Questions in the 2016 pool that were not included in the 2020 pool

18-Mar-20

Working from First Public Release with 2nd Errata - 5 Mar 2020

2016 ID	Question
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?
E1A01	When using a transceiver that displays the carrier frequency of phone signals, which of the following displayed frequencies represents the highest frequency at which a properly adjusted USB emission will be totally within the band?
E1A03	With your transceiver displaying the carrier frequency of phone signals, you hear a DX station calling CQ on 14.349 MHz USB. Is it legal to return the call using upper sideband on the same frequency?
E1A07	Which amateur band requires transmission on specific channels rather than on a range of frequencies?
E1A12	With your transceiver displaying the carrier frequency of CW signals, you hear a DX station's CQ on 3.500 MHz. Is it legal to return the call using CW on the same frequency?
E1B02	Which of the following factors might cause the physical location of an amateur station apparatus or antenna structure to be restricted?
E1C01	What is a remotely controlled station?
E1C02	What is meant by automatic control of a station?
E1C06	Which of the following statements concerning remotely controlled amateur stations is true?
E1C07	What is meant by local control?
E1C09	Which of these frequencies are available for an automatically controlled repeater operating below 30 MHz?
E1C10	What types of amateur stations may automatically retransmit the radio signals of other amateur stations?
E1D02	What is the amateur satellite service?
E1D04	What is an Earth station in the amateur satellite service?
E1D05	What class of licensee is authorized to be the control operator of a space station?
E1D06	Which of the following is a requirement of a space station?
E1E01	What is the minimum number of qualified VEs required to administer an Element 4 amateur operator license examination?
E1E13	Which of these choices is an acceptable method for monitoring the applicants if a VEC opts to conduct an exam session remotely?

E1F10 What is the maximum transmitter peak envelope power for an amateur station transmitting spread spectrum communications?

E2A02 What is the direction of a descending pass for an amateur satellite?

E2A03 What is the orbital period of an Earth satellite?

E2A06 On what band would a satellite receive signals if it were operating in mode U/V?

E2A10 Why may the received signal from an amateur satellite exhibit a rapidly repeating fading effect?

E2A12 What is one way to predict the location of a satellite at a given time?

E2B04 What is blanking in a video signal?

E2B08 Which of the following is a common method of transmitting accompanying audio with amateur fast-scan television?

E2B12 How are analog SSTV images typically transmitted on the HF bands?

E2B13 How many lines are commonly used in each frame on an amateur slow-scan color television picture?

E2B16 Which is a video standard used by North American Fast Scan ATV stations?

E2B17 What is the approximate bandwidth of a slow-scan TV signal?

E2B18 On which of the following frequencies is one likely to find FM ATV transmissions?

E2C01 Which of the following is true about contest operating?

E2C04 What type of transmission is most often used for a ham radio mesh network?

E2D12 How does JT65 improve EME communications?

E2E07 What is the typical bandwidth of a properly modulated MFSK16 signal?

E2E12 Which type of control is used by stations using the Automatic Link Enable (ALE) protocol?

E3A06 Which of the following is required for microwave propagation via rain scatter?

E3A14 From the contiguous 48 states, in which approximate direction should an antenna be pointed to take maximum advantage of aurora propagation?

E3A15 What is an electromagnetic wave?

E3A16 Which of the following best describes electromagnetic waves traveling in free space?

E3B07 Which of the following could account for hearing an echo on the received signal of a distant station?

E3B10 What is the cause of gray-line propagation?

E4A01 What usually limits the highest frequency that can be accurately displayed on a digital oscilloscope?

E4A04 What determines the upper frequency limit for a computer soundcard-based oscilloscope program?

E4A05 What might be an advantage of a digital vs an analog oscilloscope?

E4A09 When using a computer's soundcard input to digitize signals, what is the highest frequency signal that can be digitized without aliasing?

E4A12 Which of the following procedures is an important precaution to follow when connecting a spectrum analyzer to a transmitter output?

E4A15 What is an advantage of a period-measuring frequency counter over a direct-count type?

E4B02 What is an advantage of using a bridge circuit to measure AC impedance?

E4B03 If a frequency counter with a specified accuracy of +/- 1.0 ppm reads 146,520,000 Hz, what is the most the actual frequency being measured could differ from the reading?

E4B04 If a frequency counter with a specified accuracy of +/- 0.1 ppm reads 146,520,000 Hz, what is the most the actual frequency being measured could differ from the reading?

E4B05 If a frequency counter with a specified accuracy of +/- 10 ppm reads 146,520,000 Hz, what is the most the actual frequency being measured could differ from the reading?

E4B08 Which of the following is a characteristic of a good DC voltmeter?

E4B14 What happens if a dip meter is too tightly coupled to a tuned circuit being checked?

E4C10 Which of the following is a desirable amount of selectivity for an amateur RTTY HF receiver?

E4C11 Which of the following is a desirable amount of selectivity for an amateur SSB phone receiver?

E4C12 What is an undesirable effect of using too wide a filter bandwidth in the IF section of a receiver?

E4C15 What is usually the primary source of noise that can be heard from an HF receiver with an antenna connected?

E4C16 Which of the following is a result of missing codes in an SDR receiver's analog-to-digital converter?

E4D07 Which describes the most significant effect of an off-frequency signal when it is causing cross-modulation interference to a desired signal?

E4D13 Which of the following can cause receiver desensitization?

E4E01 Which of the following types of receiver noise can often be reduced by use of a receiver noise blanker?

E4E06 What is a major cause of atmospheric static?

E4E07 How can you determine if line noise interference is being generated within your home?

E4E08 What type of signal is picked up by electrical wiring near a radio antenna?

E4E10 What is a common characteristic of interference caused by a touch controlled electrical device?

E5A05 What is the magnitude of the current at the input of a series RLC circuit as the frequency goes through resonance?

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?

E5C04 Which of the following represents a capacitive reactance in polar coordinates?

E5C07 What is a vector?

E5C10 When using rectangular coordinates to graph the impedance of a circuit, what does the vertical axis represent?

E5C11 What do the two numbers that are used to define a point on a graph using rectangular coordinates represent?

E5C17 Which point on Figure E5-2 best represents the impedance of a series circuit consisting of a 300-ohm resistor, a 0.64-microhenry inductor and an 85-picofarad capacitor at 24.900 MHz?

E5D05 Which parasitic characteristic increases with conductor length?

E5D07 What determines the strength of the magnetic field around a conductor?

E5D08 What type of energy is stored in an electromagnetic or electrostatic field?

E6A05 What is the alpha of a bipolar junction transistor?

E6A13 What do the initials CMOS stand for?

E6A15 Which semiconductor materials contain excess holes in the outer shell of electrons?

E6A16 What are the majority charge carriers in N-type semiconductor material?

E6A17 What are the names of the three terminals of a field-effect transistor?

E6B03 What special type of diode is capable of both amplification and oscillation?

E6B08 Which of the following describes a type of semiconductor diode?

E6B12 What is one common use for PIN diodes?

E6C04 What is the primary advantage of tri-state logic?

E6C12 What is BiCMOS logic?

E6C14 What is the primary advantage of using a Programmable Gate Array (PGA) in a logic circuit?

E6D01 How many turns will be required to produce a 5-microhenry inductor using a powdered-iron toroidal core that has an inductance index (A L) value of 40 microhenrys/100 turns-squared?

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?

E6D11 How many turns will be required to produce a 1-mH inductor using a ferrite toroidal core that has an inductance index (A L) value of 523 millihenrys/1000 turns-squared?

E6D16 What is the common name for a capacitor connected across a transformer secondary that is used to absorb transient voltage spikes?

E6E01 Which of the following is true of a charge-coupled device (CCD)?

E6E07 Which of the following is typically used to construct a MMIC-based microwave amplifier?

E6E10 What is the packaging technique in which leadless components are soldered directly to circuit boards?

E6E12 Why are high-power RF amplifier ICs and transistors sometimes mounted in ceramic packages?

E6F01 What is photoconductivity?

E6F13 What is a liquid-crystal display (LCD)?

E6F14 Which of the following is true of LCD displays?

E7B13 In Figure E7-2, what is the purpose of R?

E7C07 What kind of filter would you use to attenuate an interfering carrier signal while receiving an SSB transmission?

E7C09 What is a Jones filter as used as part of an HF receiver IF stage?

E7C11 Which of the following is the common name for a filter network which is equivalent to two L networks connected back-to-back with the inductors in series and the capacitors in shunt at the input and output?

E7C14 Which mode is most affected by non-linear phase response in a receiver IF filter?

E7D11 What circuit element is controlled in a series analog voltage regulator to maintain a constant output voltage?

E7D14 What is one purpose of a "bleeder" resistor in an unregulated power supply?

E7E03 How does an analog phase modulator function?

E7F12 What digital process is applied to I and Q signals to recover the baseband modulation information?

E7F16 How might the sampling rate of an existing digital signal be adjusted by a factor of 3/4?

E7F17 What do the letters I and Q in I/Q Modulation represent?

E7G06 Which of the following is the most appropriate use of an op-amp active filter?

E8A02 What type of wave has a rise time significantly faster than its fall time (or vice versa)?

E8A11 What type of information can be conveyed using digital waveforms?

E8A12 What is an advantage of using digital signals instead of analog signals to convey the same information?

E8B01 What is the term for the ratio between the frequency deviation of an RF carrier wave, and the modulating frequency of its corresponding FM-phone signal?

E8C10 What is an advantage of Gray code in digital communications where symbols are transmitted as multiple bits

E8D06 Which of the following indicates likely overmodulation of an AFSK signal such as PSK or MFSK?

E9A02 Which of the following antennas has no gain in any direction?

E9A03 Why would one need to know the feed point impedance of an antenna?

E9A06 How does the beamwidth of an antenna vary as the gain is increased?

E9A07 What is meant by antenna gain?

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?

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

E9B08 How can the approximate beamwidth in a given plane of a directional antenna be determined?

E9B13 What does the abbreviation NEC stand for when applied to antenna modeling programs?

E9B14 What type of information can be obtained by submitting the details of a proposed new antenna to a modeling program?

E9B16 How many elevation lobes appear in the forward direction of the antenna radiation pattern shown in Figure E9-2?

E9C13 What is the main effect of placing a vertical antenna over an imperfect ground?

E9D05 What is a disadvantage of using a multiband trapped antenna?

E9D06 What happens to the bandwidth of an antenna as it is shortened through the use of loading coils?

E9E06 What is the equivalent lumped-constant network for a hairpin matching system on a 3-element Yagi?

E9E08 Which of the following measurements is characteristic of a mismatched transmission line?

E9E11 What is an effective way of matching a feed line to a VHF or UHF antenna when the impedances of both the antenna and feed line are unknown?

E9F04 What is the typical velocity factor for a coaxial cable with solid polyethylene dielectric?

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?

E9F15 What impedance does a 1/2-wavelength transmission line present to a generator when the line is open at the far end?

E9G05 What type of chart is shown in Figure E9-3?

E9H03 Withdrawn February 1, 2016

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