M.Sc. ELECTRONICS
Third Semester
ELECTRONIC COMMUNICATION SYSTEM
(MSE – 303)

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 *four* from *Question no.* 2 to 6
***Question no.* 1 is compulsory.**

1. Write short notes (any two): (5×2=10)
   a. PAM
   b. PWM
   c. PPM
2. What is delta modulation? Mention the advantage and disadvantage of delta modulation. Why delta-sigma modulation is required? (3+4+3=10)
3. Derive an expression for frequency modulated signal. Mention some of its merits and demerits over amplitude modulation. (5+5=10)
4. Describe the working principle of a ring modulator. How the single side band transmission is achieved? (8+2=10)
5. State Nyquist rate for sampling a signal. Derive a process of recovering the original signal from a sampled signal. (7+3=10)
6. What do you mean by convolution of a signal? Show that the convolution in domain is same as that of the multiplication in frequency domain. (3+7=10)

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Duration: 20 minutes **Marks – 20**

(PART A - Objective Type)

I. Tick the correct answer: **1×20=20**

1. Indicate the false statement. Modulation is used to
   a. reduce the bandwidth used
   b. separate differing transmissions
   c. ensure that intelligence may be transmitted over long distances
   d. allow the use of practicable antennas

2. Which of the steps is not included in the process of reception?
   a. Decoding
   b. Encoding
   c. Storage
   d. Interpretation

3. The acoustic channel is used for which of the following?
   a. UHF communications
   b. Single-sideband communication
   c. Television communications
   d. Person-to-person voice communications

4. One of the following types of noise becomes of great importance at high frequencies. It is the
   a. shot noise
   b. random noise
   c. impulse noise
   d. transit-time noise

5. The value of a resistor creating thermal noise is doubled. The noise power generator is therefore
   a. halved
   b. quadrupled
   c. doubled
   d. unchanged

6. Indicate the noise whose source is in a category different from that of the other three.
   a. Solar noise
   b. Cosmic noise
   c. Atmospheric noise
   d. Galactic noise

7. If the carrier of a 100 percent modulated AM wave is suppressed, the percentage power saving will be
   a. 50
   b. 150
   c. 100
   d. 66.66

8. A carrier is simultaneously modulated by two sine waves with modulation indices of 0.3 and 0.4; the total modulation index
   a. is 1
   b. cannot be calculated unless the phase relations are known
   c. is 0.5
   d. is 0.7

9. Amplitude modulation is used for broadcasting because
   a. it is more noise immune than other modulation systems.
   b. compared with other systems it requires less transmitting power
   c. its use avoids receiver complexity.
   d. no other modulation system can provide the necessary bandwidth for high fidelity

10. Indicate the false statement regarding the advantages of SSB over double sideband, full-carrier AM
    a. More channel space is available.
    b. Transmitter circuits must be more stable, giving better reception.
    c. The signal is more noise-resistant
    d. Much less power is required for the same signal strength

11. Vestigal sideband modulation (C3F) is normally used for
    a. HF point-to-point communications
    b. monoaural broadcasting
    c. TV broadcasting
    d. stereo broadcasting

12. The difference between phase and frequency modulation
    a. is purely theoretical because they are the same in practice
    b. is too great to make the two system compatible
    c. lies in the poorer audio response of phase modulation
    d. lies in the different definitions of the modulation index

13. A pre-emphasis circuit provides extra noise immunity by
    a. boosting the bass frequencies
    b. amplifying the higher audio frequencies
    c. pre-amplifying the whole audio band
    d. converting the phase modulation to FM

14. The Hartley states that
    a. the maximum rate of information transmission depends on the channel bandwidth
    b. the maximum rate of information transmission depends on the depth of modulation
    c. redundancy is essential
    d. only binary codes may be used

15. Indicate which of the following system is digital.
    a. Pulse-position modulation
    b. Pulse-code modulation
    c. Pulse-width modulation
    d. Pulse-frequency modulation

16. Quantizing noise occurs in
    a. time-division multiplex
    b. frequency division multiplex
    c. pulse-code modulation
    d. pulse-width modulation

17. The modulation system inherently most noise-resistant is
    a. SSB, suppressed-carrier
    b. Frequency modulation
    c. pulse-position modulation
    d. pulse-code modulation

18. In order to reduce quantizing noise, one must
    a. increase the number of standard amplitudes
    b. send pulses whose sides are more nearly vertical
    c. use an RF amplifier in the receiver
    d. increase the number of samples per second

19. The Hartley-Shannon theorem sets a limit on the
    a. highest frequency that may be sent over a given channel
    b. maximum capacity of a channel with a given noise level
    c. maximum number of coding levels in a channel with a given noise level
    d. maximum number of quantizing levels in a channel of a given bandwidth

20. Indicate which of the following pulse modulation systems is analog.
    a. PCM
    b. Differential PCM
    c. PWM
    d. Delta

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