Results for sample extra2016 test paper

Your answers are marked like this:

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

✘ *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: E0A04
When evaluating a site with multiple transmitters operating at the same time, the operators and licensees of which transmitters are responsible for mitigating over-exposure situations?
A. Only the most powerful transmitter
B. Only commercial transmitters
✔ **C. Each transmitter that produces 5 percent or more of its MPE limit at accessible locations**
D. Each transmitter operating with a duty-cycle greater than 50 percent

Subelement E1

2: E1A07
Which amateur band requires transmission on specific channels rather than on a range of frequencies?
A. 12 meter band
B. 17 meter band
C. 30 meter band
✔ **D. 60 meter band**

3: E1B04
What must be done before placing an amateur station within an officially designated wilderness area or wildlife preserve, or an area listed in the National Register of Historical Places?
A. A proposal must be submitted to the National Park Service
B. A letter of intent must be filed with the National Audubon Society

✔ **C. An Environmental Assessment must be submitted to the FCC**

D. A form FSD-15 must be submitted to the Department of the Interior

4: E1C07

What is meant by local control?

A. Controlling a station through a local auxiliary link

B. Automatically manipulating local station controls

✔ **C. Direct manipulation of the transmitter by a control operator**

D. Controlling a repeater using a portable handheld transceiver

5: E1D04

What is an Earth station in the amateur satellite service?

✔ **A. An amateur station within 50 km of the Earth's surface intended for communications with amateur stations by means of objects in space**

B. An amateur station that is not able to communicate using amateur satellites

C. An amateur station that transmits telemetry consisting of measurement of upper atmosphere

D. Any amateur station on the surface of the Earth

6: E1E01

What is the minimum number of qualified VEs required to administer an Element 4 amateur operator license examination?

A. 5

B. 2

C. 4

✔ **D. 3**

7: E1F05

Amateur stations may not transmit in which of the following frequency segments if they are located in the contiguous 48 states and north of Line A?

xA. 440 MHz - 450 MHz

B. 53 MHz - 54 MHz

C. 222 MHz - 223 MHz

✔ **D. 420 MHz - 430 MHz**

Subelement E2

8: E2A14

What technology is used to track, in real time, balloons carrying amateur radio transmitters?

A. Radar

B. Bandwidth compressed LORAN

✔ **C. APRS**

D. Doppler shift of beacon signals

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

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

10: E2C13

What indicator is required to be used by U.S.-licensed operators when operating a station via remote control where the transmitter is located in the U.S.?

A. / followed by the USPS two letter abbreviation for the state in which the remote station is located

B. /R# where # is the district of the remote station

C. The ARRL section of the remote station

✔ **D. No additional indicator is required**

11: E2D12

How does JT65 improve EME communications?

A. It can decode signals many dB below the noise floor using FEC

B. It controls the receiver to track Doppler shift

C. It supplies signals to guide the antenna to track the Moon

D. All of these choices are correct

12: E2E02

What do the letters FEC mean as they relate to digital operation?

✔ **A. Forward Error Correction**

B. First Error Correction

C. Fatal Error Correction

D. Final Error Correction

Subelement E3

13: E3A10

Which type of atmospheric structure can create a path for microwave propagation?

A. The jet stream

✔ **B. Temperature inversion**

C. Wind shear

D. Dust devil

14: E3B01

What is transequatorial propagation?

✔ **A. Propagation between two mid-latitude points at approximately the same distance north and south of the magnetic equator**

B. Propagation between any two points located on the magnetic equator
C. Propagation between two continents by way of ducts along the magnetic equator
D. Propagation between two stations at the same latitude

15: E3C12
How does the maximum distance of ground-wave propagation change when the signal frequency is increased?
A. It stays the same
B. It increases
✔ **C. It decreases**
D. It peaks at roughly 14 MHz

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: E4B15
Which of the following can be used as a relative measurement of the Q for a series-tuned circuit?
A. The inductance to capacitance ratio
B. The frequency shift
✔ **C. The bandwidth of the circuit's frequency response**
xD. The resonant frequency of the circuit

18: E4C05
What does a value of -174 dBm/Hz represent with regard to the noise floor of a receiver?
A. The minimum detectable signal as a function of receive frequency
✔ **B. The theoretical noise at the input of a perfect receiver at room temperature**
C. The noise figure of a 1 Hz bandwidth receiver
D. The galactic noise contribution to minimum detectable signal

19: E4D05
What transmitter frequencies would cause an intermodulation-product signal in a receiver tuned to 146.70 MHz when a nearby station transmits on 146.52 MHz?
✔ **A. 146.34 MHz and 146.61 MHz**
B. 146.88 MHz and 146.34 MHz
C. 146.10 MHz and 147.30 MHz
D. 173.35 MHz and 139.40 MHz

20: E4E03

Which of the following signals might a receiver noise blanker be able to remove from desired signals?

A. Signals which are constant at all IF levels

✔ **B. Signals which appear across a wide bandwidth**

C. Signals which appear at one IF but not another

D. Signals which have a sharply peaked frequency distribution

Subelement E5

21: E5A09

How is the Q of an RLC parallel resonant circuit calculated?

A. Reactance of either the inductance or capacitance divided by the resistance

B. Reactance of either the inductance or capacitance multiplied by the resistance

✔ **C. Resistance divided by the reactance of either the inductance or capacitance**

D. Reactance of the inductance multiplied by the reactance of the capacitance

22: E5B04

What is the time constant of a circuit having two 220 microfarad capacitors and two 1 megohm resistors, all in parallel?

A. 55 seconds

B. 110 seconds

C. 440 seconds

✔ **D. 220 seconds**

23: E5C15

Which point in Figure E5-2 best represents the impedance of a series circuit consisting of a 300 ohm resistor and an 18 microhenry inductor at 3.505 MHz?

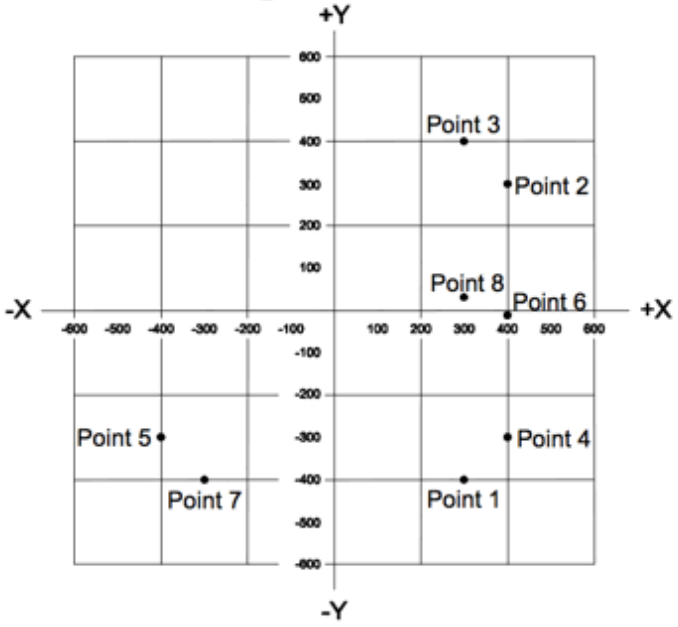
A. Point 1

✔ **B. Point 3**

C. Point 7

D. Point 8

Figure E5-2



24: E5D07

What determines the strength of the magnetic field around a conductor?

A. The resistance divided by the current
B. The ratio of the current to the resistance
C. The diameter of the conductor
✔ **D. The amount of current flowing through the conductor**

Subelement E6

25: E6A08

What term indicates the frequency at which the grounded-base current gain of a transistor has decreased to 0.7 of the gain obtainable at 1 kHz?

A. Corner frequency
B. Alpha rejection frequency
C. Beta cutoff frequency
✔ **D. Alpha cutoff frequency**

26: E6B03

What special type of diode is capable of both amplification and oscillation?

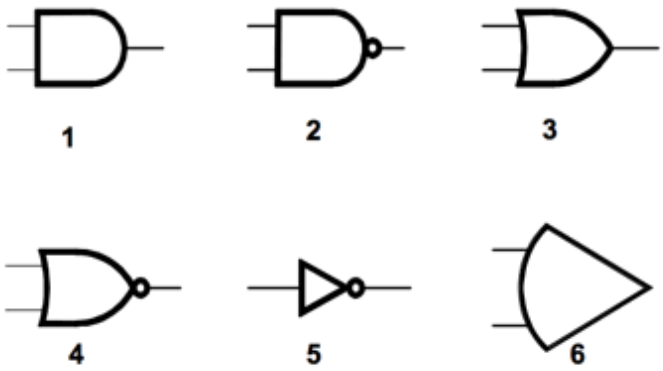
xA. Point contact
B. Zener
✔ **C. Tunnel**
D. Junction

27: E6C10

In Figure E6-5, what is the schematic symbol for a NOR gate?

A. 1
B. 2
C. 3
✔ **D. 4**

Figure E6-5



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: E6E09

Which of the following component package types would be most suitable for use at frequencies above the HF range?

A. TO-220
B. Axial lead
C. Radial lead
✔ **D. Surface mount**

30: E6F07

What is a solid state relay?

A. A relay using transistors to drive the relay coil
✔ **B. A device that uses semiconductors to implement the functions of an electromechanical relay**
C. A mechanical relay that latches in the on or off state each time it is pulsed
D. A passive delay line

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: E7B04

Where on the load line of a Class A common emitter amplifier would bias normally be set?

✔ **A. Approximately half-way between saturation and cutoff**

B. Where the load line intersects the voltage axis

C. At a point where the bias resistor equals the load resistor

D. At a point where the load line intersects the zero bias current curve

33: E7C01

How are the capacitors and inductors of a low-pass filter Pi-network arranged between the network's input and output?

A. Two inductors are in series between the input and output, and a capacitor is connected between the two inductors and ground

B. Two capacitors are in series between the input and output, and an inductor is connected between the two capacitors and ground

C. An inductor is connected between the input and ground, another inductor is connected between the output and ground, and a capacitor is connected between the input and output

✔ **D. A capacitor is connected between the input and ground, another capacitor is connected between the output and ground, and an inductor is connected between input and output**

34: E7D13

What is the equation for calculating power dissipation by a series connected linear voltage regulator?

A. Input voltage multiplied by input current

B. Input voltage divided by output current

✔ **C. Voltage difference from input to output multiplied by output current**

D. Output voltage multiplied by output current

35: E7E07

What is meant by the term baseband in radio communications?

A. The lowest frequency band that the transmitter or receiver covers

✔ **B. The frequency components present in the modulating signal**

C. The unmodulated bandwidth of the transmitted signal

D. The basic oscillator frequency in an FM transmitter that is multiplied to increase the deviation and carrier frequency

36: E7F14

Which of the following would allow a digital signal processing filter to create a sharper filter response?

A. Higher data rate

✔ **B. More taps**

C. Complex phasor representations

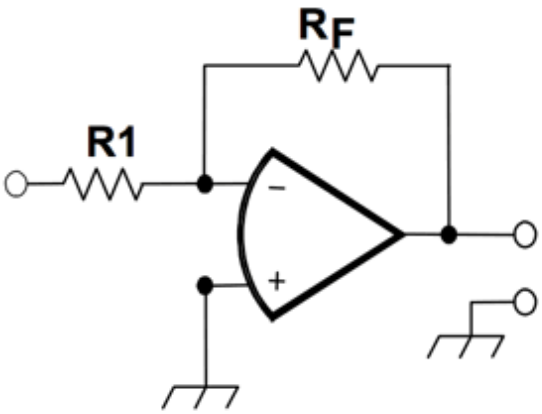
D. Double-precision math routines

37: E7G11

What absolute voltage gain can be expected from the circuit in Figure E7-4 when R1 is 3300 ohms and RF is 47 kilohms?

A. 28
✔ **B. 14**
C. 7
D. 0.07

Figure E7-4



38: E7H07
How can an oscillator's microphonic responses be reduced?
A. Use of NP0 capacitors
B. Eliminating noise on the oscillator's power supply
C. Using the oscillator only for CW and digital signals
D. Mechanically isolating the oscillator circuitry from its enclosure

Subelement E8

39: E8A06
What is the approximate ratio of PEP-to-average power in a typical single-sideband phone signal?
✔ **A. 2.5 to 1**
B. 25 to 1
C. 1 to 1
D. 100 to 1

40: E8B11
What is digital time division multiplexing?
A. Two or more data streams are assigned to discrete sub-carriers on an FM transmitter
✔ **B. Two or more signals are arranged to share discrete time slots of a data transmission**
C. Two or more data streams share the same channel by transmitting time of transmission as the sub-carrier
D. Two or more signals are quadrature modulated to increase bandwidth efficiency

41: E8C05
What is the necessary bandwidth of a 13-WPM international Morse code

transmission?

A. Approximately 13 Hz
B. Approximately 26 Hz
✔ **C. Approximately 52 Hz**
D. Approximately 104 Hz

42: E8D01
Why are received spread spectrum signals resistant to interference?

✔ **A. Signals not using the spread spectrum algorithm are suppressed in the receiver**
B. The high power used by a spread spectrum transmitter keeps its signal from being easily overpowered
C. The receiver is always equipped with a digital blanker
D. If interference is detected by the receiver it will signal the transmitter to change frequencies

Subelement E9

43: E9A09
How is antenna efficiency calculated?

A. (radiation resistance / transmission resistance) x 100 per cent
✔ **B. (radiation resistance / total resistance) x 100 per cent**
C. (total resistance / radiation resistance) x 100 per cent
D. (effective radiated power / transmitter output) x 100 percent

44: E9B04
What may occur when a directional antenna is operated at different frequencies within the band for which it was designed?

A. Feed point impedance may become negative
B. The E-field and H-field patterns may reverse
C. Element spacing limits could be exceeded
✔ **D. The gain may change depending on frequency**

45: E9C03
What is the radiation pattern of two 1/4 wavelength vertical antennas spaced a 1/2 wavelength apart and fed in phase?

A. Omni-directional
B. Cardioid
✔ **C. A Figure-8 broadside to the axis of the array**
D. A Figure-8 end-fire along the axis of the array

46: E9D11
Which of the following types of conductors would be best for minimizing losses in a station's RF ground system?

A. A resistive wire, such as spark plug wire
✔ **B. A wide flat copper strap**
C. A cable with six or seven 18 gauge conductors in parallel

D. A single 12 gauge or 10 gauge stainless steel wire

47: E9E08

Which of the following measurements is characteristic of a mismatched transmission line?

A. An SWR less than 1:1
B. A reflection coefficient greater than 1
C. A dielectric constant greater than 1
✔ **D. An SWR greater than 1:1**

48: E9F07

How does ladder line compare to small-diameter coaxial cable such as RG-58 at 50 MHz?

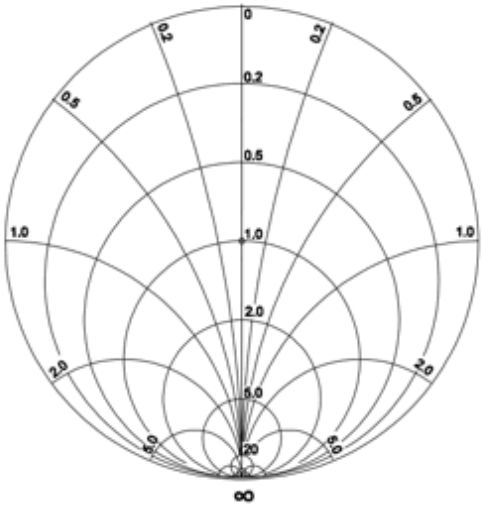
✔ **A. Lower loss**
B. Higher SWR
C. Smaller reflection coefficient
xD. Lower velocity factor

49: E9G06

On the Smith chart shown in Figure E9-3, what is the name for the large outer circle on which the reactance arcs terminate?

A. Prime axis
✔ **B. Reactance axis**
xC. Impedance axis
D. Polar axis

Figure E9-3



50: E9H04

What is an advantage of using a shielded loop antenna for direction finding?

A. It automatically cancels ignition noise in mobile installations
✔ **B. It is electro statically balanced against ground, giving better nulls**
C. It eliminates tracking errors caused by strong out-of-band signals
D. It allows stations to communicate without giving away their position

Results:
You scored 45 correct answers and 5 incorrect answers from a total of 50.

You would have passed the exam! Congratulations!

e)

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