Results for sample extra2016 test paper

Your answers are marked like this:

✔ **A. You got this question right, this is your correct answer.**

x *A. You got this question wrong, this is your incorrect answer.*

✔ *A. You got this question wrong, this is the correct answer.*

✔ **A. You didnt answer this question but this would be the correct answer.**

Subelement E0

1: E0A09
Which insulating material commonly used as a thermal conductor for some types of electronic devices is extremely toxic if broken or crushed and the particles are accidentally inhaled?
A. Mica
B. Zinc oxide
✔ **C. Beryllium Oxide**
D. Uranium Hexafluoride

Subelement E1

2: E1A04
With your transceiver displaying the carrier frequency of phone signals, you hear a DX station calling CQ on 3.601 MHz LSB. Is it legal to return the call using lower sideband on the same frequency?
A. Yes, because the DX station initiated the contact
B. Yes, because the displayed frequency is within the 75 meter phone band segment
✔ **C. No, the sideband will extend beyond the edge of the phone band segment**
D. No, U.S. stations are not permitted to use phone emissions below 3.610 MHz

3: E1B07
What is the highest modulation index permitted at the highest modulation frequency for angle modulation below 29.0 MHz?
A. 0.5
✔ **B. 1.0**
C. 2.0
D. 3.0

4: E1C09
Which of these ranges of frequencies is available for an automatically controlled repeater operating below 30 MHz?
A. 18.110 MHz - 18.168 MHz
B. 24.940 MHz - 24.990 MHz
C. 10.100 MHz - 10.150 MHz
✔ **D. 29.500 MHz - 29.700 MHz**

5: E1D06
Which of the following is a requirement of a space station?
✔ **A. The space station must be capable of terminating transmissions by telecommand when directed by the FCC**
B. The space station must cease all transmissions after 5 years
C. The space station must be capable of changing its orbit whenever such a change is ordered by NASA
D. All of these choices are correct

6: E1E06
Who is responsible for the proper conduct and necessary supervision during an amateur operator license examination session?
A. The VEC coordinating the session
B. The FCC
✔ **C. Each administering VE**
D. The VE session manager

7: E1F10
What is the maximum permitted transmitter peak envelope power for an amateur station transmitting spread spectrum communications?
A. 1 W
B. 1.5 W
✔ **C. 10 W**
D. 1.5 kW

Subelement E2

8: E2A06
On what band would a satellite receive signals if it were operating in mode U/V?
✔ **A. 435 MHz - 438 MHz**
xB. 144 MHz - 146 MHz
C. 50.0 MHz - 50.2 MHz
D. 29.5 MHz - 29.7 MHz

9: E2B06
What is vestigial sideband modulation?
✔ **A. Amplitude modulation in which one complete sideband and a portion of the other are transmitted**
B. A type of modulation in which one sideband is inverted

C. Narrow-band FM modulation achieved by filtering one sideband from the audio before frequency modulating the carrier

xD. Spread spectrum modulation achieved by applying FM modulation following single sideband amplitude modulation

10: E2C06

During a VHF/UHF contest, in which band segment would you expect to find the highest level of activity?

A. At the top of each band, usually in a segment reserved for contests
B. In the middle of each band, usually on the national calling frequency

✔ **C. In the weak signal segment of the band, with most of the activity near the calling frequency**

D. In the middle of the band, usually 25 kHz above the national calling frequency

11: E2D04

What is the purpose of digital store-and-forward functions on an Amateur Radio satellite?

A. To upload operational software for the transponder
B. To delay download of telemetry between satellites

✔ **C. To store digital messages in the satellite for later download by other stations**

D. To relay messages between satellites

12: E2E11

What is the difference between direct FSK and audio FSK?

✔ **A. Direct FSK applies the data signal to the transmitter VFO**

B. Audio FSK has a superior frequency response
C. Direct FSK uses a DC-coupled data connection
D. Audio FSK can be performed anywhere in the transmit chain

Subelement E3

13: E3A14

From the contiguous 48 states, in which approximate direction should an antenna be pointed to take maximum advantage of aurora propagation?

A. South

✔ **B. North**

C. East
D. West

14: E3B07

Which of the following could account for hearing an echo on the received signal of a distant station?

A. High D layer absorption
B. Meteor scatter
C. Transmit frequency is higher than the MUF

✔ **D. Receipt of a signal by more than one path**

15: E3C03
Which of the following signal paths is most likely to experience high levels of absorption when the A index or K index is elevated?
A. Transequatorial propagation
✔ **B. Polar paths**
C. Sporadic-E
D. NVIS

Subelement E4

16: E4A03
Which of the following test instrument is used to display spurious signals and/or intermodulation distortion products in an SSB transmitter?
A. A wattmeter
✔ **B. A spectrum analyzer**
C. A logic analyzer
D. A time-domain reflectometer

17: E4B02
What is an advantage of using a bridge circuit to measure impedance?
A. It provides an excellent match under all conditions
B. It is relatively immune to drift in the signal generator source
✔ **C. It is very precise in obtaining a signal null**
D. It can display results directly in Smith chart format

18: E4C09
Which of the following choices is a good reason for selecting a high frequency for the design of the IF in a conventional HF or VHF communications receiver?
A. Fewer components in the receiver
B. Reduced drift
✔ **C. Easier for front-end circuitry to eliminate image responses**
D. Improved receiver noise figure

19: E4D10
What does a third-order intercept level of 40 dBm mean with respect to receiver performance?
A. Signals less than 40 dBm will not generate audible third-order intermodulation products
B. The receiver can tolerate signals up to 40 dB above the noise floor without producing third-order intermodulation products
✔ **C. A pair of 40 dBm signals will theoretically generate a third-order intermodulation product with the same level as the input signals**
D. A pair of 1 mW input signals will produce a third-order intermodulation product which is 40 dB stronger than the input signal

20: E4E11
Which is the most likely cause if you are hearing combinations of local AM

broadcast signals within one or more of the MF or HF ham bands?

A. The broadcast station is transmitting an over-modulated signal

✔ **B. Nearby corroded metal joints are mixing and re-radiating the broadcast signals**

C. You are receiving sky wave signals from a distant station

D. Your station receiver IF amplifier stage is defective

Subelement E5

21: E5A15

Which of the following can increase Q for inductors and capacitors?

✔ **A. Lower losses**

B. Lower reactance

C. Lower self-resonant frequency

D. Higher self-resonant frequency

22: E5B10

What is the relationship between the current through an inductor and the voltage across an inductor?

✔ **A. Voltage leads current by 90 degrees**

B. Current leads voltage by 90 degrees

C. Voltage and current are 180 degrees out of phase

D. Voltage and current are in phase

23: E5C02

How are impedances described in polar coordinates?

A. By X and R values

B. By real and imaginary parts

✔ **C. By phase angle and amplitude**

D. By Y and G values

24: E5D01

What is the result of skin effect?

✔ **A. As frequency increases, RF current flows in a thinner layer of the conductor, closer to the surface**

B. As frequency decreases, RF current flows in a thinner layer of the conductor, closer to the surface

C. Thermal effects on the surface of the conductor increase the impedance

D. Thermal effects on the surface of the conductor decrease the impedance

Subelement E6

25: E6A14

How does DC input impedance at the gate of a field-effect transistor compare with the DC input impedance of a bipolar transistor?

A. They are both low impedance
B. An FET has low input impedance; a bipolar transistor has high input impedance
✔ **C. An FET has high input impedance; a bipolar transistor has low input impedance**
D. They are both high impedance

26: E6B08
Which of the following describes a type of semiconductor diode?
✔ **A. Metal-semiconductor junction**
B. Electrolytic rectifier
C. CMOS-field effect
D. Thermionic emission diode

27: E6C03
What is tri-state logic?
✔ **A. Logic devices with 0, 1, and high impedance output states**
B. Logic devices that utilize ternary math
C. Low power logic devices designed to operate at 3 volts
D. Proprietary logic devices manufactured by Tri-State Devices

28: E6D09
What devices are commonly used as VHF and UHF parasitic suppressors at the input and output terminals of a transistor HF amplifier?
A. Electrolytic capacitors
B. Butterworth filters
✔ **C. Ferrite beads**
D. Steel-core toroids

29: E6E01
Which of the following is true of a charge-coupled device (CCD)?
A. Its phase shift changes rapidly with frequency
B. It is a CMOS analog-to-digital converter
✔ **C. It samples an analog signal and passes it in stages from the input to the output**
D. It is used in a battery charger circuit

30: E6F03
What is the most common configuration of an optoisolator or optocoupler?
A. A lens and a photomultiplier
B. A frequency modulated helium-neon laser
C. An amplitude modulated helium-neon laser
✔ **D. An LED and a phototransistor**

Subelement E7

31: E7A12
What type of logic defines "0" as a high voltage?

A. Reverse Logic
B. Assertive Logic
✔ **C. Negative logic**
D. Positive Logic

32: E7B17
Why are odd-order rather than even-order intermodulation distortion products of concern in linear power amplifiers?
✔ **A. Because they are relatively close in frequency to the desired signal**
B. Because they are relatively far in frequency from the desired signal
C. Because they invert the sidebands causing distortion
D. Because they maintain the sidebands, thus causing multiple duplicate signals

33: E7C02
Which of the following is a property of a T-network with series capacitors and a parallel shunt inductor?
A. It is a low-pass filter
B. It is a band-pass filter
✔ **C. It is a high-pass filter**
D. It is a notch filter

34: E7D01
What is one characteristic of a linear electronic voltage regulator?
A. It has a ramp voltage as its output
xB. It eliminates the need for a pass transistor
C. The control element duty cycle is proportional to the line or load conditions
✔ **D. The conduction of a control element is varied to maintain a constant output voltage**

35: E7E11
Which type of detector is used for demodulating SSB signals?
A. Discriminator
B. Phase detector
✔ **C. Product detector**
D. Phase comparator

36: E7F07
What function can a Fast Fourier Transform perform?
A. Converting analog signals to digital form
B. Converting digital signals to analog form
✔ **C. Converting digital signals from the time domain to the frequency domain**
D. Converting 8-bit data to 16 bit data

37: E7G05
How can unwanted ringing and audio instability be prevented in a multi-section op-amp RC audio filter circuit?
✔ **A. Restrict both gain and Q**
B. Restrict gain but increase Q
C. Restrict Q but increase gain

D. Increase both gain and Q

38: E7H13
Which of the following is a technique for providing highly accurate and stable oscillators needed for microwave transmission and reception?
A. Use a GPS signal reference
B. Use a rubidium stabilized reference oscillator
C. Use a temperature-controlled high Q dielectric resonator
✔ **D. All of these choices are correct**

Subelement E8

39: E8A13
Which of these methods is commonly used to convert analog signals to digital signals?
✔ **A. Sequential sampling**
B. Harmonic regeneration
C. Level shifting
D. Phase reversal

40: E8B02
How does the modulation index of a phase-modulated emission vary with RF carrier frequency (the modulated frequency)?
A. It increases as the RF carrier frequency increases
B. It decreases as the RF carrier frequency increases
C. It varies with the square root of the RF carrier frequency
✔ **D. It does not depend on the RF carrier frequency**

41: E8C06
What is the necessary bandwidth of a 170-hertz shift, 300-baud ASCII transmission?
A. 0.1 Hz
B. 0.3 kHz
✔ **C. 0.5 kHz**
D. 1.0 kHz

42: E8D10
What are some of the differences between the Baudot digital code and ASCII?
A. Baudot uses 4 data bits per character, ASCII uses 7 or 8; Baudot uses 1 character as a letters/figures shift code, ASCII has no letters/figures code
✔ **B. Baudot uses 5 data bits per character, ASCII uses 7 or 8; Baudot uses 2 characters as letters/figures shift codes, ASCII has no letters/figures shift code**
C. Baudot uses 6 data bits per character, ASCII uses 7 or 8; Baudot has no letters/figures shift code, ASCII uses 2 letters/figures shift codes
D. Baudot uses 7 data bits per character, ASCII uses 8; Baudot has no letters/figures shift code, ASCII uses 2 letters/figures shift codes

Subelement E9

43: E9A08
What is meant by antenna bandwidth?
A. Antenna length divided by the number of elements
✔ **B. The frequency range over which an antenna satisfies a performance requirement**
C. The angle between the half-power radiation points
D. The angle formed between two imaginary lines drawn through the element ends

44: E9B09
What type of computer program technique is commonly used for modeling antennas?
A. Graphical analysis
✔ **B. Method of Moments**
C. Mutual impedance analysis
D. Calculus differentiation with respect to physical properties

45: E9C04
What happens to the radiation pattern of an unterminated long wire antenna as the wire length is increased?
A. The lobes become more perpendicular to the wire
✔ **B. The lobes align more in the direction of the wire**
C. The vertical angle increases
D. The front-to-back ratio decreases

46: E9D06
What happens to the bandwidth of an antenna as it is shortened through the use of loading coils?
A. It is increased
✔ **B. It is decreased**
C. No change occurs
D. It becomes flat

47: E9E02
What is the name of an antenna matching system that matches an unbalanced feed line to an antenna by feeding the driven element both at the center of the element and at a fraction of a wavelength to one side of center?
✔ **A. The gamma match**
B. The delta match
C. The epsilon match
D. The stub match

48: E9F05
What is the approximate physical length of a solid polyethylene dielectric coaxial transmission line that is electrically one-quarter wavelength long at 14.1 MHz?
A. 20 meters
B. 2.3 meters

✔ **C. 3.5 meters**
D. 0.2 meters

49: E9G09
What third family of circles is often added to a Smith chart during the process of solving problems?
✔ **A. Standing wave ratio circles**
B. Antenna-length circles
C. Coaxial-length circles
D. Radiation-pattern circles

50: E9H05
What is the main drawback of a wire-loop antenna for direction finding?
✔ **A. It has a bidirectional pattern**
B. It is non-rotatable
C. It receives equally well in all directions
D. It is practical for use only on VHF bands

Results:
You scored 47 correct answers and 3 incorrect answers from a total of 50.

You would have passed the exam! Congratulations!

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