TEST 1 ANSWERS

What is POTS?

a. Phone Only Transmission Signal
b. People Only Telephone Service
c. Pure Orthogonal Telegraph System
d. Plain Old Telephone System

2. Which of the following is an international standards organization for communications?

a. ANSI
b. ITT
c. ITU
d. IOC

3. Bandwidth of a signal is

a. the difference between its two frequency limits
b. the centre frequency divided by the modulating frequency
c. the sum of its two frequency limits
d. none of the above

4. A complete representation of a signal can be done using

a. time domain
b. frequency domain
c. both a and b
d. amplitude domain

5. Given a sinusoidal signal with peak-to-peak amplitude of 10 v, calculate its RMS voltage

a 7.07 V
b 3.54 V
c. 1.77 V
d. 2.82 V

6. What is modulation?

a. the process of varying the characteristics of a modulating signal using a carrier
b. the process of varying the characteristics of a carrier using a modulating signal
c. the process of varying the characteristics of a modulated signal using a modulating signal
d. the process of varying the characteristics of a baseband using a modulating signal

7. Demodulation of a signal takes place at which point in a communication system?

a. transmission medium
b. transmitter
c. receiver
d. all of the above

8. The carrier frequency must be higher than the frequency of the modulating signal
a. always false
b. always true
c. only for effective satellite communication
d. to avoid too high a skip distance

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9. In an amplitude modulated wave, two-thirds of the power is in the

a. upper sideband
b. lower sideband
c. carrier signal
d. none of the above

10. In FM, the amplitude of the modulating signal

a. Causes the carrier frequency to change
b. Causes the carrier amplitude to change
c. affects the distance the signal will be transmitted
d. Both a and b

11. What is the period of a Signal with a frequency of 10kHz?

a. 1ms
b. 10ms
c. 0.1ms
d. 0.01ms

12. A filter that allows all frequencies to pass through except a specific bandwidth is

a. Low pass
b. High pass
c. Band stop
d. Band pass

13. Two signals have powers of 25 mW and 40 mW. When combined, what is the total power in dBm?

a. 65.0 dBm
b. 22.3 dBm
c. 30.5 dBm
d. 18.1 dBm

14. Spectral analysis of any signal provides relative information about?

a. Amplitude changes with respect to time
b. Phase changes with respect to time
c. The harmonic content of a signal
d. Both band c

15. The vertical scale of any spectrum analyzer indicates

a. harmonic content
b. amplitude
c. frequency
d. time

16. For an **sinusoidal** signal that is **NOT** modulated, how many lines will be shown on an **INDUSTRIAL GRADE** spectrum analyzer?

a. 3
b. 2
c. 1
d. 0

17. From a spectral analysis perspective a perfect **square wave** contains?

a. Only the fundamental frequency and no harmonics
b. One harmonic plus the fundamental frequency
c. An infinite number of both odd and even harmonics
d. An infinite number of odd harmonics, with decreasing amplitudes.

18. A periodic signal displayed on a **LAB VOLT** spectrum analyzer will appear as a series of spectral lines equal to:

a. Twice number of harmonics it is composed of, plus one
b. The number of harmonics in the signal
c. It will appear only as a single vertical line
d. None of the above

19. The MARKERS on an ***Industrial Grade*** Spectrum Analyzer can be used for precise measurements of ?

a. Amplitude
b. Frequency
c. Both a and b
d. Neither a nor b

20 . A periodic signal contains four harmonics with power levels of 10dBm, 8dBm, 6dBm and 4dBm respectively. The total signal power of the signal is therefore?

a. 10.8 dBm
b. 13.6 dBm
c. 19.2 dBm
d. 28.0 dBm

21. For the signal in the question above containing four harmonics with power levels of 10dBm, 8dBm, 6dBm and 4dBm respectively, how many lines will be shown on a ***LAB VOLT*** spectrum analyzer display including the zero reference line marker?

a. Three
b. Four
c. Six
d. Nine

22. The third harmonic of a signal whose base frequency is 40 kHz is at the following frequency?

a. 13.33 kHz
b. 43.00 kHz
c. 3.00 kHz
d. 120 kHz

23. The fifth harmonic of a signal whose base frequency is 15 kHz is at the following frequency?

a. 5 kHz
b. 18 kHz
c. 75 kHz
d. 150 kHz

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24. In cell phone technology the acronym CDMA refers to

a. Cellular Digital Modulation Amplification
b. Code Division Multiple Access
c. Code Display Maximum Access
d. Coded Display MP3 Access

25. Wireless cell phone transmission channels are

a. Half duplex
b. Poled half duplex
c. Full duplex
d. Simplex

26. The amplitude variations in AM (Amplitude Modulated) signal are a function of?

a. The phase of the modulating signal
b. The frequency of the modulating signal
c. The amplitude of the modulating signal
d. All of the above

27. An AM signal with a single pure sinusoidal modulating tone will display how many spectral lines on a spectrum analyzer?

a. 3
b. 5
c. An infinite number
d. 1

28. A spectrum analyzer displays three spectral lines: 903 kHz, 910kHz and 917 kHz. The 903 kHz and 917 kHz lines are the same amplitude as each other, and the 910kHz line is larger than the other two. What type of signal is being displayed?

a. A 910kHz square wave.
b. A. 910kHz carrier with 7 kHz amplitude modulation
c. A 910kHz carrier with 14 kHz frequency modulation
d. A 903 KHz carrier with pulse modulation

29 . What is the carrier frequency deviation for an FM signal with a modulation index of 1.5 and a modulating signal frequency of 10kHz.

a. 3.3 kHz
b. 7.5 kHz
c. 15 kHz
d. 30 kHz

30. The frequency spectrum of an AM signal shows only one spectral line at 500 kHz. This means;

a. That the modulating signal frequency is 500 kHz
b. That the carrier signal frequency is 500 kHz
c. That the carrier is not modulated
d. Both band c

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31. In FM, the amplitude of the modulating signal

a. Causes the carrier amplitude to change
b. Causes the frequency of the carrier to change
c. Has no effect on the carrier
d. Affects the rate the carrier frequency changes

32. The spectrum of an FM signal shows spectral lines spaced at intervals of 10kHz. What is the modulating signal frequency if the carrier is 105 MHz?

a. 105.01 MHz
b. 20 kHz
c. 10 kHz
d. 15 kHz

33. Approximately how long does it take for a signal to make the round trip from earth to a geostationary communication satellite and back to earth?

a. 0.65 second
b. 0.25 second
c. 0.1 second
d. 50 milliseconds

34. Geostationary satellites used for Canadian TV are placed in an earth orbit directly over:

a. Canada
b. Northern Europe
c. Latitude 45 degrees north
d. The equator

35. The Global Positioning System (GPS)

a. requires that at least three satellites be in view from the target on the earth
b. is funded and monitored by the U.S. Department of Defence
c. maintains satellites in semi-synchronous orbit
d. all of the above

36. Wavelength division multiplexing is similar in principle with time division multiplexing:

a. in 2G cellular phone systems
b. this is false statement
c. in fibre optic transmission
d. when viewed on a spectrum analyzer

37. As you travel away from a radiating antenna, its total power

a. Appears to decrease
b. Decreases as the square of the distance
c. Decreases linearly with distance
d. None of the above

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38. Upon hitting a plane boundary, an electromagnetic waveform bounces off

a. and inverts its phase
b. at the same angle at which it struck the boundary
c. specularly
d. all of the above

39. Bluetooth gets it's name because;

a. It is a protocol to allow interoperation between different equipment vendors, just as King Bluetooth was able to get warring tribes to talk to each other.
b. The ancient Danish runes representing Harold Bluetooth's initials look similar to a frequency hopping spread spectrum signal
c. The antennas within Bluetooth devices look similar to the ancient Danish runes representing Harald Bluetooth's initials.
d. The inventors wanted people to remember that the standard was developed in Sweden, where Harald Bluetooth used to be king.

40. You are viewing **three** harmonics with a power of 30 dBm each on a spectrum analyzer, find the total power of the spectrum observed
a. 32.4 dBm
b. 33.2 dBm
c. 34.8 dBm
d. 90.0 dBm