

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Which of the following is NOT produced when two sine waves are combined through a nonlinear device? 1) _____
A) Components at the sum and difference frequencies
B) Harmonics of the two original frequencies
C) Components of each of the two original frequencies
D) an ac level
- 2) Which of the following is considered a nonlinear device? 2) _____
A) Capacitor B) Resistor C) Transistor D) Potentiometer
- 3) Which of the following modulation techniques is the most economical? 3) _____
A) Medium-level B) Ultra low-level C) Low-level D) High-level
- 4) If the % modulation of an AM transmitter is 60% and the unmodulated antenna current is 10 A, what is the modulated current? 4) _____
A) 14 A B) 5 A C) 13 A D) 11 A
- 5) If the carrier transmits 12 kW, what is the modulated power from Problem 4? 5) _____
A) 14 kW B) 12 kW C) 16 kW D) 10 kW
- 6) The reason modulation is used in electronic communication is: 6) _____
A) Audio frequency radio waves do not propagate long distances very reliably
B) Efficient transmission and reception of radio waves are not possible unless extremely large antennas are used.
C) Since all intelligence signals occur at approximately the same frequency, there would be catastrophic interference problems if these frequencies were used.
D) All of the above
- 7) Which of the following is not created by nonlinear mixing? 7) _____
A) Harmonics of the sum and difference frequencies
B) dc (0 Hz)
C) The original two frequencies
D) The sum and difference of the two original frequencies
- 8) A 2 kHz sinewave is mixed with a 1.5 MHz carrier sinewave through a nonlinear device. Which frequency is not present in the output signal? 8) _____
A) 1.498 MHz B) 3.004 MHz C) 1.502 MHz D) 3 MHz
- 9) A 2.5 MHz carrier is modulated by a music signal that has frequency components ranging from 100 Hz to 5 kHz. What is the range of frequencies generated for the upper sideband? 9) _____
A) 2.495 MHz to 2.499 MHz B) 2.495 MHz to 2.505 MHz
C) 2.5 MHz to 2.505 MHz D) 2.5001 MHz to 2.505 MHz

- 10) Overmodulation: 10) _____
A) is undesirable because it produces sideband splatter.
B) causes the AM signal to become distorted so that the receiver cannot produce a clean replica of the original intelligence signal.
C) results when the modulation index exceeds unity.
D) all of the above.
- 11) The total output power of an AM transmitter that is being operated at 50% modulation is measured to be 1800 watts. What is the carrier power? 11) _____
A) 900 watts B) 1440 watts C) 1600 watts D) 2025 watts
- 12) A 250W carrier is to be modulated at an 85% modulation level. What is the total transmitted power? 12) _____
A) 430.6 watts B) 340.3 watts C) 356.3 watts D) 183.7 watts
- 13) An AM broadcast station operates at its maximum allowed output power of 80W at a percent modulation of 60%. What is the upper sideband power? 13) _____
A) 12.2 watts B) 9.23 watts C) 6.1 watts D) 18.47 watts
- 14) The antenna current of an AM transmitter is 5A when it is not modulated. It increases to 6A when it is modulated. Its modulation index expressed as a percentage is: 14) _____
A) 83.3% B) 69.4% C) 93.8% D) 63.2%
- 15) An intelligence signal is amplified by a 65% efficient amplifier before being combined with a 250W carrier to generate an AM signal. If it is desired to operate at 100% modulation, what must be the dc input power to the final intelligence signal amplifier? 15) _____
A) 384.6W B) 162.5W C) 83.3W D) 192.3W
- 16) High-level modulation is used: 16) _____
A) when the intelligence signal is added to the carrier at the last possible point before the transmitting antenna.
B) when the transmitter must be made as power efficient as possible.
C) in high-power applications such as standard radio broadcasting.
D) all of the above.
- 17) The process of neutralization is: 17) _____
A) the process of adjusting the percent modulation to its desired level in a modulator stage.
B) the process of adjusting the tank circuit so that the transmitter produces the proper output frequency.
C) placing a negative feedback capacitor in an RF amplifier to reduce the tendency for self-oscillation.
D) a technique for filtering out all of the undesired frequencies produced by mixing action in a nonlinear amplifier except for the carrier, sum, and difference frequencies.
- 18) The O.T.A. is: 18) _____
A) an operational transconductance amplifier.
B) a special type of op amp used to create an AM signal.
C) a linear integrated circuit that creates AM with an absolute minimum of design considerations.
D) all of the above.

- 19) The last stage of intelligence amplification before mixing with the carrier occurs in: 19) _____
 A) the modulated amplifier B) the RF linear amplifier.
 C) the buffer. D) the modulator.
- 20) The equation defining the AM envelope is 20) _____
 A) $e = E_c \sin \omega_c t \quad e = E_i \sin \omega_i t$
 B) $e = E_c \sin \omega_c t$
 C) $e = E_i \sin \omega_i t + \sin \omega_c t$
 D) $e = (E_c + E_i \sin \omega_i t) \sin \omega_c t$
 E) none of the above
- 21) The result of the trigonometric identity $(\sin x)(\sin y)$ is 21) _____
 A) $0.5 \cos(x-y) - 0.5 \cos(x+y)$
 B) $-0.5 \cos(x-y) + 0.5 \cos(x+y)$
 C) $\cos(x-y) - \cos(x+y)$
 D) $-0.5 \cos(x-y) + \cos(x+y)$
 E) none of the above
- 22) The typical output impedance for an RF transmitter is 22) _____
 A) 50
 B) 8
 C) 75
 D) 16
 E) none of the above
- 23) Determine the side frequency voltage if the modulation index is 70% and the carrier amplitude is 50V. 23) _____
 A) 25
 B) 35
 C) 50
 D) 17.5
 E) none of the above

Answer Key

Testname: UNTITLED2

- 1) D
- 2) C
- 3) D
- 4) D
- 5) A
- 6) D
- 7) A
- 8) B
- 9) D
- 10) D
- 11) C
- 12) B
- 13) C
- 14) C
- 15) D
- 16) D
- 17) C
- 18) D
- 19) D
- 20) D
- 21) A
- 22) A
- 23) D