# 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: 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: 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: E1B08*
**What limitations may the FCC place on an amateur station if its signal causes interference to domestic broadcast reception, assuming that the receivers involved are of good engineering design?**

A. The amateur station must cease operation
B. The amateur station must cease operation on all frequencies below 30 MHz
C. The amateur station must cease operation on all frequencies above 30 MHz

✔ **D. The amateur station must avoid transmitting during certain hours on frequencies that cause the interference**

*4: E1C13*

**Which of the following is required in order to operate in accordance with CEPT rules in foreign countries where permitted?**

A. You must identify in the official language of the country in which you are operating

B. The U.S. embassy must approve of your operation

✔ **C. You must bring a copy of FCC Public Notice DA 11-221**

D. You must append "/CEPT" to your call sign

*5: E1D03*

**What is a telecommand station in the amateur satellite service?**

A. An amateur station located on the Earth's surface for communication with other Earth stations by means of Earth satellites

✔ **B. An amateur station that transmits communications to initiate, modify or terminate functions of a space station**

C. An amateur station located more than 50 km above the Earth's surface

D. An amateur station that transmits telemetry consisting of measurements of upper atmosphere

*6: E1E11*

**What must the VE team do if an examinee scores a passing grade on all examination elements needed for an upgrade or new license?**

A. Photocopy all examination documents and forward them to the FCC for processing

✔ **B. Three VEs must certify that the examinee is qualified for the license grant and that they have complied with the administering VE requirements**

C. Issue the examinee the new or upgrade license

D. All these choices are correct

*7: E1F09*

**Which of the following conditions apply when transmitting spread spectrum emission?**

A. A station transmitting SS emission must not cause harmful interference to other stations employing other authorized emissions

B. The transmitting station must be in an area regulated by the FCC or in a country that permits SS emissions

C. The transmission must not be used to obscure the meaning of any communication

✔ **D. All of these choices are correct**

## Subelement E2

*8: E2A02*

**What is the direction of a descending pass for an amateur satellite?**

✔ **A. From north to south**

B. From west to east

C. From east to west

D. From south to north

*9: E2B15*
**What signals SSTV receiving equipment to begin a new picture line?**
✔ **A. Specific tone frequencies**
B. Elapsed time
C. Specific tone amplitudes
D. A two-tone signal

*10: E2C03*
**From which of the following bands is amateur radio contesting generally excluded?**
✔ **A. 30 m**
B. 6 m
C. 2 m
D. 33 cm

*11: E2D13*
**What type of modulation is used for JT65 contacts?**
✔ **A. Multi-tone AFSK**
B. PSK
C. RTTY
D. IEEE 802.11

*12: E2E04*
**What is indicated when one of the ellipses in an FSK crossed-ellipse display suddenly disappears?**
✔ **A. Selective fading has occurred**
B. One of the signal filters is saturated
C. The receiver has drifted 5 kHz from the desired receive frequency
D. The mark and space signal have been inverted

## Subelement E3

*13: E3A15*
**What is an electromagnetic wave?**
A. A wave of alternating current, in the core of an electromagnet
B. A wave consisting of two electric fields at parallel right angles to each other
✔ **C. A wave consisting of an electric field and a magnetic field oscillating at right angles to each other**
D. A wave consisting of two magnetic fields at right angles to each other

*14: E3B03*
**What is the best time of day for transequatorial propagation?**
A. Morning
B. Noon
✔ **C. Afternoon or early evening**

D. Late at night

*15: E3C02*
**What is indicated by a rising A or K index?**
✔ **A. Increasing disruption of the geomagnetic field**
B. Decreasing disruption of the geomagnetic field
C. Higher levels of solar UV radiation
D. An increase in the critical frequency

## Subelement E4

*16: E4A15*
**What is an advantage of a period-measuring frequency counter over a direct-count type?**
A. It can run on battery power for remote measurements
B. It does not require an expensive high-precision time base
✔ **C. It provides improved resolution of low-frequency signals within a comparable time period**
D. It can directly measure the modulation index of an FM transmitter

*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**
D. The resonant frequency of the circuit

*18: E4C15*
**What is usually the primary source of noise that is heard from an HF receiver with an antenna connected?**
A. Detector noise
B. Induction motor noise
C. Receiver front-end noise
✔ **D. Atmospheric noise**

*19: E4D08*
**What causes intermodulation in an electronic circuit?**
A. Too little gain
B. Lack of neutralization
✔ **C. Nonlinear circuits or devices**
D. Positive feedback

*20: E4E16*
**What current flows equally on all conductors of an unshielded multi-conductor cable?**
A. Differential-mode current

✔ **B. Common-mode current**
C. Reactive current only
D. Return current

# Subelement E5

*21: E5A04*
**What is the magnitude of the impedance of a circuit with a resistor, an inductor and a capacitor all in parallel, at resonance?**
✔ **A. Approximately equal to circuit resistance**
B. Approximately equal to inductive reactance
C. Low, as compared to the circuit resistance
D. Approximately equal to capacitive reactance

*22: E5B11*
**What is the phase angle between the voltage across and the current through a series RLC circuit if XC is 25 ohms, R is 100 ohms, and XL is 50 ohms?**
A. 14 degrees with the voltage lagging the current
✔ **B. 14 degrees with the voltage leading the current**
C. 76 degrees with the voltage lagging the current
D. 76 degrees with the voltage leading the current

*23: E5C05*
**What is the name of the diagram used to show the phase relationship between impedances at a given frequency?**
A. Venn diagram
B. Near field diagram
✔ **C. Phasor diagram**
D. Far field diagram

*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: E6A12*
**Why do many MOSFET devices have internally connected Zener diodes on the gates?**
A. To provide a voltage reference for the correct amount of reverse-bias gate voltage
xB. To protect the substrate from excessive voltages
C. To keep the gate voltage within specifications and prevent the device from

overheating

✔ **D. To reduce the chance of the gate insulation being punctured by static discharges or excessive voltages**

*26: E6B12*

**What is one common use for PIN diodes?**

A. As a constant current source

B. As a constant voltage source

✔ **C. As an RF switch**

D. As a high voltage rectifier

*27: E6C08*

**In Figure E6-5, what is the schematic symbol for a NAND gate?**

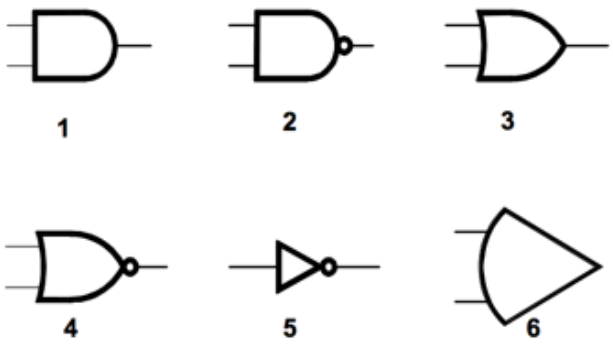
A. 1

✔ **B. 2**

C. 3

D. 4

**Figure E6-5**




*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: E6E06*

**What characteristics of the MMIC make it a popular choice for VHF through microwave circuits?**

A. The ability to retrieve information from a single signal even in the presence of other strong signals

B. Plate current that is controlled by a control grid

C. Nearly infinite gain, very high input impedance, and very low output impedance

✔ **D. Controlled gain, low noise figure, and constant input and output impedance over the specified frequency range**

*30: E6F01*

**What is photoconductivity?**

A. The conversion of photon energy to electromotive energy
✔ **B. The increased conductivity of an illuminated semiconductor**
C. The conversion of electromotive energy to photon energy
D. The decreased conductivity of an illuminated semiconductor

# 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: E7B14*
**Why are switching amplifiers more efficient than linear amplifiers?**
A. Switching amplifiers operate at higher voltages
✔ **B. The power transistor is at saturation or cut off most of the time, resulting in low power dissipation**
C. Linear amplifiers have high gain resulting in higher harmonic content
D. Switching amplifiers use push-pull circuits

*33: E7C13*
**What is one advantage of a Pi-matching network over an L-matching network consisting of a single inductor and a single capacitor?**
✔ **A. The Q of Pi-networks can be varied depending on the component values chosen**
B. L-networks cannot perform impedance transformation
C. Pi-networks have fewer components
D. Pi-networks are designed for balanced input and output

*34: E7D05*
**Which of the following types of linear voltage regulator places a constant load on the unregulated voltage source?**
A. A constant current source
B. A series regulator
C. A shunt current source
✔ **D. A shunt regulator**

*35: E7E02*
**What is the function of a reactance modulator?**
A. To produce PM signals by using an electrically variable resistance
B. To produce AM signals by using an electrically variable inductance or capacitance
C. To produce AM signals by using an electrically variable resistance
✔ **D. To produce PM signals by using an electrically variable inductance or capacitance**

*36: E7F03*
**What type of digital signal processing filter is used to generate an SSB signal?**
xA. An adaptive filter
B. A notch filter
✔ **C. A Hilbert-transform filter**
D. An elliptical filter

*37: E7G01*
**What is the typical output impedance of an integrated circuit op-amp?**
✔ **A. Very low**
B. Very high
C. 100 ohms
D. 1000 ohms

*38: E7H05*
**How is positive feedback supplied in a Pierce oscillator?**
A. Through a tapped coil
B. Through link coupling
C. Through a neutralizing capacitor
✔ **D. Through a quartz crystal**

## Subelement E8

*39: E8A01*
**What is the name of the process that shows that a square wave is made up of a sine wave plus all of its odd harmonics?**
✔ **A. Fourier analysis**
B. Vector analysis
xC. Numerical analysis
D. Differential analysis

*40: E8B07*
**Orthogonal Frequency Division Multiplexing is a technique used for which type of amateur communication?**
✔ **A. High speed digital modes**
B. Extremely low-power contacts
C. EME
D. OFDM signals are not allowed on amateur bands

*41: E8C10*
**What is an advantage of Gray code in digital communications where symbols are transmitted as multiple bits**
A. It increases security
xB. It has more possible states than simple binary
C. It has more resolution than simple binary
✔ **D. It facilitates error detection**

*42: E8D05*

**What is the most common method of reducing key clicks?**

✔ **A. Increase keying waveform rise and fall times**

B. Low-pass filters at the transmitter output

C. Reduce keying waveform rise and fall times

D. High-pass filters at the transmitter output

## Subelement E9

*43: E9A13*

**How much gain does an antenna have compared to a 1/2-wavelength dipole when it has 12 dB gain over an isotropic antenna?**

A. 6.17 dB

✔ **B. 9.85 dB**

C. 12.5 dB

D. 14.15 dB

*44: E9B08*

**How can the approximate beam-width in a given plane of a directional antenna be determined?**

✔ **A. Note the two points where the signal strength of the antenna is 3 dB less than maximum and compute the angular difference**

B. Measure the ratio of the signal strengths of the radiated power lobes from the front and rear of the antenna

C. Draw two imaginary lines through the ends of the elements and measure the angle between the lines

D. Measure the ratio of the signal strengths of the radiated power lobes from the front and side of the antenna

*45: E9C09*

**What is a G5RV antenna?**

✔ **A. A multi-band dipole antenna fed with coax and a balun through a selected length of open wire transmission line**

B. A multi-band trap antenna

C. A phased array antenna consisting of multiple loops

D. A wide band dipole using shorted coaxial cable for the radiating elements and fed with a 4:1 balun

*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: 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: E9F08*
**What is the term for the ratio of the actual speed at which a signal travels through a transmission line to the speed of light in a vacuum?**

✔ **A. Velocity factor**
B. Characteristic impedance
C. Surge impedance
D. Standing wave ratio

*49: E9G10*
**What do the arcs on a Smith chart represent?**

A. Frequency
B. SWR
C. Points with constant resistance
✔ **D. Points with constant reactance**

*50: E9H09*
**Which of the following describes the construction of a receiving loop antenna?**

A. A large circularly polarized antenna
B. A small coil of wire tightly wound around a toroidal ferrite core
✔ **C. One or more turns of wire wound in the shape of a large open coil**
D. A vertical antenna coupled to a feed line through an inductive loop of wire

**Results:**
**You scored 46 correct answers and 4 incorrect answers from a total of 50.**

**You would have passed the exam! Congratulations!**

**e:**

---

**Click here to take another test.**

**Please mail any comments to me, Simon AA9PW, I appreciate your feedback. If you Like the site, please Like us on Facebook!**


aa9pw
1,881 likes