

M.Sc. PHYSICS
THIRD SEMESTER
ELECTRONICS & COMMUNICATION TECHNOLOGY-I
MSP-304B [SPECIAL REPEAT]
[USE OMR FOR OBJECTIVE PART]

**SET
A**

Duration: 1:30 hrs.

Full Marks: 35

Time: 15 mins.

(Objective)

Marks: 10

Choose the correct answer from the following:

1×10=10

1. A carrier of peak voltage 15 V is used to transmit a message signal. If the modulation index is 70%, then what will be the peak voltage of the modulating signal?
 - a. 12 V
 - b. 11 V
 - c. 10.5 V
 - d. 30 V
2. What happens when the amplitude of the modulating signal is greater than the amplitude of the carrier?
 - a. Decay
 - b. Distortion
 - c. Amplification
 - d. Attenuation
3. What are FM and AM collectively referred together as?
 - a. Modulation
 - b. Angle modulation
 - c. Fast band modulation
 - d. Hi-fi Modulation
4. According to Carson's rule, what is the bandwidth of the signal with a deviation of 30kHz and a maximum modulating signal of frequency 5kHz?
 - a. 70 kHz
 - b. 90 kHz
 - c. 100 kHz
 - d. 80 kHz
5. Which of the following is not a form of pulse modulation?
 - a. Pulse amplitude modulation
 - b. Pulse width modulation
 - c. Pulse position modulation
 - d. Pulse frequency modulation
6. What type of digital modulation is widely used for digital data transmission?
 - a. Pulse amplitude modulation
 - b. Pulse width modulation
 - c. Pulse position modulation
 - d. Pulse code modulation
7. The signals which are obtained by encoding each quantized signal into a digital word is called as
 - a. PAM Signal
 - b. PCM Signal
 - c. FM Signal
 - d. Sampling and Quantization

8. Choosing a discrete value that is near but not exactly at the analog signal level leads to
- a. PCM error
 - b. Quantization error
 - c. PAM error
 - d. Sampling error
9. The leakage current in the transmission lines is referred to as the
- a. Resistance
 - b. Radiation
 - c. Conductance
 - d. Polarisation
10. Which of the following parameters of a transmission line is not a primary parameter?
- a. Resistance
 - b. Attenuation constant
 - c. Capacitance
 - d. Conductance

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(Descriptive)

Time : 1 hr. 15 mins.

Marks : 25

[Answer question no.1 & any two (2) from the rest]

1. A sinusoidal carrier has amplitude of 10 V and frequency 30 kHz. It is amplitude modulated by a sinusoidal voltage of amplitude 3 V and frequency 1 kHz. Modulated voltage is developed across 50 Ω resistance. 1+1+1.5
+1.5=5
 - i. Determine the modulation index
 - ii. Write the equation for modulated wave
 - iii. Plot the modulated wave showing maxima and minima of waveform.
 - iv. Draw the spectrum of modulated wave

2. a. Explain the mathematical analysis of a Wide Band Frequency Modulation (WBFM) and draw the frequency spectrum. 8+2=10
b. Write down two point of difference between NBFM and WBFM.

3. Apply the sampling theorem to represent the signal $x(t)$ through its samples and subsequently illustrate the process of reconstructing the signal from these samples. 10

4. a. Draw the transfer characteristic curves for midtread and midrise quantizers, and compute the quantization error for each configuration. 6+4=10
b. A television signal with a bandwidth of 4.2 MHz is transmitted using binary PCM. The number of quantization level is 512. Calculate-
 - i. Code word length
 - ii. Transmission bandwidth
 - iii. Final bit rate
 - iv. Output signal to quantization noise ratio

5. a. Derive the transmission line equations for voltage and current and write the expression for series impedance, shunt admittance and the propagation constants. 7+3=10
- b. Find the solutions of the transmission line equations derived in section (a).

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