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
xB. Zinc oxide
✔ **C. Beryllium Oxide**
D. Uranium Hexafluoride

Subelement E1

2: E1A03
With your transceiver displaying the carrier frequency of phone signals, you hear a station calling CQ on 14.349 MHz USB. Is it legal to return the call using upper sideband on the same frequency?
A. Yes, because you were not the station calling CQ
B. Yes, because the displayed frequency is within the 20 meter band
✔ **C. No, the sideband will extend beyond the band edge**
D. No, U.S. stations are not permitted to use phone emissions above 14.340 MHz

3: E1B01
Which of the following constitutes a spurious emission?
A. An amateur station transmission made at random without the proper call sign identification
B. A signal transmitted to prevent its detection by any station other than the intended recipient
C. Any transmitted signal that unintentionally interferes with another licensed radio station
✔ **D. An emission outside its necessary bandwidth that can be reduced or eliminated**

without affecting the information transmitted

4: E1C06
Which of the following statements concerning remotely controlled amateur stations is true?
A. Only Extra Class operators may be the control operator of a remote station
B. A control operator need not be present at the control point
✔ **C. A control operator must be present at the control point**
D. Repeater and auxiliary stations may not be remotely controlled

5: E1D02
What is the amateur satellite service?
A. A radio navigation service using satellites for the purpose of self training, intercommunication and technical studies carried out by amateurs
B. A spacecraft launching service for amateur-built satellites
✔ **C. A radio communications service using amateur radio stations on satellites**
D. A radio communications service using stations on Earth satellites for public service broadcast

6: E1E09
What may be the penalty for a VE who fraudulently administers or certifies an examination?
✔ **A. Revocation of the VE's amateur station license grant and the suspension of the VE's amateur operator license grant**
B. A fine of up to $1000 per occurrence
C. A sentence of up to one year in prison
D. All of these choices are correct

7: E1F02
What privileges are authorized in the U.S. to persons holding an amateur service license granted by the Government of Canada?
x A. None, they must obtain a U.S. license
B. All privileges of the Extra Class license
✔ **C. The operating terms and conditions of the Canadian amateur service license, not to exceed U.S. Extra Class privileges**
D. Full privileges, up to and including those of the Extra Class License, on the 80, 40, 20, 15, and 10 meter bands

Subelement E2

8: E2A03
What is the orbital period of an Earth satellite?
A. The point of maximum height of a satellite's orbit
B. The point of minimum height of a satellite's orbit
✔ **C. The time it takes for a satellite to complete one revolution around the Earth**
D. The time it takes for a satellite to travel from perigee to apogee

9: E2B18

On which of the following frequencies is one likely to find FM ATV transmissions?

A. 14.230 MHz
B. 29.6 MHz
C. 52.525 MHz
✔ **D. 1255 MHz**

10: E2C12

What might help to restore contact when DX signals become too weak to copy across an entire HF band a few hours after sunset?

A. Switch to a higher frequency HF band
✔ **B. Switch to a lower frequency HF band**
C. Wait 90 minutes or so for the signal degradation to pass
D. Wait 24 hours before attempting another communication on the band

11: E2D03

Which of the following digital modes is especially useful for EME communications?

A. FSK441
B. PACTOR III
C. Olivia
✔ **D. JT65**

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: E3A11

What is a typical range for tropospheric propagation of microwave signals?

A. 10 miles to 50 miles
✔ **B. 100 miles to 300 miles**
C. 1200 miles
D. 2500 miles

14: E3B14

What happens to linearly polarized radio waves that split into ordinary and extraordinary waves in the ionosphere?

A. They are bent toward the magnetic poles
B. Their polarization is randomly modified
✔ **C. They become elliptically polarized**
D. They become phase-locked

15: E3C06

By how much does the VHF/UHF radio horizon distance exceed the geometric horizon?

✔ **A. By approximately 15 percent of the distance**

B. By approximately twice the distance

C. By approximately 50 percent of the distance

D. By approximately four times the distance

Subelement E4

16: E4A13

How is the compensation of an oscilloscope probe typically adjusted?

✔ **A. A square wave is displayed and the probe is adjusted until the horizontal portions of the displayed wave are as nearly flat as possible**

B. A high frequency sine wave is displayed and the probe is adjusted for maximum amplitude

C. A frequency standard is displayed and the probe is adjusted until the deflection time is accurate

D. A DC voltage standard is displayed and the probe is adjusted until the displayed voltage is accurate

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: E4C08

An SDR receiver is overloaded when input signals exceed what level?

A. One-half the maximum sample rate

B. One-half the maximum sampling buffer size

✔ **C. The maximum count value of the analog-to-digital converter**

✘D. The reference voltage of the analog-to-digital converter

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: E4E07

How can you determine if line noise interference is being generated within your home?

A. By checking the power line voltage with a time domain reflectometer
B. By observing the AC power line waveform with an oscilloscope
✔ **C. By turning off the AC power line main circuit breaker and listening on a battery operated radio**
D. By observing the AC power line voltage with a spectrum analyzer

Subelement E5

21: E5A05
What is the magnitude of the current at the input of a series RLC circuit as the frequency goes through resonance?
A. Minimum
✔ **B. Maximum**
C. R/L
D. L/R

22: E5B02
What is the term for the time it takes for a charged capacitor in an RC circuit to discharge to 36.8% of its initial voltage?
A. One discharge period
B. An exponential discharge rate of one
C. A discharge factor of one
✔ **D. One time constant**

23: E5C09
When using rectangular coordinates to graph the impedance of a circuit, what does the horizontal axis represent?
✔ **A. Resistive component**
B. Reactive component
C. The sum of the reactive and resistive components
D. The difference between the resistive and reactive components

24: E5D08
What type of energy is stored in an electromagnetic or electrostatic field?
A. Electromechanical energy
✔ **B. Potential energy**
C. Thermodynamic energy
D. Kinetic energy

Subelement E6

25: E6A13
What do the initials CMOS stand for?
A. Common Mode Oscillating System
B. Complementary Mica-Oxide Silicon

✔ **C. Complementary Metal-Oxide Semiconductor**
D. Common Mode Organic Silicon

26: E6B04
What type of semiconductor device is designed for use as a voltage-controlled capacitor?
✔ **A. Varactor diode**
B. Tunnel diode
C. Silicon-controlled rectifier
D. Zener diode

27: E6C13
Which of the following is an advantage of BiCMOS logic?
A. Its simplicity results in much less expensive devices than standard CMOS
B. It is totally immune to electrostatic damage
✔ **C. It has the high input impedance of CMOS and the low output impedance of bipolar transistors**
D. All of these choices are correct

28: E6D07
What is the usable frequency range of inductors that use toroidal cores, assuming a correct selection of core material for the frequency being used?
A. From a few kHz to no more than 30 MHz
✔ **B. From less than 20 Hz to approximately 300 MHz**
C. From approximately 10 Hz to no more than 3000 kHz
D. From about 100 kHz to at least 1000 GHz

29: E6E02
Which of the following device packages is a through-hole type?
✔ **A. DIP**
B. PLCC
C. Ball grid array
D. SOT

30: E6F04
What is the photovoltaic effect?
A. The conversion of voltage to current when exposed to light
✔ **B. The conversion of light to electrical energy**
C. The conversion of electrical energy to mechanical energy
D. The tendency of a battery to discharge when used outside

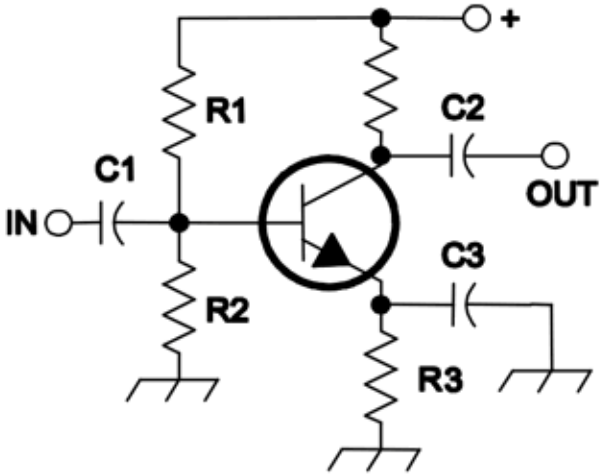
Subelement E7

31: E7A03
Which of the following can divide the frequency of a pulse train by 2?
A. An XOR gate
✔ **B. A flip-flop**

C. An OR gate
D. A multiplexer

32: E7B12
What type of amplifier circuit is shown in Figure E7-1?
A. Common base
B. Common collector
✔ **C. Common emitter**
D. Emitter follower

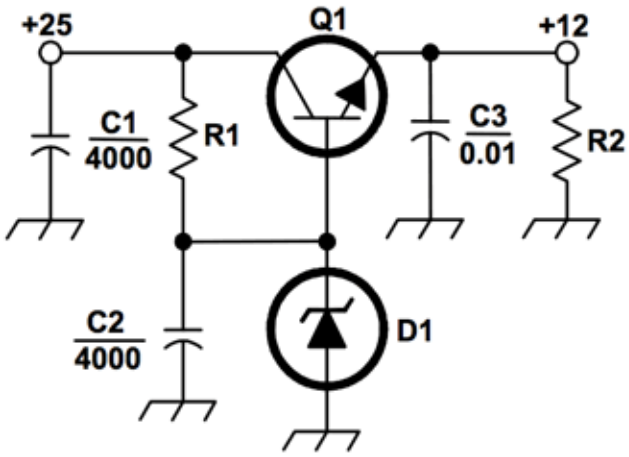
Figure E7-1



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: E7D08
What type of circuit is shown in Figure E7-3?
A. Switching voltage regulator
B. Grounded emitter amplifier
✔ **C. Linear voltage regulator**
D. Emitter follower

Figure E7- 3



35: E7E04

What is one way a single-sideband phone signal can be generated?

✔ **A. By using a balanced modulator followed by a filter**

B. By using a reactance modulator followed by a mixer

C. By using a loop modulator followed by a mixer

D. By driving a product detector with a DSB signal

36: E7F04

What is a common method of generating an SSB signal using digital signal processing?

A. Mixing products are converted to voltages and subtracted by adder circuits

✘B. A frequency synthesizer removes the unwanted sidebands

C. Emulation of quartz crystal filter characteristics

✔ **D. Combine signals with a quadrature phase relationship**

37: E7G03

What is the typical input impedance of an integrated circuit op-amp?

A. 100 ohms

B. 1000 ohms

C. Very low

✔ **D. Very high**

38: E7H03

How is positive feedback supplied in a Hartley oscillator?

✔ **A. Through a tapped coil**

B. Through a capacitive divider

C. Through link coupling

D. Through a neutralizing capacitor

Subelement E8

39: E8A12

What is an advantage of using digital signals instead of analog signals to convey the same information?

A. Less complex circuitry is required for digital signal generation and detection
B. Digital signals always occupy a narrower bandwidth
✔ **C. Digital signals can be regenerated multiple times without error**
✘D. All of these choices are correct

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: E8C07
What is the necessary bandwidth of a 4800-Hz frequency shift, 9600-baud ASCII FM transmission?
✔ **A. 15.36 kHz**
B. 9.6 kHz
C. 4.8 kHz
D. 5.76 kHz

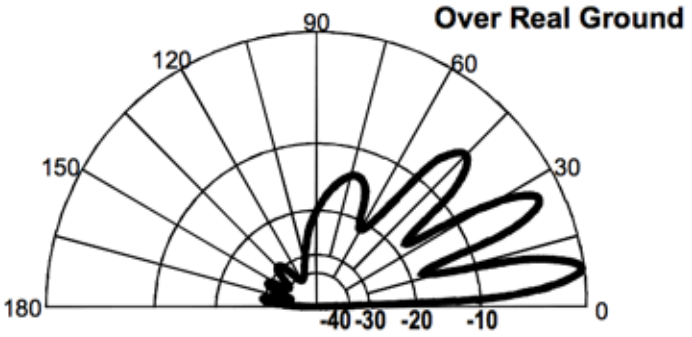
42: E8D02
What spread spectrum communications technique uses a high speed binary bit stream to shift the phase of an RF carrier?
A. Frequency hopping
✔ **B. Direct sequence**
C. Binary phase-shift keying
D. Phase compandored spread spectrum

Subelement E9

43: E9A10
Which of the following choices is a way to improve the efficiency of a ground-mounted quarter-wave vertical antenna?
✔ **A. Install a good radial system**
B. Isolate the coax shield from ground
C. Shorten the radiating element
D. Reduce the diameter of the radiating element

44: E9B16
How many elevation lobes appear in the forward direction of the antenna radiation pattern shown in Figure E9-2?
✔ **A. 4**
B. 3
C. 1
D. 7

Figure E9-2



45: E9C13

What is the main effect of placing a vertical antenna over an imperfect ground?

A. It causes increased SWR

B. It changes the impedance angle of the matching network

✔ **C. It reduces low-angle radiation**

D. It reduces losses in the radiating portion of the antenna

46: E9D08

What happens as the Q of an antenna increases?

A. SWR bandwidth increases

✔ **B. SWR bandwidth decreases**

C. Gain is reduced

D. More common-mode current is present on the feed line

47: E9E06

What is the equivalent lumped-constant network for a hairpin matching system of a 3-element Yagi?

A. Pi-network

B. Pi-L-network

✔ **C. A shunt inductor**

D. A series capacitor

48: E9F13

What impedance does a 1/4 wavelength transmission line present to a generator when the line is shorted at the far end?

✔ **A. Very high impedance**

B. Very low impedance

C. The same as the characteristic impedance of the transmission line

D. The same as the generator output impedance

49: E9G04

What are the two families of circles and arcs that make up a Smith chart?

A. Resistance and voltage

B. Reactance and voltage

✔ **C. Resistance and reactance**

D. Voltage and impedance

50: E9H01

When constructing a Beverage antenna, which of the following factors should be

included in the design to achieve good performance at the desired frequency?

A. Its overall length must not exceed 1/4 wavelength

xB. It must be mounted more than 1 wavelength above ground

C. It should be configured as a four-sided loop

✔ **D. It should be one or more wavelengths long**

Results:
You scored 43 correct answers and 7 incorrect answers from a total of 50.

You would have passed the exam! Congratulations!

e›

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