate radiated power. Draw the circuit diagram of Linear diode detector. 6+4=10
3. What do you mean by resolution in TV? Draw the block diagram of Monochrome TV transmitter and Receiver. 3+7=10
4. Draw the block diagram of phase-shift method for SSB generation and its working principle. Determine the MI (m_f) of an FM signal which is being broadcast in 88-108MHz band. This FM has a carrier swing of 125 KHz. 5+5=10
5. Describe PCM modulation method with block diagram. A PCM system uses uniform quantizer followed by a 7bit binary encoder. The bit rate of the system is equal to 50×10^6 bits/sec. What is the maximum message signal bandwidth. 6+4=10
6. What is the difference between angle and phase modulation. Describe Armstrong method for phase modulation. 3+7=10

PTO

7. Write short notes on (Any two):

5+5=10

- i. Superheterodyne Receiver
- ii. Adaptive Delta Modulation
- iii. White noise
- iv. BFSK and BPSK

8. What are different types of noises in DM? Explain. Give remedy for it. A signal having bandwidth equal to 3.5 KHz is sampled, quantized and coded by PCM system. The coded signal is then transmitted by transmission rate of 50kbit/sec. Determine the maximum signal to noise ratio. The input signal has peak to peak value of 4volts and rms value of 0.2v.

5+5=10

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Duration: 20 minutes

Marks – 20

(PART A - Objective Type)

I. Choose the correct answer:

1×20=20

i. Which method is used for digital modulation?

- a. FM b. PAM c. DSB-SC d. DPSK

ii. Among them angle modulation is

- a. PWM b. PM c. AM d. PAM

iii. The circuit used for tracking phase and frequency of the carrier component of an incoming FM signal is known as

- a. De-emphasis b. Sample and Hold circuit
c. PLL-FM d. None of these.

iv. Frequency used for commercial FM is

- a. 88-108MHz b. 90-101 MHz
c. Both of these d. None of these.

v. Modulation index for AM is given by

- a. $\frac{V_{max}-V_{min}}{V_{max}+V_{min}}$ b. $\frac{V_{max}+V_{min}}{V_{max}-V_{min}}$ c. Both of these d. None of these.

vi. Carson's rule for bandwidth determination is used in

- a. AM b. FM c. PWM d. None of these.

vii. If a signal has SNR 100, then SNR IN dB will be

- a. 10Db b. 1 db c. 20 db d. None of these

viii. Armstrong method for frequency modulated wave generation is a

- a. Direct method
- b. Indirect method
- c. Both a and b
- d. None of these.

ix. Among them, what is extra-terrestrial noise is

- a. Shot noise
- b. Thermal noise
- c. Cosmic noise
- d. None of these.

x. The sampling rate (f_s) of value $2W$ samples per second for a signal bandwidth of W Hz is often referred to as

- a. Nyquist rate
- b. Sampling rate
- c. Both a and b
- d. None of these.

xi. Figure of merit is defined as $F = \frac{SNR_o}{SNR_i}$, state

- a. True
- b. False
- c. Both a and b
- d. None of these

xii. DPSK signifies

- a. Digital Phase Shift Keying
- b. Differential Phase Shift Keying
- c. Both of these
- d. None of these

xiii. Modulation index (m_f) for FM is given by

- a. $m_f = \frac{\Delta f}{f_m}$
- b. $m_f = \frac{f_m}{\Delta f}$
- c. Both a and b
- d. None of these

xiv. Probability of Error for BPSK is

- a. $\frac{1}{2} \operatorname{erfc} \sqrt{2E_b/N_0}$
- b. $\frac{1}{2} \operatorname{erfc} \sqrt{E_b/N_0}$
- c. Both of these
- d. None of these

xv. One drawback of DM system is

- a. Bandwidth requirement is more.
- b. Noise is more
- c. Both a and b
- d. None of these

xvi. Granular noise is produced in

- a. PCM
- b. PWM
- c. Delta modulation
- d. None of these.

xvii. Quantization follows after

- a. All pulse modulated signal
- b. sampling
- c. All modulation system
- d. None of these.

xviii. AM is

- a. Linear modulation
- b. Nonlinear modulation
- c. Both of these
- d. None of these

xix. TV communication uses

- a. FM for audio, AM for video.
- b. AM for audio, FM for video.
- c. Both of these
- d. None of these.

xx. In India which monochrome TV system is used

- a. 525 lines
- b. 625 lines
- c. 819 lines
- d. None
