

**M.Sc. ELECTRONICS**  
**Third Semester**  
**Electronics 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**

**1. Answer the following questions (any five)**

**2×5=10**

- a) What is AM? What are different types of AM?
- b) State sampling theorem.
- c) What do you mean by Noise figure? What is SNR?
- d) Define FSK.
- e) A broadcast radio transmitter radiates 5Kw power when the modulation percentage is 60%. How much is the carrier power?
- f) What do you mean by narrow band FM? Give one application of FM.
- g) Compare between narrow band FM and Wide band FM.

**2. Answer the following questions (any five)**

**3×5=15**

- a) Derive AM wave with proper diagram.
- b) Differentiate between AM and FM.
- c) What is PWM? How it is generated?
- d) What is Delta modulation? What are different types of noises produced in Delta modulation?
- e) Write briefly about balanced modulator.
- f) A 100 MHz carrier has a peak voltage of 5volt. The carrier is frequency modulated by a sinusoidal modulating wave of frequency 2Kz, such that frequency deviation is 75KHz. Write the expression for the modulated carrier waveform.

- g) A PCM system uses uniform quantizer followed by a 7bit binary encoder. The bit rate of the system is equal to  $50 \times 10^6$  bits/sec. What is the maximum message signal bandwidth?

**3. Answer the following questions (any five)**

**5×5=25**

- a) Draw the Block diagram of TV system.
- b) What are the different types of Digital modulation schemes?
- c) Write the Armstrong method for FM generation.
- d) Write briefly about PCM communication.
- e) A TV signal having Bandwidth 4.2MHz is transmitted using binary PCM. Give that the number of quantization level is 512. Determine
  - i. Code word length.
  - ii. Transmission Bandwidth.
  - iii. Final bitrate.
  - iv. O/P signal to quantization noise ratio.
- f) Write short notes on quantization noise.
- g) Write briefly about Vestigial Sideband Transmission.

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*(The figures in the margin indicate full marks for the questions)*

**Duration: 20 minutes**

**Marks – 20**

**PART A- Objective Type**

**I. Choose the correct options from the following:**

**1×20=20**

1. Which method is used for analog modulation?

- a. PCM                      b.FSK                      c.PAM                      d. DPCM

2. Among them angle modulation is

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

3. The circuit used for PAM modulated naturally sampling is known as

- a. Sample circuit              b.Sample and Hold circuit              c.Both of these              d.None of these.

4. Frequency used for commercial FM is

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

5. 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

6. Preemphasis/Demphasis circuit used in

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

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

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

8. Armstrong method for frequency modulated wave generation is a

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

9. Balanced modulator is used for generation of

- a. SSB signal              b.AM                      c.DSB-SC                      d.None of these

10. The sampling rate ( $f_s$ ) of value  $2w$  samples per second for a signal bandwidth of  $W$ Hz is often referred to as
- Nyquist rate
  - Sampling rate
  - Both of these
  - None of these.
11. Figure of merit is defined as  $F = \frac{SNR_o}{SNR_i}$ , state
- True
  - False
  - Both of these
  - None of these
12. QPSK signifies
- Quadrature Phase Shift Keying
  - Quadrant Phase Shift Keying
  - Both of these
  - None of these
13. Modulation index ( $m_f$ ) for FM is given by
- $m_f = \frac{\Delta f}{f_m}$
  - $m_f = \frac{f_m}{\Delta f}$
  - Both of these
  - None of these
14. Probability of Error for BPSK is
- $\frac{1}{2} \operatorname{erfc} \sqrt{2E_b/N_0}$
  - $\frac{1}{2} \operatorname{erfc} \sqrt{E_b/N_0}$
  - Both of these
  - None of these
15. One drawback of PCM system is
- Bandwidth requirement is more.
  - Noise is more
  - Both of these
  - None of these
16. Granular noise is produced in
- PCM
  - PWM
  - Delta modulation
  - None of these.
17. Quantization noise is produced in
- All pulse modulated signal
  - PCM
  - All modulation system
  - None of these.
18. AM is
- Linear modulation
  - Non linear modulation
  - Both of these
  - None of these
19. TV communication uses
- FM for audio, AM for video.
  - AM for audio, FM for video.
  - Both of these
  - None of these.
20. RGB color model signifies
- Red
  - Blue
  - Gray
  - Red, Green and Blue