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: E0A03
Which of the following would be a practical way to estimate whether the RF fields produced by an amateur radio station are within permissible MPE limits?
A. Use a calibrated antenna analyzer
B. Use a hand calculator plus Smith-chart equations to calculate the fields
✔ **C. Use an antenna modeling program to calculate field strength at accessible locations**
D. All of the choices are correct

Subelement E1

2: E1A13
Who must be in physical control of the station apparatus of an amateur station aboard any vessel or craft that is documented or registered in the United States?
A. Only a person with an FCC Marine Radio
✔ **B. Any person holding an FCC issued amateur license or who is authorized for alien reciprocal operation**
C. Only a person named in an amateur station license grant
D. Any person named in an amateur station license grant or a person holding an unrestricted Radiotelephone Operator Permit

3: E1B11
What is the permitted mean power of any spurious emission relative to the mean power of the fundamental emission from a station transmitter or external RF amplifier installed after January 1, 2003 and transmitting on a frequency below 30 MHZ?
✔ **A. At least 43 dB below**
B. At least 53 dB below

C. At least 63 dB below
D. At least 73 dB below

4: E1C11
Which of the following operating arrangements allows an FCC-licensed U.S. citizen to operate in many European countries, and alien amateurs from many European countries to operate in the U.S.?
✔ **A. CEPT agreement**
B. IARP agreement
C. ITU reciprocal license
D. All of these choices are correct

5: E1D01
What is the definition of the term telemetry?
✔ **A. One-way transmission of measurements at a distance from the measuring instrument**
B. Two-way radiotelephone transmissions in excess of 1000 feet
C. Two-way single channel transmissions of data
D. One-way transmission that initiates, modifies, or terminates the functions of a device at a distance

6: E1E10
What must the administering VEs do after the administration of a successful examination for an amateur operator license?
A. They must collect and send the documents to the NCVEC for grading
B. They must collect and submit the documents to the coordinating VEC for grading
✔ **C. They must submit the application document to the coordinating VEC according to the coordinating VEC instructions**
D. They must collect and send the documents to the FCC according to instructions

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: E2A12
What is one way to predict the location of a satellite at a given time?
A. By means of the Doppler data for the specified satellite
B. By subtracting the mean anomaly from the orbital inclination
C. By adding the mean anomaly to the orbital inclination
✔ **D. By calculations using the Keplerian elements for the specified satellite**

9: E2B07
What is the name of the signal component that carries color information in NTSC video?
A. Luminance
✔ **B. Chroma**
C. Hue
D. Spectral Intensity

10: E2C07
What is the Cabrillo format?
✔ **A. A standard for submission of electronic contest logs**
B. A method of exchanging information during a contest QSO
C. The most common set of contest rules
D. The rules of order for meetings between contest sponsors

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: E2E09
Which of the following HF digital modes uses variable-length coding for bandwidth efficiency?
A. RTTY
B. PACTOR
C. MT63
✔ **D. PSK31**

Subelement E3

13: E3A16
Which of the following best describes electromagnetic waves traveling in free space?
A. Electric and magnetic fields become aligned as they travel
B. The energy propagates through a medium with a high refractive index
✗C. The waves are reflected by the ionosphere and return to their source
✔ **D. Changing electric and magnetic fields propagate the energy**

14: E3B10
What is the cause of gray-line propagation?
A. At midday, the Sun super heats the ionosphere causing increased refraction of radio waves
✔ **B. At twilight and sunrise, D-layer absorption is low while E-layer and F-layer propagation remains high**

C. In darkness, solar absorption drops greatly while atmospheric ionization remains steady
D. At mid-afternoon, the Sun heats the ionosphere decreasing radio wave refraction and the MUF

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: E4A04
What determines the upper frequency limit for a computer soundcard-based oscilloscope program?
✔ **A. Analog-to-digital conversion speed of the soundcard**
B. Amount of memory on the soundcard
C. Q of the interface of the interface circuit
D. All of these choices are correct

17: E4B06
How much power is being absorbed by the load when a directional power meter connected between a transmitter and a terminating load reads 100 watts forward power and 25 watts reflected power?
A. 100 watts
B. 125 watts
C. 25 watts
✔ **D. 75 watts**

18: E4C12
What is an undesirable effect of using too wide a filter bandwidth in the IF section of a receiver?
A. Output-offset overshoot
B. Filter ringing
C. Thermal-noise distortion
✔ **D. Undesired signals may be heard**

19: E4D06
What is the term for unwanted signals generated by the mixing of two or more signals?
A. Amplifier desensitization
B. Neutralization
C. Adjacent channel interference
✔ **D. Intermodulation interference**

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: E5C06
What does the impedance 50â€“j25 represent?
A. 50 ohms resistance in series with 25 ohms inductive reactance
✔ **B. 50 ohms resistance in series with 25 ohms capacitive reactance**
C. 25 ohms resistance in series with 50 ohms inductive reactance
D. 25 ohms resistance in series with 50 ohms capacitive reactance

24: E5D04
Why are short connections necessary at microwave frequencies?
A. To increase neutralizing resistance
✔ **B. To reduce phase shift along the connection**
C. Because of ground reflections
D. To reduce noise figure

Subelement E6

25: E6A02
Which of the following semiconductor materials contains excess free electrons?
✔ **A. N-type**

B. P-type
C. Bipolar
D. Insulated gate

26: E6B13
What type of bias is required for an LED to emit light?
A. Reverse bias
✔ **B. Forward bias**
C. Zero bias
D. Inductive bias

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: E6E05
Which of the following noise figure values is typical of a low-noise UHF preamplifier?
✔ **A. 2 dB**
B. -10 dB
C. 44 dBm
D. -20 dBm

30: E6F14
Which of the following is true of LCD displays?
A. They are hard to view in high ambient light conditions
✔ **B. They may be hard view through polarized lenses**
C. They only display alphanumeric symbols
D. All of these choices are correct

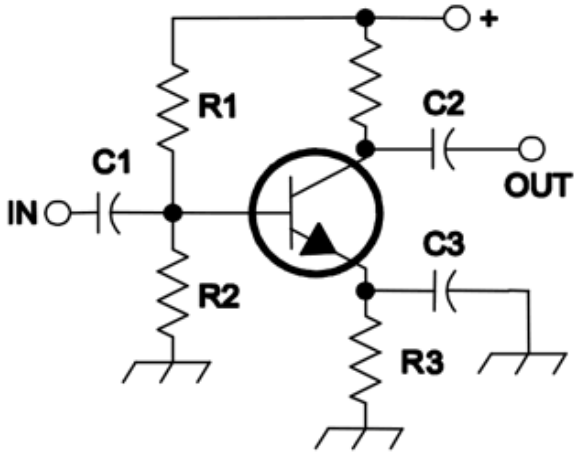
Subelement E7

31: E7A05
Which of the following is a circuit that continuously alternates between two states without an external clock?

A. Monostable multivibrator
B. J-K flip-flop
C. T flip-flop
✔ **D. Astable multivibrator**

32: E7B10
In Figure E7-1, what is the purpose of R1 and R2?
A. Load resistors
✔ **B. Fixed bias**
C. Self bias
D. Feedback

Figure E7-1



33: E7C08
Which of the following factors has the greatest effect in helping determine the bandwidth and response shape of a crystal ladder filter?
✔ **A. The relative frequencies of the individual crystals**
B. The DC voltage applied to the quartz crystal
C. The gain of the RF stage preceding the filter
D. The amplitude of the signals passing through the filter

34: E7D01
What is one characteristic of a linear electronic voltage regulator?
A. It has a ramp voltage as its output
B. 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: E7E09
What occurs when an excessive amount of signal energy reaches a mixer circuit?
✔ **A. Spurious mixer products are generated**
B. Mixer blanking occurs
C. Automatic limiting occurs
D. A beat frequency is generated

36: E7F07

What function can a Fast Fourier Transform perform?

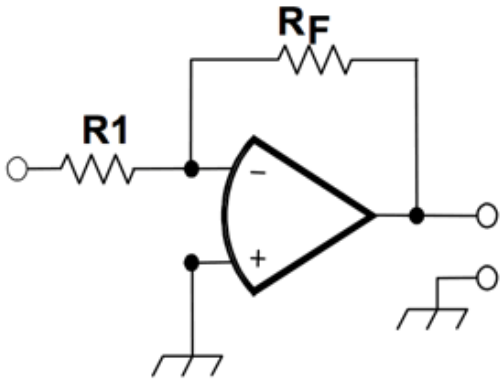
A. Converting analog signals to digital form
B. Converting digital signals to analog form
✔ **C. Converting digital signals from the time domain to the frequency domain**
D. Converting 8-bit data to 16 bit data

37: E7G09

What will be the output voltage of the circuit shown in Figure E7-4 if R1 is 1000 ohms, RF is 10,000 ohms, and 0.23 volts DC is applied to the input?

A. 0.23 volts
B. 2.3 volts
C. -0.23 volts
✔ **D. -2.3 volts**

Figure E7-4



38: E7H11

What are the major spectral impurity components of direct digital synthesizers?

A. Broadband noise
xB. Digital conversion noise
✔ **C. Spurious signals at discrete frequencies**
D. Nyquist limit noise

Subelement E8

39: E8A04

What is "dither" with respect to analog to digital converters?

A. An abnormal condition where the converter cannot settle on a value to represent the signal
✔ **B. A small amount of noise added to the input signal to allow more precise representation of a signal over time**
C. An error caused by irregular quantization step size
D. A method of decimation by randomly skipping samples

40: E8B04

What is the modulation index of an FM-phone signal having a maximum carrier deviation of plus or minus 6 kHz when modulated with a 2 kHz modulating

frequency?

A. 6000

✔ **B. 3**

C. 2000

D. 1/3

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: E9B05

What type of antenna pattern over real ground is shown in Figure E9-2?

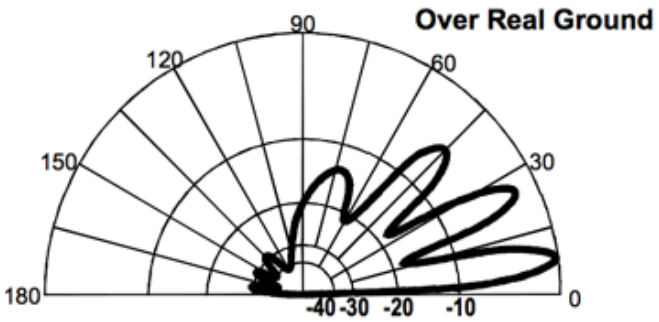
✔ **A. Elevation**

B. Azimuth

C. Radiation resistance

D. Polarization

Figure E9-2



45: E9C08

What is a folded dipole antenna?

A. A dipole one-quarter wavelength long
B. A type of ground-plane antenna
✔ **C. A dipole consisting of one wavelength of wire forming a very thin loop**
D. A dipole configured to provide forward gain

46: E9D03

Where should a high Q loading coil be placed to minimize losses in a shortened vertical antenna?

✔ **A. Near the center of the vertical radiator**
B. As low as possible on the vertical radiator
C. As close to the transmitter as possible
D. At a voltage node

47: E9E01

What system matches a higher impedance transmission line to a lower impedance antenna by connecting the line to the driven element in two places spaced a fraction of a wavelength each side of element center?

A. The gamma matching system
✔ **B. The delta matching system**
C. The omega matching system
D. The stub matching system

48: E9F09

What is the approximate physical length of a solid polyethylene dielectric coaxial transmission line that is electrically one-quarter wavelength long at 7.2 MHz?

A. 10 meters
✔ **B. 6.9 meters**
C. 24 meters
D. 50 meters

49: E9G11

How are the wavelength scales on a Smith chart calibrated?

A. In fractions of transmission line electrical frequency
✔ **B. In fractions of transmission line electrical wavelength**
C. In fractions of antenna electrical wavelength
D. In fractions of antenna electrical frequency

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 47 correct answers and 3 incorrect answers from a total of 50.

You would have passed the exam! Congratulations!

e:

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