

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

The Amateur Extra (2012 - 2016) question pool contains 702 questions and the Amateur Extra (2008 - 2012) question pool contains 738 questions.

The same 12 figures are used in both the Amateur Extra (2012 - 2016) and Amateur Extra (2008 - 2012) question pools.

Forty-four question numbers previously in the Amateur Extra (2008 - 2012) question pool were removed and eight new question numbers were added for a net of 702 questions in the Amateur Extra (2012 - 2016) question pool.

Removed Questions	Added Questions
E1B13	E2D12
E1D12	E2E10
E1E15	E6C12
E1E16	E6C13
E1E17	E7A14
E1E18	E7A15
E1E19	E7B21
E1E20	E8C04
E1F15	
E1F16	
E1F17	
E2A14	
E2B20	
E2B21	
E3A11	
E4B16	
E4B17	
E5D19	
E6A18	
E6B14	
E6D17	
E6D18	
E6E13	
E6F13	
E6F14	
E6F15	
E7E15	
E7F12	
E7F13	
E7G16	
E7G17	
E7H19	
E7H20	
E8B13	
E8C14	
E8C15	
E8D17	
E8D18	
E8D19	
E9A16	
E9B15	
E9C14	
E9C15	
E9C17	

A net of 694 questions (702 - 8 new = 694) were compared between the Amateur Extra (2012 - 2016) and the Amateur Extra (2008 - 2012) question pools. A total of 481 question numbers differed between the two question pools.

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

The following shows the results of the comparison. Maroon colored text came from the Amateur Extra (2012 – 2016) question pool. Navy colored text came from the Amateur Extra (2008 – 2012) question pool. Blue colored text describes the elements being compared.

E0A01

Choice 3 mismatch

Radioactive materials emit ionizing radiation, while RF signals have less energy and can only cause heating

RF radiation does not have sufficient energy to break apart atoms and molecules; radiation from radioactive sources does

Choice 4 mismatch

Radiation from an antenna will damage unexposed photographic film but ordinary radioactive materials do not cause this problem

Radiation from an antenna will damage unexposed photographic film, ordinary radioactive materials do not cause this problem

E0A02

Question mismatch

When evaluating RF exposure levels from your station at a neighbor's home, what must you do?

When evaluating exposure levels from your station at a neighbor's home, what must you do?

Choice 3 mismatch

You need only evaluate exposure levels on your own property

Nothing; you need only evaluate exposure levels on your own property

E0A03

Answer mismatch

C

D

Choice 3 mismatch

Use an antenna modeling program to calculate field strength at accessible locations

Walk around under the antennas with a neon-lamp probe to find the strongest fields

Choice 4 mismatch

All of the choices are correct

Use a computer-based antenna modeling program to calculate field strength at accessible locations

E0A04

Choice 3 mismatch

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Each transmitter that produces 5% or more of its MPE exposure limit at accessible locations

Each transmitter that produces 5% or more of its maximum permissible exposure limit at accessible locations

E0A06

Choice 4 mismatch

All of these choices are correct

All of these answers are correct

E0A07

Answer mismatch

B

D

Question mismatch

How may dangerous levels of carbon monoxide from an emergency generator be detected?

What is the "far-field" zone of an antenna?

Choice 1 mismatch

By the odor

The area of the ionosphere where radiated power is not refracted

Choice 2 mismatch

Only with a carbon monoxide detector

The area where radiated power dissipates over a specified time period

Choice 3 mismatch

Any ordinary smoke detector can be used

The area where radiated field strengths are obstructed by objects of reflection

Choice 4 mismatch

By the yellowish appearance of the gas

The area where the shape of the antenna pattern is independent of distance

E0A11

Question mismatch

Which of the following injuries can result from using high-power UHF or microwave transmitters?

Which of these items might be a significant hazard when operating a klystron or cavity magnetron transmitter?

Choice 3 mismatch

Localized heating of the body from RF exposure in excess of the MPE limits

Injury from radiation leaks that exceed the MPE limits

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E1A01

Question mismatch

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?

When using a transceiver that displays the carrier frequency of phone signals, which of the following displayed frequencies will result in a normal USB emission being within the band?

E1A02

Question mismatch

When using a transceiver that displays the carrier frequency of phone signals, which of the following displayed frequencies represents the lowest frequency at which a properly adjusted LSB emission will be totally within the band?

When using a transceiver that displays the carrier frequency of phone signals, which of the following displayed frequencies will result in a normal LSB emission being within the band?

E1A04

Question mismatch

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?

With your transceiver displaying the carrier frequency of phone signals, you hear a DX station's CQ on 3.601 MHz LSB. Is it legal to return the call using lower sideband on the same frequency?

E1A05

Question mismatch

What is the maximum power output permitted on the 60 meter band?

Which is the only amateur band that does not permit the transmission of phone or image emissions?

Choice 1 mismatch

50 watts PEP effective radiated power relative to an isotropic radiator
160 meters

Choice 2 mismatch

50 watts PEP effective radiated power relative to a dipole
60 meters

Choice 3 mismatch

100 watts PEP effective radiated power relative to the gain of a half-wave

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

dipole
30 meters

Choice 4 mismatch

100 watts PEP effective radiated power relative to an isotropic radiator
17 meters

Rules mismatch

[97.313]

[97.305]

E1A06

Question mismatch

Which of the following describes the rules for operation on the 60 meter band?

What is the maximum power output permitted on the 60 meter band?

Choice 1 mismatch

Working DX is not permitted

50 watts PEP effective radiated power relative to an isotropic radiator

Choice 2 mismatch

Operation is restricted to specific emission types and specific channels

50 watts PEP effective radiated power relative to a dipole

Choice 3 mismatch

Operation is restricted to LSB

100 watts PEP effective radiated power relative to an isotropic radiator

Choice 4 mismatch

All of these choices are correct

100 watts PEP effective radiated power relative to a dipole

E1A08

Answer mismatch

B

C

Question mismatch

If a station in a message forwarding system inadvertently forwards a message that is in violation of FCC rules, who is primarily accountable for the rules violation?

What is the only emission type permitted to be transmitted on the 60 meter band by an amateur station?

Choice 1 mismatch

The control operator of the packet bulletin board station

CW

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

The control operator of the originating station
RTTY Frequency shift keying

Choice 3 mismatch

The control operators of all the stations in the system
Single sideband, upper sideband only

Choice 4 mismatch

The control operators of all the stations in the system not authenticating
the source from which they accept communications
Single sideband, lower sideband only

Rules mismatch

[97.219]

[97.303]

E1A09

Question mismatch

What is the first action you should take if your digital message forwarding
station inadvertently forwards a communication that violates FCC rules?
Which frequency bands contain at least one segment authorized only to control
operators holding an Amateur Extra Class operator license?

Choice 1 mismatch

Discontinue forwarding the communication as soon as you become aware of it
80/75, 40, 20 and 15 meters

Choice 2 mismatch

Notify the originating station that the communication does not comply with
FCC rules
80/75, 40, 20, and 10 meters

Choice 3 mismatch

Notify the nearest FCC Field Engineer's office
80/75, 40, 30 and 10 meters

Choice 4 mismatch

Discontinue forwarding all messages
160, 80/75, 40 and 20 meters

Rules mismatch

[97.219]

[97.301]

E1A10

Answer mismatch

A

B

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

If an amateur station is installed aboard a ship or aircraft, what condition must be met before the station is operated?

If a station in a message forwarding system inadvertently forwards a message that is in violation of FCC rules, who is primarily accountable for the rules violation?

Choice 1 mismatch

Its operation must be approved by the master of the ship or the pilot in command of the aircraft

The control operator of the packet bulletin board station

Choice 2 mismatch

The amateur station operator must agree to not transmit when the main ship or aircraft radios are in use

The control operator of the originating station

Choice 3 mismatch

It must have a power supply that is completely independent of the main ship or aircraft power supply

The control operators of all the stations in the system

Choice 4 mismatch

Its operator must have an FCC Marine or Aircraft endorsement on his or her amateur license

The control operators of all the stations in the system not authenticating the source from which they accept communications

Rules mismatch

[97.11]

[97.219]

E1A11

Answer mismatch

B

A

Question mismatch

What authorization or licensing is required when operating an amateur station aboard a US-registered vessel in international waters?

What is the first action you should take if your digital message forwarding station inadvertently forwards a communication that violates FCC rules?

Choice 1 mismatch

Any amateur license with an FCC Marine or Aircraft endorsement

Discontinue forwarding the communication as soon as you become aware of it

Choice 2 mismatch

Any FCC-issued amateur license or a reciprocal permit for an alien amateur licensee

Notify the originating station that the communication does not comply with FCC rules

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Only General class or higher amateur licenses
Notify the nearest FCC Field Engineer's office

Choice 4 mismatch

An unrestricted Radiotelephone Operator Permit
Discontinue forwarding all messages

Rules mismatch

[97.5]
[97.219]

E1A12

Answer mismatch

C

A

Question mismatch

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?

If an amateur station is installed on board a ship or aircraft, what condition must be met before the station is operated?

Choice 1 mismatch

Yes, the DX station initiated the contact

Its operation must be approved by the master of the ship or the pilot in command of the aircraft

Choice 2 mismatch

Yes, the displayed frequency is within the 80 meter CW band segment

The amateur station operator must agree to not transmit when the main ship or aircraft radios are in use

Choice 3 mismatch

No, sidebands from the CW signal will be out of the band.

It must have a power supply that is completely independent of the main ship or aircraft power supply

Choice 4 mismatch

No, USA stations are not permitted to use CW emissions below 3.525 MHz

Its operator must have an FCC Marine or Aircraft endorsement on his or her amateur license

Rules mismatch

[97.301, 97.305]
[97.11]

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E1A13

Question mismatch

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?

When a US-registered vessel is in international waters, what type of FCC-issued license or permit is required to transmit amateur communications from an on-board amateur transmitter?

Choice 1 mismatch

Only a person with an FCC Marine Radio

Any amateur license with an FCC Marine or Aircraft endorsement

Choice 2 mismatch

Any person holding an FCC-issued amateur license or who is authorized for alien reciprocal operation

Any amateur license or reciprocal permit for alien amateur licensee

Choice 3 mismatch

Only a person named in an amateur station license grant

Only General class or higher amateur licenses

Choice 4 mismatch

Any person named in an amateur station license grant or a person holding an unrestricted Radiotelephone Operator Permit

An unrestricted Radiotelephone Operator Permit

E1B01

Choice 2 mismatch

A signal transmitted to prevent its detection by any station other than the intended recipient

A signal transmitted in a way that prevents its detection by any station other than the intended recipient

E1B02

Choice 1 mismatch

The location is near an area of political conflict

The location is in or near an area of political conflict, military maneuvers or major construction

Choice 2 mismatch

The location is of geographical or horticultural importance

The location's geographical or horticultural importance

Choice 4 mismatch

The location is of environmental importance or significant in American history, architecture, or culture

The location is significant to our environment, American history, architecture, or culture.

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E1B05

Answer mismatch

D

B

Question mismatch

What is the maximum bandwidth for a data emission on 60 meters?

What height restrictions apply to an amateur station antenna structure not close to a public use airport unless the FAA is notified and it is registered with the FCC?

Choice 1 mismatch

60 Hz

It must not extend more than 300 feet above average height of terrain surrounding the site

Choice 2 mismatch

170 Hz

It must be no higher than 200 feet above ground level at its site

Choice 3 mismatch

1.5 kHz

There are no height restrictions because the structure obviously would not be a hazard to aircraft in flight

Choice 4 mismatch

2.8 kHz

It must not extend more than 100 feet above sea level or the rim of the nearest valley or canyon

Rules mismatch

[97.303]

[97.15]

E1B06

Question mismatch

Which of the following additional rules apply if you are installing an amateur station antenna at a site at or near a public use airport?

Which of the following additional rules apply if you are installing an amateur station antenna at a site within 20,000 feet of a public use airport?

Choice 1 mismatch

You may have to notify the Federal Aviation Administration and register it with the FCC as required by Part 17 of FCC rules

You may have to notify the Federal Aviation Administration and register it with the FCC

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E1B07

Answer mismatch

B

A

Question mismatch

Where must the carrier frequency of a CW signal be set to comply with FCC rules for 60 meter operation?

Whose approval is required before erecting an amateur station antenna located at or near a public use airport if the antenna would exceed a certain height depending upon the antenna's distance from the nearest active runway?

Choice 1 mismatch

At the lowest frequency of the channel

The FAA must be notified and it must be registered with the FCC

Choice 2 mismatch

At the center frequency of the channel

Approval must be obtained from the airport manager

Choice 3 mismatch

At the highest frequency of the channel

Approval must be obtained from the local zoning authorities

Choice 4 mismatch

On any frequency where the signal's sidebands are within the channel

The FAA must approve any antenna structure that is higher than 20 feet

E1B08

Question mismatch

What limitations may the FCC place on an amateur station if its signal causes interference to domestic broadcast reception, assuming that the receiver(s) involved are of good engineering design?

On what frequencies may the operation of an amateur station be restricted if its emissions cause interference to the reception of a domestic broadcast station on a receiver of good engineering design?

Choice 1 mismatch

The amateur station must cease operation

On the frequency used by the domestic broadcast station

Choice 2 mismatch

The amateur station must cease operation on all frequencies below 30 MHz

On all frequencies below 30 MHz

Choice 3 mismatch

The amateur station must cease operation on all frequencies above 30 MHz

On all frequencies above 30 MHz

Choice 4 mismatch

The amateur station must avoid transmitting during certain hours on

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

frequencies that cause the interference
On the interfering amateur service transmitting frequencies

E1B09

Answer mismatch

C

B

Question mismatch

Which amateur stations may be operated in RACES?
What is the Radio Amateur Civil Emergency Service (RACES)?

Choice 1 mismatch

Only those club stations licensed to Amateur Extra class operators
A radio service using amateur service frequencies on a regular basis for communications that can reasonably be furnished through other radio services

Choice 2 mismatch

Any FCC-licensed amateur station except a Technician class operator's station
A radio service of amateur stations for civil defense communications during periods of local, regional, or national civil emergencies

Choice 3 mismatch

Any FCC-licensed amateur station certified by the responsible civil defense organization for the area served
A radio service using amateur service frequencies for broadcasting to the public during periods of local, regional or national civil emergencies

Choice 4 mismatch

Any FCC-licensed amateur station participating in the Military Affiliate Radio System (MARS)
A radio service using local government frequencies by Amateur Radio operators for civil emergency communications

Rules mismatch

[97.407]

[97.3]

E1B10

Answer mismatch

A

C

Question mismatch

What frequencies are authorized to an amateur station participating in RACES?
Which amateur stations may be operated in RACES?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

All amateur service frequencies authorized to the control operator
Only those club stations licensed to Amateur Extra class operators

Choice 2 mismatch

Specific segments in the amateur service MF, HF, VHF and UHF bands
Any FCC-licensed amateur station except a Technician class operator's station

Choice 3 mismatch

Specific local government channels
Any FCC-licensed amateur station certified by the responsible civil defense organization for the area served

Choice 4 mismatch

Military Affiliate Radio System (MARS) channels
Any FCC-licensed amateur station participating in the Military Affiliate Radio System (MARS)

E1B11

Question mismatch

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?

What frequencies are normally authorized to an amateur station participating in RACES?

Choice 1 mismatch

At least 43 dB below
All amateur service frequencies otherwise authorized to the control operator

Choice 2 mismatch

At least 53 dB below
Specific segments in the amateur service MF, HF, VHF and UHF bands

Choice 3 mismatch

At least 63 dB below
Specific local government channels

Choice 4 mismatch

At least 73 dB below
Military Affiliate Radio System (MARS) channels

Rules mismatch

[97.307]

[97.407]

E1B12

Question mismatch

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

What is the highest modulation index permitted at the highest modulation frequency for angle modulation?
What are the frequencies authorized to an amateur station participating in RACES during a period when the President's War Emergency Powers are in force?

Choice 1 mismatch

.5

All frequencies in the amateur service authorized to the control operator

Choice 2 mismatch

1.0

Specific amateur service frequency segments authorized in FCC Part 214

Choice 3 mismatch

2.0

Specific local government channels

Choice 4 mismatch

3.0

Military Affiliate Radio System (MARS) channels

Rules mismatch

[97.307]

[97.407]

E1C09

Question mismatch

Which of these frequencies are available for an automatically controlled repeater operating below 30 MHz?

Which of these frequencies are available for automatically controlled ground-station repeater operation?

E1C10

Choice 3 mismatch

Only earth stations, repeater stations or model craft

Only earth stations, repeater stations or model crafts

E1D01

Choice 2 mismatch

Two-way radiotelephone transmissions in excess of 1000 feet

A two-way interactive transmission

Choice 3 mismatch

Two-way single channel transmissions of data

A two-way single channel transmission of data

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E1D02

Question mismatch

What is the amateur satellite service?

What is the amateur-satellite service?

Choice 1 mismatch

A radio navigation service using satellites for the purpose of self training, intercommunication and technical studies carried out by amateurs

A radio navigation service using satellites for the purpose of self-training, intercommunication and technical studies carried out by amateurs

Choice 3 mismatch

A radio communications service using amateur radio stations on satellites

A radio communications service using amateur stations on satellites

Choice 4 mismatch

A radio communications service using stations on Earth satellites for public service broadcast

A radio communications service using stations on Earth satellites for weather information gathering

E1D03

Choice 2 mismatch

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

An amateur station that transmits communications to initiate, modify or terminate certain functions of a space station

E1D04

Choice 1 mismatch

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

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

E1D05

Choice 1 mismatch

All except Technician Class

Any except those of Technician Class operators

Choice 2 mismatch

Only General, Advanced or Amateur Extra Class

Only those of General, Advanced or Amateur Extra Class operators

Choice 3 mismatch

All classes

A holder of any class of license

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

Only Amateur Extra Class

Only those of Amateur Extra Class operators

E1D06

Choice 1 mismatch

The space station must be capable of terminating transmissions by telecommand when directed by the FCC

The space station must be capable of effecting a cessation of transmissions by telecommand when so ordered by the FCC

Choice 4 mismatch

All of these choices are correct

The station call sign must appear on all sides of the spacecraft

E1D10

Choice 2 mismatch

Any amateur station so designated by the space station licensee, subject to the privileges of the class of operator license held by the control operator

Any amateur station so designated by the space station licensee

E1E02

Choice 2 mismatch

In a question pool maintained by the FCC

In an FCC-maintained question pool

Choice 3 mismatch

In a question pool maintained by all the VECs

In the VEC-maintained question pool

E1E03

Answer mismatch

C

A

Question mismatch

What is a Volunteer Examiner Coordinator?

Who is responsible for maintaining the question pools from which all amateur license examination questions must be taken?

Choice 1 mismatch

A person who has volunteered to administer amateur operator license examinations

All of the VECs

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

A person who has volunteered to prepare amateur operator license examinations
The VE team

Choice 3 mismatch

An organization that has entered into an agreement with the FCC to coordinate amateur operator license examinations
The VE question pool team

Choice 4 mismatch

The person who has entered into an agreement with the FCC to be the VE session manager
The FCC's Wireless Telecommunications Bureau

Rules mismatch

[97.521]

[97.523]

E1E04

Answer mismatch

D

C

Question mismatch

Which of the following best describes the Volunteer Examiner accreditation process?

What is a Volunteer Examiner Coordinator?

Choice 1 mismatch

Each General, Advanced and Amateur Extra Class operator is automatically accredited as a VE when the license is granted
A person who has volunteered to administer amateur operator license examinations

Choice 2 mismatch

The amateur operator applying must pass a VE examination administered by the FCC Enforcement Bureau

A person who has volunteered to prepare amateur operator license examinations

Choice 3 mismatch

The prospective VE obtains accreditation from the FCC

An organization that has entered into an agreement with the FCC to coordinate amateur operator license examinations

Choice 4 mismatch

The procedure by which a VEC confirms that the VE applicant meets FCC requirements to serve as an examiner

The person that has entered into an agreement with the FCC to be the VE session manager

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Rules mismatch
[97.509, 97.525]
[97.521]

E1E05

Question mismatch

What is the minimum passing score on amateur operator license examinations?
What is a VE?

Choice 1 mismatch

Minimum passing score of 70%

An amateur operator who is approved by three or more fellow volunteer examiners to administer amateur license examinations

Choice 2 mismatch

Minimum passing score of 74%

An amateur operator who is approved by a VEC to administer amateur operator license examinations

Choice 3 mismatch

Minimum passing score of 80%

An amateur operator who administers amateur license examinations for a fee

Choice 4 mismatch

Minimum passing score of 77%

An amateur operator who is approved by an FCC staff member to administer amateur operator license examinations

Rules mismatch

[97.503]
[97.525, 97.3]

E1E06

Answer mismatch

C

A

Question mismatch

Who is responsible for the proper conduct and necessary supervision during an amateur operator license examination session?
What is a VE team?

Choice 1 mismatch

The VEC coordinating the session

A group of at least three VEs who administer examinations for an amateur operator license

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

The FCC

The VEC staff

Choice 3 mismatch

Each administering VE

One or two VEs who administer examinations for an amateur operator license

Choice 4 mismatch

The VE session manager

A group of FCC Volunteer Enforcers who investigate Amateur Rules violations

E1E07

Answer mismatch

B

C

Question mismatch

What should a VE do if a candidate fails to comply with the examiner's instructions during an amateur operator license examination?

Which of the following persons seeking to become VEs cannot be accredited?

Choice 1 mismatch

Warn the candidate that continued failure to comply will result in termination of the examination

Persons holding less than an Advanced Class operator license

Choice 2 mismatch

Immediately terminate the candidate's examination

Persons less than 21 years of age

Choice 3 mismatch

Allow the candidate to complete the examination, but invalidate the results

Persons who have ever had an amateur operator or amateur station license suspended or revoked

Choice 4 mismatch

Immediately terminate everyone's examination and close the session

Persons who are employees of the federal government

E1E08

Answer mismatch

C

D

Question mismatch

To which of the following examinees may a VE not administer an examination?

Which of the following best describes the Volunteer Examiner accreditation process?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

Employees of the VE

Each General, Advanced and Amateur Extra Class operator is automatically accredited as a VE when the license is granted

Choice 2 mismatch

Friends of the VE

The amateur operator applying must pass a VE examination administered by the FCC Enforcement Bureau

Choice 3 mismatch

Relatives of the VE as listed in the FCC rules

The prospective VE obtains accreditation from a VE team

Choice 4 mismatch

All of these choices are correct

The procedure by which a VEC confirms that the VE applicant meets FCC requirements to serve as an examiner

Rules mismatch

[97.509]

[97.5091, 97.525]

E1E09

Question mismatch

What may be the penalty for a VE who fraudulently administers or certifies an examination?

Where must the VE team be while administering an examination?

Choice 1 mismatch

Revocation of the VE's amateur station license grant and the suspension of the VE's amateur operator license grant

All of the administering VEs must be present where they can observe the examinees throughout the entire examination

Choice 2 mismatch

A fine of up to \$1000 per occurrence

The VEs must leave the room after handing out the exam(s) to allow the examinees to concentrate on the exam material

Choice 3 mismatch

A sentence of up to one year in prison

The VEs may be elsewhere provided at least one VE is present and is observing the examinees throughout the entire examination

Choice 4 mismatch

All of these choices are correct

The VEs may be anywhere as long as they each certify in writing that examination was administered properly

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E1E10

Question mismatch

What must the administering VEs do after the administration of a successful examination for an amateur operator license?

Who is responsible for the proper conduct and necessary supervision during an amateur operator license examination session?

Choice 1 mismatch

They must collect and send the documents to the NCVEC for grading
The VEC coordinating the session

Choice 2 mismatch

They must collect and submit the documents to the coordinating VEC for grading
The FCC

Choice 3 mismatch

They must submit the application document to the coordinating VEC according to the coordinating VEC instructions
Each administering VE

Choice 4 mismatch

They must collect and send the documents to the FCC according to instructions
The VE session manager

E1E11

Question mismatch

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

What should a VE do if a candidate fails to comply with the examiner's instructions during an amateur operator license examination?

Choice 1 mismatch

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

Warn the candidate that continued failure to comply will result in termination of the examination

Choice 2 mismatch

Three VEs must certify that the examinee is qualified for the license grant and that they have complied with the administering VE requirements
Immediately terminate the candidate's examination

Choice 3 mismatch

Issue the examinee the new or upgrade license

Allow the candidate to complete the examination, but invalidate the results

Choice 4 mismatch

All these choices are correct

Immediately terminate everyone's examination and close the session

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E1E12

Answer mismatch

A

C

Question mismatch

What must the VE team do with the application form if the examinee does not pass the exam?

To which of the following examinees may a VE not administer an examination?

Choice 1 mismatch

Return the application document to the examinee

Employees of the VE

Choice 2 mismatch

Maintain the application form with the VEC's records

Friends of the VE

Choice 3 mismatch

Send the application form to the FCC and inform the FCC of the grade

The VE's close relatives as listed in the FCC rules

Choice 4 mismatch

Destroy the application form

All these answers are correct

E1E13

Question mismatch

What are the consequences of failing to appear for re-administration of an examination when so directed by the FCC?

What may be the penalty for a VE who fraudulently administers or certifies an examination?

Choice 1 mismatch

The licensee's license will be cancelled

Revocation of the VE's amateur station license grant and the suspension of the VE's amateur operator license grant

Choice 2 mismatch

The person may be fined or imprisoned

A fine of up to \$1000 per occurrence

Choice 3 mismatch

The licensee is disqualified from any future examination for an amateur operator license grant

A sentence of up to one year in prison

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

All these choices are correct

All of these choices are correct

Rules mismatch

[97.519]

[97.509]

E1E14

Answer mismatch

A

C

Question mismatch

For which types of out-of-pocket expenses do the Part 97 rules state that VEs and VECs may be reimbursed?

What must the VE team do with the examinee's test papers once they have finished the examination?

Choice 1 mismatch

Preparing, processing, administering and coordinating an examination for an amateur radio license

The VE team must collect and send them to the NCVEC

Choice 2 mismatch

Teaching an amateur operator license examination preparation course

The VE team must collect and send them to the coordinating VEC for grading

Choice 3 mismatch

No expenses are authorized for reimbursement

The VE team must collect and grade them immediately

Choice 4 mismatch

Providing amateur operator license examination preparation training materials

The VE team must collect and send them to the FCC for grading

Rules mismatch

[97.527]

[97.509]

E1F03

Answer mismatch

A

B

Question mismatch

Under what circumstances may a dealer sell an external RF power amplifier capable of operation below 144 MHz if it has not been granted FCC certification?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Which of the following operating arrangements allow an FCC-licensed US citizen and many Central and South American amateur operators to operate in each other's countries?

Choice 1 mismatch

It was purchased in used condition from an amateur operator and is sold to another amateur operator for use at that operator's station
CEPT agreement

Choice 2 mismatch

The equipment dealer assembled it from a kit
IARP agreement

Choice 3 mismatch

It was imported from a manufacturer in a country that does not require certification of RF power amplifiers
ITU agreement

Choice 4 mismatch

It was imported from a manufacturer in another country, and it was certificated by that country's government
All of these choices are correct

Rules mismatch

[97.315]
[97.5]

E1F04

Answer mismatch

A
B

Question mismatch

Which of the following geographic descriptions approximately describes "Line A"?

What does it mean if an external RF amplifier is listed on the FCC database as certificated for use in the amateur service?

Choice 1 mismatch

A line roughly parallel to and south of the US-Canadian border
The RF amplifier may be marketed for use in any radio service

Choice 2 mismatch

A line roughly parallel to and west of the US Atlantic coastline
That particular RF amplifier may be marketed for use in the amateur service

Choice 3 mismatch

A line roughly parallel to and north of the US-Mexican border and Gulf coastline
All similar RF amplifiers produced by other manufacturers may be marketed

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

A line roughly parallel to and east of the US Pacific coastline
All RF amplifiers produced by that manufacturer may be marketed

Rules mismatch

[97.3]

[97.315]

E1F05

Answer mismatch

D

A

Question mismatch

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? Under what circumstances may a dealer sell an external RF power amplifier capable of operation below 144 MHz if it has not been granted FCC certification?

Choice 1 mismatch

440 - 450 MHz

It was purchased in used condition from an amateur operator and is sold to another amateur operator for use at that operator's station

Choice 2 mismatch

53 - 54 MHz

The equipment dealer assembled it from a kit

Choice 3 mismatch

222 - 223 MHz

It was imported from a manufacturer in a country that does not require certification of RF power amplifiers

Choice 4 mismatch

420 - 430 MHz

It was imported from a manufacturer in another country, and it was certificated by that country's government

Rules mismatch

[97.303]

[97.315]

E1F06

Answer mismatch

C

A

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

What is the National Radio Quiet Zone?

Which of the following geographic descriptions approximately describes "Line A"?

Choice 1 mismatch

An area in Puerto Rico surrounding the Aricebo Radio Telescope

A line roughly parallel to and south of the US-Canadian border

Choice 2 mismatch

An area in New Mexico surrounding the White Sands Test Area

A line roughly parallel to and west of the US Atlantic coastline

Choice 3 mismatch

An area surrounding the National Radio Astronomy Observatory

A line roughly parallel to and north of the US-Mexican border and Gulf coastline

Choice 4 mismatch

An area in Florida surrounding Cape Canaveral

A line roughly parallel to and east of the US Pacific coastline

E1F07

Question mismatch

When may an amateur station send a message to a business?

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

Choice 1 mismatch

When the total money involved does not exceed \$25

440 - 450 MHz.

Choice 2 mismatch

When the control operator is employed by the FCC or another government agency

53 - 54 MHz

Choice 3 mismatch

When transmitting international third-party communications

222 - 223 MHz

Choice 4 mismatch

When neither the amateur nor his or her employer has a pecuniary interest in the communications

420 - 430 MHz

Rules mismatch

[97.113]

[97.303]

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E1F08

Answer mismatch

A

C

Question mismatch

Which of the following types of amateur station communications are prohibited?

What is the National Radio Quiet Zone?

Choice 1 mismatch

Communications transmitted for hire or material compensation, except as otherwise provided in the rules

An area in Puerto Rico surrounding the Aricebo Radio Telescope

Choice 2 mismatch

Communications that have a political content, except as allowed by the Fairness Doctrine

An area in New Mexico surrounding the White Sands Test Area

Choice 3 mismatch

Communications that have a religious content

An area surrounding the National Radio Astronomy Observatory

Choice 4 mismatch

Communications in a language other than English

An area in Florida surrounding Cape Canaveral

Rules mismatch

[97.113]

[97.3]

E1F09

Question mismatch

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

When may the control operator of a repeater accept payment for providing communication services to another party?

Choice 1 mismatch

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

When the repeater is operating under portable power

Choice 2 mismatch

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

When the repeater is operating under local control

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

The transmission must not be used to obscure the meaning of any communication
During Red Cross or other emergency service drills

Choice 4 mismatch

All of these choices are correct
Under no circumstances

Rules mismatch

[97.311]

[97.113]

E1F10

Answer mismatch

C

D

Question mismatch

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

When may an amateur station send a message to a business?

Choice 1 mismatch

1 W

When the total money involved does not exceed \$25

Choice 2 mismatch

1.5 W

When the control operator is employed by the FCC or another government agency

Choice 3 mismatch

10 W

When transmitting international third-party communications

Choice 4 mismatch

1.5 kW

When neither the amateur nor his or her employer has a pecuniary interest in
the communications

Rules mismatch

[97.313]

[97.113]

E1F11

Answer mismatch

D

A

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

Which of the following best describes one of the standards that must be met by an external RF power amplifier if it is to qualify for a grant of FCC certification?

Which of the following types of amateur-operator-to-amateur-operator communications are prohibited?

Choice 1 mismatch

It must produce full legal output when driven by not more than 5 watts of mean RF input power

Communications transmitted for hire or material compensation, except as otherwise provided in the rules

Choice 2 mismatch

It must be capable of external RF switching between its input and output networks

Communications that have a political content, except as allowed by the Fairness Doctrine

Choice 3 mismatch

It must exhibit a gain of 0 dB or less over its full output range

Communications that have a religious content

Choice 4 mismatch

It must satisfy the FCC's spurious emission standards when operated at the lesser of 1500 watts, or its full output power

Communications in a language other than English

Rules mismatch

[97.317]

[97.113]

E1F12

Answer mismatch

B

D

Question mismatch

Who may be the control operator of an auxiliary station?

FCC-licensed amateur stations may use spread spectrum (SS) emissions to communicate under which of the following conditions?

Choice 1 mismatch

Any licensed amateur operator

When the other station is in an area regulated by the FCC

Choice 2 mismatch

Only Technician, General, Advanced or Amateur Extra Class operators

When the other station is in a country permitting SS communications

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Only General, Advanced or Amateur Extra Class operators

When the transmission is not used to obscure the meaning of any communication

Choice 4 mismatch

Only Amateur Extra Class operators

All of these choices are correct

Rules mismatch

[97.201]

[97.311]

E1F13

Question mismatch

What types of communications may be transmitted to amateur stations in foreign countries?

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

Choice 1 mismatch

Business-related messages for non-profit organizations

1 W

Choice 2 mismatch

Messages intended for connection to users of the maritime satellite service

1.5 W

Choice 3 mismatch

Communications incidental to the purpose of the amateur service and remarks of a personal nature

100 W

Choice 4 mismatch

All of these choices are correct

1.5 kW

Rules mismatch

[97.117]

[97.311]

E1F14

Answer mismatch

A

D

Question mismatch

Under what circumstances might the FCC issue a "Special Temporary Authority" (STA) to an amateur station?

Which of the following best describes one of the standards that must be met

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

by an external RF power amplifier if it is to qualify for a grant of FCC certification?

Choice 1 mismatch

To provide for experimental amateur communications

It must produce full legal output when driven by not more than 5 watts of mean RF input power

Choice 2 mismatch

To allow regular operation on Land Mobile channels

It must be capable of external RF switching between its input and output networks

Choice 3 mismatch

To provide additional spectrum for personal use

It must exhibit a gain of 0 dB or less over its full output range

Choice 4 mismatch

To provide temporary operation while awaiting normal licensing

It must satisfy the FCC's spurious emission standards when operated at its full output power

Rules mismatch

[97.317]

E2A03

Question mismatch

What is the orbital period of an Earth satellite?

What is the orbital period of a satellite?

Choice 1 mismatch

The point of maximum height of a satellite's orbit

The point of maximum height of a satellite's orbit

Choice 2 mismatch

The point of minimum height of a satellite's orbit

The point of minimum height of a satellite's orbit

E2A04

Question mismatch

What is meant by the term mode as applied to an amateur radio satellite?

What is meant by the term "mode" as applied to an amateur radio satellite?

Choice 2 mismatch

The satellite's uplink and downlink frequency bands

The satellite's uplink and downlink frequency bands

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

The satellite's orientation with respect to the Earth
The satellite's orientation with respect to the Earth

E2A05

Question mismatch

What do the letters in a satellite's mode designator specify?
What do the letters in a satellite's mode designator specify?

Choice 4 mismatch

The uplink and downlink frequency ranges
The uplink and downlink frequencies

E2A06

Choice 1 mismatch

435-438 MHz
432 MHz

Choice 2 mismatch

144-146 MHz
144 MHz

Choice 3 mismatch

50.0-50.2 MHz
50 MHz

Choice 4 mismatch

29.5 to 29.7 MHz
28 MHz

E2A07

Choice 4 mismatch

All of these choices are correct
All these answers are correct

E2A08

Question mismatch

Why should effective radiated power to a satellite which uses a linear transponder be limited?
What is the primary reason for satellite users to limit their transmit ERP?

Choice 1 mismatch

To prevent creating errors in the satellite telemetry
For RF exposure safety

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

To avoid reducing the downlink power to all other users
Because the satellite transmitter output power is limited

Choice 3 mismatch

To prevent the satellite from emitting out of band signals
To avoid limiting the signal of the other users

E2A10

Choice 1 mismatch

Because the satellite is spinning
Because the satellite is rotating

Choice 3 mismatch

Because of the satellite's low orbital altitude
Because of the satellite's low orbital altitude

Choice 4 mismatch

Because of the Doppler Effect
Because of the Doppler effect

E2A13

Choice 2 mismatch

Geostationary
Geosynchronous

E2B03

Question mismatch

How is an interlaced scanning pattern generated in a fast-scan (NTSC) television system?
How is an interlace scanning pattern generated in a fast-scan (NTSC) television system?

E2B05

Question mismatch

Which of the following is an advantage of using vestigial sideband for standard fast- scan TV transmissions?
Which of the following is an advantage of using vestigial sideband for standard fast scan TV transmissions?

E2B06

Choice 1 mismatch

Amplitude modulation in which one complete sideband and a portion of the

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

other are transmitted

Amplitude modulation in which one complete sideband and a portion of the other sideband is transmitted

E2B07

Question mismatch

What is the name of the signal component that carries color information in NTSC video?

What is the name of the video signal component that carries color information?

E2B09

Question mismatch

What hardware, other than a receiver with SSB capability and a suitable computer, is needed to decode SSTV using Digital Radio Mondiale (DRM)?

What hardware, other than a transceiver with SSB capability and a suitable computer, is needed to decode SSTV based on Digital Radio Mondiale (DRM)?

E2B11

Choice 4 mismatch

To identify the call sign of the station transmitting

To identify the callsign of the station transmitting

E2B12

Question mismatch

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

How are analog slow-scan television images typically transmitted on the HF bands?

Choice 3 mismatch

Varying tone frequencies representing the video are transmitted using PSK

Varying tone frequencies representing the video are transmitted using FM

E2B17

Answer mismatch

B

A

Question mismatch

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

Which of the following is NOT a characteristic of FMTV (Frequency-Modulated Amateur Television) as compared to vestigial sideband AM television?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

600 Hz

Immunity from fading due to limiting

Choice 2 mismatch

3 kHz

Poor weak signal performance

Choice 3 mismatch

2 MHz

Greater signal bandwidth

Choice 4 mismatch

6 MHz

Greater complexity of receiving equipment

E2B18

Answer mismatch

D

B

Question mismatch

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

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

Choice 1 mismatch

14.230 MHz

600 Hz

Choice 2 mismatch

29.6 MHz

3 kHz

Choice 3 mismatch

52.525 MHz

2 MHz

Choice 4 mismatch

1255 MHz

6 MHz

E2B19

Answer mismatch

C

D

Question mismatch

What special operating frequency restrictions are imposed on slow scan TV

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

transmissions?

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

Choice 1 mismatch

None; they are allowed on all amateur frequencies
14.230 MHz

Choice 2 mismatch

They are restricted to 7.245 MHz, 14.245 MHz, 21.345, MHz, and 28.945 MHz
29.6 MHz

Choice 3 mismatch

They are restricted to phone band segments and their bandwidth can be no greater than that of a voice signal of the same modulation type
52.525 MHz

Choice 4 mismatch

They are not permitted above 54 MHz
1255 MHz

E2C02

Question mismatch

Which of the following best describes the term "self-spotting" in regards to contest operating?

Which of the following best describes "self spotting" in regards to contest operating?

E2C05

Question mismatch

What is the function of a DX QSL Manager?

Which of the following frequencies would generally be acceptable for U.S. stations to work other U.S. stations in a phone contest?

Choice 1 mismatch

To allocate frequencies for DXpeditions
5405 kHz

Choice 2 mismatch

To handle the receiving and sending of confirmation cards for a DX station
14.310 MHz

Choice 3 mismatch

To run a net to allow many stations to contact a rare DX station
50.050 MHz

Choice 4 mismatch

To relay calls to and from a DX station
146.52 MHz

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Rules mismatch

[97.301]

E2C07

Choice 1 mismatch

A standard for submission of electronic contest logs

A standard for organizing information in contest log files

E2C09

Question mismatch

How does the spread-spectrum technique of frequency hopping work?

How does the spread-spectrum technique of frequency hopping (FH) work?

E2C10

Question mismatch

Why might a DX station state that they are listening on another frequency?

Why might a phone DX station state that he is listening on another frequency?

E2C11

Question mismatch

How should you generally identify your station when attempting to contact a DX station working a pileup or in a contest?

How should you generally sign your call when attempting to contact a DX station working a "pileup" or in a contest?

Choice 4 mismatch

Send the call sign of the DX station three times, the words this is, then your call sign three times

Send the call sign of the DX station three times, the words "this is", then your call sign three times

E2C12

Question mismatch

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

In North America during low sunspot activity, when signals from Europe become weak and fluttery across an entire HF band two to three hours after sunset, what might help to contact other European DX stations?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E2D01

Question mismatch

Which of the following digital modes is especially designed for use for meteor scatter signals?

What does "command mode" mean in packet operations?

Choice 1 mismatch

WSPR

Your computer is ready to run packet communications software

Choice 2 mismatch

FSK441

The TNC is ready to receive instructions via the keyboard

Choice 3 mismatch

Hellschreiber

Your TNC has received a command packet from a remote TNC

Choice 4 mismatch

APRS

The computer is ready to be set up to communicate with the TNC

E2D02

Question mismatch

What is the definition of baud?

What is the definition of "baud"?

E2D03

Answer mismatch

D

A

Question mismatch

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

Which of the follow is true when comparing HF and 2-meter packet operations?

Choice 1 mismatch

FSK441

HF packet typically uses FSK with a data rate of 300 baud; 2-meter packet uses AFSK with a data rate of 1200 baud

Choice 2 mismatch

PACTOR III

HF packet and 2-meter packet operations use different codes for information exchange

Choice 3 mismatch

Olivia

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

HF packet is limited to Amateur Extra class amateur licensees; 2-meter packet is open to all but Novice Class amateur licensees

Choice 4 mismatch

JT65

HF and 2-meter packet operations are both limited to CW/Data-only band segments

E2D04

Question mismatch

What is the purpose of digital store-and-forward functions on an Amateur Radio satellite?

What is the purpose of digital store-and-forward functions on an Amateur satellite?

Choice 2 mismatch

To delay download of telemetry between satellites

To delay download of telemetry until the satellite is over the control station

E2D05

Question mismatch

Which of the following techniques is normally used by low Earth orbiting digital satellites to relay messages around the world?

Which of the following techniques is normally used by low-earth orbiting digital satellites to relay messages around the world?

E2D06

Answer mismatch

A

B

Choice 1 mismatch

144.39 MHz

144.20 MHz

Choice 2 mismatch

144.20 MHz

144.39 MHz

E2D07

Answer mismatch

C

A

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch
FACTOR
AX.25

Choice 3 mismatch
AX.25
FACTOR

E2D08
Answer mismatch
A
D

Choice 1 mismatch
Unnumbered Information
Connect frames

Choice 2 mismatch
Disconnect
Disconnect frames

Choice 3 mismatch
Acknowledgement
Acknowledgement frames

Choice 4 mismatch
Connect
Unnumbered Information frames

E2D10
Choice 3 mismatch
An APRS station with a GPS unit can automatically transmit information to show a mobile station's position during the event
An APRS station with a GPS unit can automatically transmit information to show a mobile station's position during the event

E2D11
Question mismatch
Which of the following data are used by the APRS network to communicate your location?
Which of the following data sources are needed to accurately transmit your geographical location over the APRS network?

Choice 1 mismatch
Polar coordinates
The NMEA-0183 formatted data from a Global Positioning System (GPS) satellite receiver

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

Time and frequency

The latitude and longitude of your location, preferably in degrees, minutes and seconds, entered into the APRS computer software

Choice 3 mismatch

Radio direction finding LOPs

The NMEA-0183 formatted data from a LORAN navigation system

Choice 4 mismatch

Latitude and longitude

Any of these choices is correct

E2E01

Question mismatch

Which type of modulation is common for data emissions below 30 MHz?

What is a common method of transmitting data emissions below 30 MHz?

Choice 2 mismatch

FSK

FSK/AFSK

E2E07

Choice 4 mismatch

2.16 kHz

2 kHz

E2E11

Answer mismatch

A

D

Question mismatch

What is the difference between direct FSK and audio FSK?

What is the Baudot code?

Choice 1 mismatch

Direct FSK applies the data signal to the transmitter VFO

A code used to transmit data only in modern computer-based data systems using seven data bits

Choice 2 mismatch

Audio FSK has a superior frequency response

A binary code consisting of eight data bits

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Direct FSK uses a DC-coupled data connection
An alternate name for Morse code

Choice 4 mismatch

Audio FSK can be performed anywhere in the transmit chain
The International Telegraph Alphabet Number 2 (ITA2) which uses five data bits

E2E12

Answer mismatch

A
C

Question mismatch

Which type of digital communication does not support keyboard-to-keyboard operation?

Which of these digital communications modes has the narrowest bandwidth?

Choice 1 mismatch

Winlink
MFSK16

Choice 2 mismatch

RTTY
170-Hz shift, 45 baud RTTY

Choice 4 mismatch

MFSK
300-baud packet

E3A01

Question mismatch

What is the approximate maximum separation measured along the surface of the Earth between two stations communicating by Moon bounce?

What is the approximate maximum separation along the surface of the Earth between two stations communicating by moonbounce?

Choice 1 mismatch

500 miles, if the Moon is at perigee
500 miles if the moon is at perigee

Choice 2 mismatch

2000 miles, if the Moon is at apogee
2000 miles, if the moon is at apogee

Choice 3 mismatch

5000 miles, if the Moon is at perigee
5000 miles, if the moon is at perigee

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

12,000 miles, as long as both can "see" the Moon
12,000 miles, as long as both can "see" the moon

E3A02

Question mismatch

What characterizes libration fading of an Earth-Moon-Earth signal?
What characterizes libration fading of an earth-moon-earth signal?

Choice 3 mismatch

A gradual loss of signal as the Sun rises
A gradual loss of signal as the sun rises

E3A03

Choice 1 mismatch

When the Moon is at perigee
When the moon is at perigee

Choice 2 mismatch

When the Moon is full
When the moon is full

Choice 3 mismatch

When the Moon is at apogee
When the moon is at apogee

E3A05

Question mismatch

Which of the following describes a method of establishing EME contacts?
What transmit and receive time sequencing is normally used on 144 MHz when attempting an EME contact?

Choice 1 mismatch

Time synchronous transmissions with each station alternating
Two-minute sequences, where one station transmits for a full two minutes and then receives for the following two minutes

Choice 2 mismatch

Storing and forwarding digital messages
One-minute sequences, where one station transmits for one minute and then receives for the following one minute

Choice 3 mismatch

Judging optimum transmission times by monitoring beacons from the Moon
Two-and-one-half minute sequences, where one station transmits for a full 2.5 minutes and then receives for the following 2.5 minutes

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

High speed CW identification to avoid fading

Five-minute sequences, where one station transmits for five minutes and then receives for the following five minutes

E3A06

Answer mismatch

B

C

Question mismatch

What frequency range would you normally tune to find EME signals in the 2 meter band?

What transmit and receive time sequencing is normally used on 432 MHz when attempting an EME contact?

Choice 1 mismatch

144.000 - 144.001 MHz

Two-minute sequences, where one station transmits for a full two minutes and then receives for the following two minutes

Choice 2 mismatch

144.000 - 144.100 MHz

One-minute sequences, where one station transmits for one minute and then receives for the following one minute

Choice 3 mismatch

144.100 - 144.300 MHz

Two-and-one-half minute sequences, where one station transmits for a full 2.5 minutes and then receives for the following 2.5 minutes

Choice 4 mismatch

145.000 - 145.100 MHz

Five-minute sequences, where one station transmits for five minutes and then receives for the following five minutes

E3A07

Answer mismatch

D

B

Question mismatch

What frequency range would you normally tune to find EME signals in the 70 cm band?

What frequency range would you normally tune to find EME stations in the 2 meter band?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

430.000 - 430.150 MHz

144.000 - 144.001 MHz

Choice 2 mismatch

430.100 - 431.100 MHz

144.000 - 144.100 MHz

Choice 3 mismatch

431.100 - 431.200 MHz

144.100 - 144.300 MHz

Choice 4 mismatch

432.000 - 432.100 MHz

145.000 - 145.100 MHz

E3A08

Answer mismatch

A

D

Question mismatch

When a meteor strikes the Earth's atmosphere, a cylindrical region of free electrons is formed at what layer of the ionosphere?

What frequency range would you normally tune to find EME stations in the 70 cm band?

Choice 1 mismatch

The E layer

430.000 - 430.150 MHz

Choice 2 mismatch

The F1 layer

430.100 - 431.100 MHz

Choice 3 mismatch

The F2 layer

431.100 - 431.200 MHz

Choice 4 mismatch

The D layer

432.000 - 432.100 MHz

E3A09

Answer mismatch

C

A

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

Which of the following frequency ranges is well suited for meteor-scatter communications?

When a meteor strikes the Earth's atmosphere, a cylindrical region of free electrons is formed at what layer of the ionosphere?

Choice 1 mismatch

1.8 - 1.9 MHz

The E layer

Choice 2 mismatch

10 - 14 MHz

The F1 layer

Choice 3 mismatch

28 - 148 MHz

The F2 layer

Choice 4 mismatch

220 - 450 MHz

The D layer

E3A10

Answer mismatch

D

C

Question mismatch

Which of the following is a good technique for making meteor-scatter contacts?

Which range of frequencies is well suited for meteor-scatter communications?

Choice 1 mismatch

15 second timed transmission sequences with stations alternating based on location

1.8 - 1.9 MHz

Choice 2 mismatch

Use of high speed CW or digital modes

10 - 14 MHz

Choice 3 mismatch

Short transmission with rapidly repeated call signs and signal reports

28 - 148 MHz

Choice 4 mismatch

All of these choices are correct

220 - 450 MHz

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E3B01

Choice 1 mismatch

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

Propagation between two points at approximately the same distance north and south of the magnetic equator

E3B08

Question mismatch

What type of HF propagation is probably occurring if radio signals travel along the terminator between daylight and darkness?

What type of propagation is probably occurring if radio signals travel along the terminator between daylight and darkness?

E3B09

Question mismatch

At what time of day is gray-line propagation most likely to occur?

At what time of day is gray-line propagation most prevalent?

Choice 2 mismatch

When the Sun is directly above the location of the transmitting station

When the sun is directly above the location of the transmitting station

Choice 3 mismatch

When the Sun is directly overhead at the middle of the communications path between the two stations

When the sun is directly overhead at the middle of the communications path between the two stations

Choice 4 mismatch

When the Sun is directly above the location of the receiving station

When the sun is directly above the location of the receiving station

E3B10

Choice 1 mismatch

At midday, the Sun being directly overhead superheats the ionosphere causing increased refraction of radio waves

At midday, the sun, being directly overhead, superheats the ionosphere causing increased refraction of radio waves

Choice 2 mismatch

At twilight, D-layer absorption drops while E-layer and F-layer propagation remain strong

At twilight, solar absorption drops greatly, while atmospheric ionization is not weakened enough to reduce the MUF

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

In darkness, solar absorption drops greatly while atmospheric ionization remains steady

At darkness, solar absorption drops greatly, while atmospheric ionization remains steady

Choice 4 mismatch

At mid afternoon, the Sun heats the ionosphere decreasing radio wave refraction and the MUF

At mid afternoon, the sun heats the ionosphere, increasing radio wave refraction and the MUF

E3B11

Question mismatch

Which of the following describes gray-line propagation?

What communications are possible during gray-line propagation?

Choice 1 mismatch

Backscatter contacts on the 10 meter band

Contacts up to 2,000 miles only on the 10-meter band

Choice 2 mismatch

Over the horizon propagation on the 6 and 2 meter bands

Contacts up to 750 miles on the 6- and 2-meter bands

Choice 3 mismatch

Long distance communications at twilight on frequencies less than 15 MHz

Contacts up to 8,000 to 10,000 miles on three or four HF bands

Choice 4 mismatch

Tropospheric propagation on the 2 meter and 70 centimeter bands

Contacts up to 12,000 to 15,000 miles on the 2 meter and 70 centimeter bands

E3C01

Question mismatch

Which of the following effects does Aurora activity have on radio communications?

What effect does auroral activity have on radio communications?

Choice 1 mismatch

SSB signals are raspy

Signals experience long-delay echo

Choice 2 mismatch

Signals propagating through the Aurora are fluttery

FM communications are clearer

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

CW signals appear to be modulated by white noise
CW signals have a clearer tone

Choice 4 mismatch

All of these choices are correct
CW signals have a fluttery tone

E3C02

Question mismatch

What is the cause of Aurora activity?
What is the cause of auroral activity?

Choice 1 mismatch

The interaction between the solar wind and the Van Allen belt
Reflections in the solar wind

Choice 2 mismatch

A low sunspot level combined with tropospheric ducting
A low sunspot level

Choice 3 mismatch

The interaction of charged particles from the Sun with the Earth's magnetic field and the ionosphere
The emission of charged particles from the sun

E3C03

Question mismatch

Where in the ionosphere does Aurora activity occur?
Where in the ionosphere does auroral activity occur?

Choice 1 mismatch

In the F1-region
At F-region height

Choice 2 mismatch

In the F2-region
In the equatorial band

Choice 3 mismatch

In the D-region
At D-region height

Choice 4 mismatch

In the E-region
At E-region height

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E3C04

Question mismatch

Which emission mode is best for Aurora propagation?
Which emission mode is best for auroral propagation?

E3C05

Question mismatch

Which of the following describes selective fading?
What causes selective fading?

Choice 1 mismatch

Variability of signal strength with beam heading
Small changes in beam heading at the receiving station

Choice 2 mismatch

Partial cancellation of some frequencies within the received pass band
Phase differences in the received signal caused by different paths

Choice 3 mismatch

Sideband inversion within the ionosphere
Large changes in the height of the ionosphere

Choice 4 mismatch

Degradation of signal strength due to backscatter
Time differences between the receiving and transmitting stations

E3C06

Question mismatch

By how much does the VHF/UHF radio-path horizon distance exceed the geometric horizon?
How much farther does the VHF/UHF radio-path horizon distance exceed the geometric horizon?

E3C07

Question mismatch

How does the radiation pattern of a horizontally polarized 3-element beam antenna vary with its height above ground?
How does the radiation pattern of a 3-element, horizontally polarized beam antenna vary with height above ground?

E3C09

Question mismatch

Which of the following is usually responsible for causing VHF signals to propagate for hundreds of miles?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

What effect is usually responsible for propagating a VHF signal over 500 miles?

Choice 4 mismatch
Ground wave
Moonbounce

E3C11

Question mismatch

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

E3C12

Answer mismatch

C
B

Question mismatch

How does the maximum distance of ground-wave propagation change when the signal frequency is increased?
As the frequency of a signal is increased, how does its ground wave propagation change?

Choice 1 mismatch

It stays the same
It increases

Choice 2 mismatch

It increases
It decreases

Choice 3 mismatch

It decreases
It stays the same

Choice 4 mismatch

It peaks at roughly 14 MHz
Radio waves don't propagate along the Earth's surface

E3C13

Question mismatch

What type of polarization is best for ground-wave propagation?
What type of polarization does most ground-wave propagation have?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E3C14

Choice 3 mismatch

Downward bending due to aurora refraction

Auroral skip

Choice 4 mismatch

Downward bending due to density variations in the atmosphere

Radio waves may be bent

E4A01

Question mismatch

How does a spectrum analyzer differ from an oscilloscope?

How does a spectrum analyzer differ from a conventional oscilloscope?

E4A02

Question mismatch

Which of the following parameters would a spectrum analyzer display on the horizontal axis?

Which of the following parameters would a typical spectrum analyzer display on the horizontal axis?

E4A03

Question mismatch

Which of the following parameters would a spectrum analyzer display on the vertical axis?

Which of the following parameters would a typical spectrum analyzer display on the vertical axis?

E4A07

Question mismatch

Which of the following is an advantage of using an antenna analyzer compared to an SWR bridge to measure antenna SWR?

Which of the following is an advantage of using an antenna analyzer vs. a SWR bridge to measure antenna SWR?

Choice 2 mismatch

Antenna analyzers do not need an external RF source

Antenna analyzers typically do not need an external RF source

Choice 3 mismatch

Antenna analyzers display a time-varying representation of the modulation envelope

Antenna analyzers typically display a time-varying representation of the modulation envelope

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

All of these choices are correct

All of these answers are correct

E4A09

Answer mismatch

A

C

Question mismatch

Which of the following describes a good method for measuring the intermodulation distortion of your own PSK signal?

Which of the following is most important when adjusting PSK31 transmitting levels?

Choice 1 mismatch

Transmit into a dummy load, receive the signal on a second receiver, and feed the audio into the sound card of a computer running an appropriate PSK program

Power output

Choice 2 mismatch

Multiply the ALC level on the transmitter during a normal transmission by the average power output

PA current

Choice 3 mismatch

Use an RF voltmeter coupled to the transmitter output using appropriate isolation to prevent damage to the meter

ALC level

Choice 4 mismatch

All of these choices are correct

SWR

E4A10

Question mismatch

Which of the following tests establishes that a silicon NPN junction transistor is biased on?

Which of the following is a useful test for a functioning NPN transistor in an active circuit where the transistor should be biased "on" ?

E4A11

Answer mismatch

B

A

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

Which of these instruments could be used for detailed analysis of digital signals?

Which of the following test instruments can be used to indicate pulse conditions in a digital logic circuit?

Choice 1 mismatch

Dip meter

A logic probe

Choice 2 mismatch

Oscilloscope

An ohmmeter

Choice 3 mismatch

Ohmmeter

An electroscope

Choice 4 mismatch

Q meter

A Wheatstone bridge

E4B01

Question mismatch

Which of the following factors most affects the accuracy of a frequency counter?

Which of the following is a characteristic of a good harmonic frequency marker?

Choice 1 mismatch

Input attenuator accuracy

Wide tuning range

Choice 2 mismatch

Time base accuracy

Frequency stability

Choice 3 mismatch

Decade divider accuracy

Linear output amplifier

Choice 4 mismatch

Temperature coefficient of the logic

All of the above

E4B02

Answer mismatch

C

B

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

What is an advantage of using a bridge circuit to measure impedance?
Which of the following factors most affects the accuracy of a frequency counter?

Choice 1 mismatch

It provides an excellent match under all conditions
Input attenuator accuracy

Choice 2 mismatch

It is relatively immune to drift in the signal generator source
Time base accuracy

Choice 3 mismatch

The measurement is based on obtaining a signal null, which can be done very precisely
Decade divider accuracy

Choice 4 mismatch

It can display results directly in Smith chart format
Temperature coefficient of the logic

E4B03

Question mismatch

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?

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

Choice 1 mismatch

165.2 Hz
It provides an excellent match under all conditions

Choice 2 mismatch

14.652 kHz
It is relatively immune to drift in the signal generator source

Choice 3 mismatch

146.52 Hz
The measurement is based on obtaining a null in voltage, which can be done very precisely

Choice 4 mismatch

1.4652 MHz
It can display results directly in Smith chart format

E4B04

Answer mismatch

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

A
C

Question mismatch

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?

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?

Choice 1 mismatch

14.652 Hz
165.2 Hz

Choice 2 mismatch

0.1 MHz
14.652 kHz

Choice 3 mismatch

1.4652 Hz
146.52 Hz

Choice 4 mismatch

1.4652 kHz
1.4652 MHz

E4B05

Answer mismatch

D
A

Question mismatch

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?

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?

Choice 1 mismatch

146.52 Hz
14.652 Hz

Choice 2 mismatch

10 Hz
0.1 MHz

Choice 3 mismatch

146.52 kHz
1.4652 Hz

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch
1465.20 Hz
1.4652 kHz

E4B06

Question mismatch

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?

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?

Choice 1 mismatch
100 watts
146.52 Hz

Choice 2 mismatch
125 watts
10 Hz

Choice 3 mismatch
25 watts
146.52 kHz

Choice 4 mismatch
75 watts
1465.20 Hz

E4B07

Answer mismatch

A
D

Question mismatch

Which of the following is good practice when using an oscilloscope probe?
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?

Choice 1 mismatch
Keep the signal ground connection of the probe as short as possible
100 watts

Choice 2 mismatch
Never use a high impedance probe to measure a low impedance circuit
125 watts

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Never use a DC-coupled probe to measure an AC circuit
25 watts

Choice 4 mismatch

All of these choices are correct
75 watts

E4B08

Answer mismatch

C
A

Question mismatch

Which of the following is a characteristic of a good DC voltmeter?
Which of the following is good practice when using an oscilloscope probe?

Choice 1 mismatch

High reluctance input
Keep the ground connection of the probe as short as possible

Choice 2 mismatch

Low reluctance input
Never use a high impedance probe to measure a low impedance circuit

Choice 3 mismatch

High impedance input
Never use a DC-coupled probe to measure an AC circuit

Choice 4 mismatch

Low impedance input
All of these choices are correct

E4B09

Answer mismatch

D
C

Question mismatch

What is indicated if the current reading on an RF ammeter placed in series with the antenna feed line of a transmitter increases as the transmitter is tuned to resonance?
Which of the following is a characteristic of a good DC voltmeter?

Choice 1 mismatch

There is possibly a short to ground in the feed line
High reluctance input

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

The transmitter is not properly neutralized
Low reluctance input

Choice 3 mismatch

There is an impedance mismatch between the antenna and feed line
High impedance input

Choice 4 mismatch

There is more power going into the antenna
Low impedance input

E4B10

Answer mismatch

B

D

Question mismatch

Which of the following describes a method to measure intermodulation distortion in an SSB transmitter?

What is indicated if the current reading on an RF ammeter placed in series with the antenna feedline of a transmitter increases as the transmitter is tuned to resonance?

Choice 1 mismatch

Modulate the transmitter with two non-harmonically related radio frequencies and observe the RF output with a spectrum analyzer
There is possibly a short to ground in the feedline

Choice 2 mismatch

Modulate the transmitter with two non-harmonically related audio frequencies and observe the RF output with a spectrum analyzer
The transmitter is not properly neutralized

Choice 3 mismatch

Modulate the transmitter with two harmonically related audio frequencies and observe the RF output with a peak reading wattmeter
There is an impedance mismatch between the antenna and feedline

Choice 4 mismatch

Modulate the transmitter with two harmonically related audio frequencies and observe the RF output with a logic analyzer
There is more power going into the antenna

E4B11

Answer mismatch

D

B

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

How should a portable antenna analyzer be connected when measuring antenna resonance and feed point impedance?

Which of the following describes a method to measure intermodulation distortion in an SSB transmitter?

Choice 1 mismatch

Loosely couple the analyzer near the antenna base
Modulate the transmitter with two non-harmonically related radio frequencies and observe the RF output with a spectrum analyzer

Choice 2 mismatch

Connect the analyzer via a high-impedance transformer to the antenna
Modulate the transmitter with two non-harmonically related audio frequencies and observe the RF output with a spectrum analyzer

Choice 3 mismatch

Connect the antenna and a dummy load to the analyzer
Modulate the transmitter with two harmonically related audio frequencies and observe the RF output with a peak reading wattmeter

Choice 4 mismatch

Connect the antenna feed line directly to the analyzer's connector
Modulate the transmitter with two harmonically related audio frequencies and observe the RF output with a logic analyzer

E4B12

Answer mismatch

A
D

Question mismatch

What is the significance of voltmeter sensitivity expressed in ohms per volt?
How should a portable SWR analyzer be connected when measuring antenna resonance and feedpoint impedance?

Choice 1 mismatch

The full scale reading of the voltmeter multiplied by its ohms per volt rating will provide the input impedance of the voltmeter
Loosely couple the analyzer near the antenna base

Choice 2 mismatch

When used as a galvanometer, the reading in volts multiplied by the ohms/volt will determine the power drawn by the device under test
Connect the analyzer via a high-impedance transformer to the antenna

Choice 3 mismatch

When used as an ohmmeter, the reading in ohms divided by the ohms/volt will determine the voltage applied to the circuit
Connect the antenna and a dummy load to the analyzer

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

When used as an ammeter, the full scale reading in amps divided by ohms/volt will determine the size of shunt needed

Connect the antenna feed line directly to the analyzer's connector

E4B13

Question mismatch

How is the compensation of an oscilloscope probe typically adjusted?

What is the significance of voltmeter sensitivity expressed in ohms per volt?

Choice 1 mismatch

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

The full scale reading of the voltmeter multiplied by its ohms per volt rating will provide the input impedance of the voltmeter

Choice 2 mismatch

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

When used as a galvanometer, the reading in volts multiplied by the ohms/volt will determine the power drawn by the device under test

Choice 3 mismatch

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

When used as an ohmmeter, the reading in ohms divided by the ohms/volt will determine the voltage applied to the circuit

Choice 4 mismatch

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

When used as an ammeter, the full scale reading in amps divided by ohms/volt will determine the size of shunt needed

E4B14

Answer mismatch

B

A

Question mismatch

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

How is the compensation of an oscilloscope probe typically adjusted?

Choice 1 mismatch

Harmonics are generated

A square wave is observed and the probe is adjusted until the horizontal portions of the displayed wave is as nearly flat as possible

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

A less accurate reading results

A high frequency sine wave is observed, and the probe is adjusted for maximum amplitude

Choice 3 mismatch

Cross modulation occurs

A frequency standard is observed, and the probe is adjusted until the deflection time is accurate

Choice 4 mismatch

Intermodulation distortion occurs

A DC voltage standard is observed, and the probe is adjusted until the displayed voltage is accurate

E4B15

Answer mismatch

C

B

Question mismatch

Which of the following can be used as a relative measurement of the Q for a series-tuned circuit?

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

Choice 1 mismatch

The inductance to capacitance ratio

Harmonics are generated

Choice 2 mismatch

The frequency shift

A less accurate reading results

Choice 3 mismatch

The bandwidth of the circuit's frequency response

Cross modulation occurs

Choice 4 mismatch

The resonant frequency of the circuit

Intermodulation distortion occurs

E4C01

Question mismatch

What is an effect of excessive phase noise in the local oscillator section of a receiver?

What is the effect of excessive phase noise in the local oscillator section of a receiver?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

It limits the receiver's ability to receive strong signals
It limits the receiver ability to receive strong signals

Choice 2 mismatch

It reduces receiver sensitivity
It reduces the receiver sensitivity

Choice 3 mismatch

It decreases receiver third-order intermodulation distortion dynamic range
It decreases the receiver third-order intermodulation distortion dynamic range

E4C02

Answer mismatch

A
C

Question mismatch

Which of the following portions of a receiver can be effective in eliminating image signal interference?

Which of the following is the result of the capture effect in an FM receiver?

Choice 1 mismatch

A front-end filter or pre-selector
All signals on a frequency are demodulated

Choice 2 mismatch

A narrow IF filter
None of the signals could be heard

Choice 3 mismatch

A notch filter
The strongest signal received is the only demodulated signal

Choice 4 mismatch

A properly adjusted product detector
The weakest signal received is the only demodulated signal

E4C04

Question mismatch

What is the definition of the noise figure of a receiver?

What is meant by the noise floor of a receiver?

Choice 1 mismatch

The ratio of atmospheric noise to phase noise
The minimum level of noise at the audio output when the RF gain is turned all the way down

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

The noise bandwidth in Hertz compared to the theoretical bandwidth of a resistive network

The equivalent phase noise power generated by the local oscillator

Choice 3 mismatch

The ratio of thermal noise to atmospheric noise

The minimum level of noise that will overload the RF amplifier stage

Choice 4 mismatch

The ratio in dB of the noise generated by the receiver compared to the theoretical minimum noise

The equivalent input noise power when the antenna is replaced with a matched dummy load

E4C06

Question mismatch

A CW receiver with the AGC off has an equivalent input noise power density of -174 dBm/Hz. What would be the level of an unmodulated carrier input to this receiver that would yield an audio output SNR of 0 dB in a 400 Hz noise bandwidth?

The thermal noise value of a receiver is -174 dBm/Hz. What is the theoretically best minimum detectable signal for a 400 Hz bandwidth receiver?

E4C08

Choice 2 mismatch

It would improve weak signal sensitivity

It would increase signal to noise ratio

E4C09

Answer mismatch

C

D

Question mismatch

Which of the following choices is a good reason for selecting a high frequency for the design of the IF in a conventional HF or VHF communications receiver?

Which of the following is most likely to be the limiting condition for sensitivity in a modern communications receiver operating at 14 MHz?

Choice 1 mismatch

Fewer components in the receiver

The noise figure of the RF amplifier

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

Reduced drift

Mixer noise

Choice 3 mismatch

Easier for front-end circuitry to eliminate image responses

Conversion noise

Choice 4 mismatch

Improved receiver noise figure

Atmospheric noise

E4C11

Question mismatch

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

Which of the following is a desirable amount of selectivity for an amateur single-sideband phone receiver?

E4C13

Question mismatch

How does a narrow-band roofing filter affect receiver performance?

How does a narrow band roofing filter affect receiver performance?

Choice 3 mismatch

It improves dynamic range by attenuating strong signals near the receive frequency

It improves dynamic range by keeping strong signals near the receive frequency out of the IF stages

Choice 4 mismatch

All of these choices are correct

All of these choice are correct

E4C14

Question mismatch

On which of the following frequencies might a signal be transmitting which is generating a spurious image signal in a receiver tuned to 14.300 MHz and which uses a 455 kHz IF frequency?

Which of these choices is a desirable amount of selectivity for an amateur VHF FM receiver?

Choice 1 mismatch

13.845 MHz

1 kHz

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch
14.755 MHz
2.4 kHz

Choice 3 mismatch
14.445 MHz
4.2 kHz

Choice 4 mismatch
15.210 MHz
15 kHz

E4C15

Question mismatch

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

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

E4D01

Choice 1 mismatch

The difference in dB between the noise floor and the level of an incoming signal which will cause 1 dB of gain compression

The difference in dB between the level of an incoming signal which will cause 1 dB of gain compression, and the level of the noise floor

E4D02

Question mismatch

Which of the following describes two problems caused by poor dynamic range in a communications receiver?

Which of the following describes two types of problems caused by poor dynamic range in a communications receiver?

Choice 1 mismatch

Cross-modulation of the desired signal and desensitization from strong adjacent signals

Cross modulation of the desired signal and desensitization from strong adjacent signals

Choice 2 mismatch

Oscillator instability requiring frequent retuning and loss of ability to recover the opposite sideband

Oscillator instability requiring frequent retuning, and loss of ability to recover the opposite sideband, should it be transmitted

Choice 3 mismatch

Cross-modulation of the desired signal and insufficient audio power to

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

operate the speaker

Cross modulation of the desired signal and insufficient audio power to operate the speaker

E4D03

Choice 1 mismatch

When the repeaters are in close proximity and the signals cause feedback in the final amplifier of one or both transmitters

When the repeaters are in close proximity and the signals cause feedback in one or both transmitter final amplifiers

Choice 2 mismatch

When the repeaters are in close proximity and the signals mix in the final amplifier of one or both transmitters

When the repeaters are in close proximity and the signals mix in one or both transmitter final amplifiers

E4D04

Question mismatch

Which of the following may reduce or eliminate intermodulation interference in a repeater caused by another transmitter operating in close proximity?

What is an effective way to reduce or eliminate intermodulation interference between two repeater transmitters operating in close proximity to one another?

Choice 1 mismatch

A band-pass filter in the feed line between the transmitter and receiver

By installing a band-pass filter in the feed line between the transmitter and receiver

Choice 2 mismatch

A properly terminated circulator at the output of the transmitter

By installing a properly terminated circulator at the output of the transmitter

Choice 3 mismatch

A Class C final amplifier

By using a Class C final amplifier

Choice 4 mismatch

A Class D final amplifier

By using a Class D final amplifier

E4D05

Question mismatch

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?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

If a receiver tuned to 146.70 MHz receives an intermodulation-product signal whenever a nearby transmitter transmits on 146.52 MHz, what are the two most likely frequencies for the other interfering signal?

Choice 4 mismatch

173.35 MHz and 139.40 MHz

73.35 MHz and 239.40 MHz

E4D06

Question mismatch

What is the term for unwanted signals generated by the mixing of two or more signals?

If the signals of two transmitters mix together in one or both of their final amplifiers, and unwanted signals at the sum and difference frequencies of the original signals are generated, what is this called?

E4D09

Choice 3 mismatch

To increase rejection of unwanted signals

To improve rejection of unwanted signals

E4D10

Choice 3 mismatch

A pair of 40 dBm signals will theoretically generate a third-order intermodulation product with the same level as the input signals

A pair of 40 dBm signals will theoretically generate the same output on the third order intermodulation frequency as on the input frequency

E4D11

Question mismatch

Why are third-order intermodulation products created within a receiver of particular interest compared to other products?

Why are third-order intermodulation products within a receiver of particular interest compared to other products?

Choice 1 mismatch

The third-order product of two signals which are in the band of interest is also likely to be within the band

The third-order product of two signals which are in the band is itself likely to be within the band

Choice 4 mismatch

Third-order intermodulation produces three products for every input signal within the band of interest

Third-order intermodulation produces three products for every input signal

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E4D13

Choice 4 mismatch

Squelch gain misadjusted

Squelch gain adjusted too low

E4E01

Choice 1 mismatch

Ignition noise

Ignition Noise

Choice 2 mismatch

Broadband white noise

Broadband "white" noise

E4E02

Choice 1 mismatch

Broadband white noise

Broadband "white" noise

E4E03

Choice 2 mismatch

Signals which appear across a wide bandwidth

Signals which appear correlated across a wide bandwidth

E4E04

Choice 2 mismatch

By installing a noise suppression resistor and a blocking capacitor in both leads

By connecting the radio to the battery by the longest possible path and installing a blocking capacitor in both leads

Choice 3 mismatch

By installing a high-pass filter in series with the radio's power lead and a low-pass filter in parallel with the field lead

By installing a high-pass filter in series with the radio's power lead and a low-pass filter in parallel with the field lead

Choice 4 mismatch

By connecting the radio's power leads directly to the battery and by installing coaxial capacitors in line with the alternator leads

By connecting the radio's power leads directly to the battery and by installing coaxial capacitors in line with the alternator leads

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E4E05

Choice 1 mismatch

By installing a high pass filter in series with the motor's power leads
By installing a ferrite bead on the AC line used to power the motor

E4E07

Question mismatch

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

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

Choice 1 mismatch

By checking the power line voltage with a time domain reflectometer
By checking the power-line voltage with a time-domain reflectometer

Choice 3 mismatch

By turning off the AC power line main circuit breaker and listening on a battery operated radio

By turning off the AC power line main circuit breaker and listening on a battery-operated radio

E4E08

Question mismatch

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

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

E4E09

Question mismatch

What undesirable effect can occur when using an IF noise blanker?

What undesirable effect can occur when using an IF type noise blanker?

E4E10

Question mismatch

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

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

Choice 1 mismatch

The interfering signal sounds like AC hum on an AM receiver or a carrier modulated by 60 Hz hum on a SSB or CW receiver

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

The interfering signal sounds like AC hum on an AM receiver or a carrier modulated by 60 Hz FM on a SSB or CW receiver

Choice 4 mismatch

All of these choices are correct

All of these answers are correct

E4E11

Question mismatch

Which of the following is the most likely cause if you are hearing combinations of local AM broadcast signals within one or more of the MF or HF ham bands?

What is the most likely cause if you are hearing combinations of local AM broadcast signals inside one or more of the MF or HF ham bands?

Choice 2 mismatch

Nearby corroded metal joints are mixing and re-radiating the broadcast signals

Nearby corroded metal joints are mixing and re-radiating the BC signals

Choice 3 mismatch

You are receiving sky wave signals from a distant station

You are receiving sky-wave signals from a distant station

E4E12

Question mismatch

What is one disadvantage of using some types of automatic DSP notch-filters when attempting to copy CW signals?

What is one disadvantage of using some automatic DSP notch-filters when attempting to copy CW signals?

Choice 2 mismatch

Any nearby signal passing through the DSP system will overwhelm the desired signal

Any nearby signal passing through the DSP system will always overwhelm the desired signal

E4E13

Question mismatch

What might be the cause of a loud roaring or buzzing AC line interference that comes and goes at intervals?

What might be the cause of a loud "roaring" or "buzzing" AC line type of interference that comes and goes at intervals?

Choice 4 mismatch

All of these choices are correct

All of these answers are correct

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E5A03

Question mismatch

What is the magnitude of the impedance of a series RLC circuit at resonance?
What is the magnitude of the impedance of a series R-L-C circuit at resonance?

E5A05

Question mismatch

What is the magnitude of the current at the input of a series RLC circuit as the frequency goes through resonance?
What is the magnitude of the current at the input of a series R-L-C circuit as the frequency goes through resonance?

E5A06

Question mismatch

What is the magnitude of the circulating current within the components of a parallel LC circuit at resonance?
What is the magnitude of the circulating current within the components of a parallel L-C circuit at resonance?

Choice 3 mismatch

It equals 1 divided by the quantity 2 times Pi, multiplied by the square root of inductance L multiplied by capacitance C
It equals 1 divided by the quantity [2 multiplied by Pi, multiplied by the square root of (inductance "L" multiplied by capacitance "C")]

Choice 4 mismatch

It equals 2 multiplied by Pi, multiplied by frequency "F", multiplied by inductance "L"
It equals 2 multiplied by Pi, multiplied by frequency "F", multiplied by inductance "L"

E5A07

Question mismatch

What is the magnitude of the current at the input of a parallel RLC circuit at resonance?
What is the magnitude of the current at the input of a parallel R-L-C circuit at resonance?

E5A08

Question mismatch

What is the phase relationship between the current through and the voltage across a series resonant circuit at resonance?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

What is the phase relationship between the current through and the voltage across a series resonant circuit?

E5A09

Question mismatch

What is the phase relationship between the current through and the voltage across a parallel resonant circuit at resonance?

What is the phase relationship between the current through and the voltage across a parallel resonant circuit?

E5B01

Question mismatch

What is the term for the time required for the capacitor in an RC circuit to be charged to 63.2% of the applied voltage?

What is the term for the time required for the capacitor in an RC circuit to be charged to 63.2% of the supply voltage?

E5B02

Question mismatch

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?

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 value of stored charge?

E5B04

Question mismatch

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

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

E5B07

Question mismatch

What is the phase angle between the voltage across and the current through a series RLC circuit if XC is 500 ohms, R is 1 kilohm, and XL is 250 ohms?

What is the phase angle between the voltage across and the current through a series R-L-C circuit if XC is 500 ohms, R is 1 kilohm, and XL is 250 ohms?

E5B08

Question mismatch

What is the phase angle between the voltage across and the current through a

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

series RLC circuit if X_C is 100 ohms, R is 100 ohms, and X_L is 75 ohms?
What is the phase angle between the voltage across and the current through a series R-L-C circuit if X_C is 100 ohms, R is 100 ohms, and X_L is 75 ohms?

E5B09

Question mismatch

What is the relationship between the current through a capacitor and the voltage across a capacitor?

What is the relationship between the current through and the voltage across a capacitor?

E5C09

Choice 1 mismatch

Resistive component

The voltage or current associated with the resistive component

Choice 2 mismatch

Reactive component

The voltage or current associated with the reactive component

E5C10

Choice 1 mismatch

Resistive component

The voltage or current associated with the resistive component

Choice 2 mismatch

Reactive component

The voltage or current associated with the reactive component

E5C12

Question mismatch

If you plot the impedance of a circuit using the rectangular coordinate system and find the impedance point falls on the right side of the graph on the horizontal axis, what do you know about the circuit?

If you plot the impedance of a circuit using the rectangular coordinate system and find the impedance point falls on the right side of the graph on the horizontal line, what do you know about the circuit?

E5C16

Choice 1 mismatch

5.03 E-06 ohms at an angle of 45 degrees

5.03 x 10⁻⁰⁵ ohms at an angle of 45 degrees

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E5C17

Choice 1 mismatch

173 -j100 ohms

173 - j100 ohms

Choice 2 mismatch

200 +j100 ohms

200 + j100 ohms

Choice 3 mismatch

173 +j100 ohms

173 + j100 ohms

Choice 4 mismatch

200 -j100 ohms

200 - j100 ohms

E5C22

Question mismatch

In rectangular coordinates, what is the impedance of a network consisting of a 10-microhenry inductor in series with a 40-ohm resistor at 500 MHz?

In rectangular coordinates, what is the impedance of a network comprised of a 10-microhenry inductor in series with a 40-ohm resistor at 500 MHz?

E5D05

Question mismatch

Which of the following creates a magnetic field?

What is a magnetic field?

Choice 1 mismatch

Potential differences between two points in space

Electric current through the space around a permanent magnet

Choice 2 mismatch

Electric current

The region surrounding a magnet through which a magnetic force acts

Choice 3 mismatch

A charged capacitor

The space between the plates of a charged capacitor, through which a magnetic force acts

Choice 4 mismatch

A battery

The force that drives current through a resistor

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E5D08

Question mismatch

What type of energy is stored in an electromagnetic or electrostatic field?
What is the term for energy that is stored in an electromagnetic or electrostatic field?

Choice 1 mismatch

Electromechanical energy
Amperes-joules

Choice 3 mismatch

Thermodynamic energy
Joules-coulombs

E5D09

Answer mismatch

B
D

Question mismatch

What happens to reactive power in an AC circuit that has both ideal inductors and ideal capacitors?
What is the term for an out-of-phase, nonproductive power associated with inductors and capacitors?

Choice 1 mismatch

It is dissipated as heat in the circuit
Effective power

Choice 2 mismatch

It is repeatedly exchanged between the associated magnetic and electric fields, but is not dissipated
True power

Choice 3 mismatch

It is dissipated as kinetic energy in the circuit
Peak envelope power

Choice 4 mismatch

It is dissipated in the formation of inductive and capacitive fields
Reactive power

E5D10

Answer mismatch

A
B

Question mismatch

How can the true power be determined in an AC circuit where the voltage and

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

current are out of phase?

In a circuit that has both inductors and capacitors, what happens to reactive power?

Choice 1 mismatch

By multiplying the apparent power times the power factor
It is dissipated as heat in the circuit

Choice 2 mismatch

By dividing the reactive power by the power factor
It is repeatedly exchanged between the associated magnetic and electric fields, but is not dissipated

Choice 3 mismatch

By dividing the apparent power by the power factor
It is dissipated as kinetic energy in the circuit

Choice 4 mismatch

By multiplying the reactive power times the power factor
It is dissipated in the formation of inductive and capacitive fields

E5D11

Answer mismatch

C

A

Question mismatch

What is the power factor of an R-L circuit having a 60 degree phase angle between the voltage and the current?

How can the true power be determined in an AC circuit where the voltage and current are out of phase?

Choice 1 mismatch

1.414

By multiplying the apparent power times the power factor

Choice 2 mismatch

0.866

By dividing the reactive power by the power factor

Choice 3 mismatch

0.5

By dividing the apparent power by the power factor

Choice 4 mismatch

1.73

By multiplying the reactive power times the power factor

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E5D12

Answer mismatch

B

C

Question mismatch

How many watts are consumed in a circuit having a power factor of 0.2 if the input is 100-V AC at 4 amperes?

What is the power factor of an R-L circuit having a 60 degree phase angle between the voltage and the current?

Choice 1 mismatch

400 watts

1.414

Choice 2 mismatch

80 watts

0.866

Choice 3 mismatch

2000 watts

0.5

Choice 4 mismatch

50 watts

1.73

E5D13

Question mismatch

How much power is consumed in a circuit consisting of a 100 ohm resistor in series with a 100 ohm inductive reactance drawing 1 ampere?

How many watts are consumed in a circuit having a power factor of 0.2 if the input is 100-V AC at 4 amperes?

Choice 1 mismatch

70.7 Watts

400 watts

Choice 2 mismatch

100 Watts

80 watts

Choice 3 mismatch

141.4 Watts

2000 watts

Choice 4 mismatch

200 Watts

50 watts

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E5D14

Answer mismatch

A

B

Question mismatch

What is reactive power?

How much power is consumed in a circuit consisting of a 100 ohm resistor in series with a 100 ohm inductive reactance drawing 1 ampere?

Choice 1 mismatch

Wattless, nonproductive power

70.7 Watts

Choice 2 mismatch

Power consumed in wire resistance in an inductor

100 Watts

Choice 3 mismatch

Power lost because of capacitor leakage

141.4 Watts

Choice 4 mismatch

Power consumed in circuit Q

200 Watts

E5D15

Answer mismatch

D

A

Question mismatch

What is the power factor of an RL circuit having a 45 degree phase angle between the voltage and the current?

What is reactive power?

Choice 1 mismatch

0.866

Wattless, nonproductive power

Choice 2 mismatch

1.0

Power consumed in wire resistance in an inductor

Choice 3 mismatch

0.5

Power lost because of capacitor leakage

Choice 4 mismatch

0.707

Power consumed in circuit Q

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E5D16

Answer mismatch

C

D

Question mismatch

What is the power factor of an RL circuit having a 30 degree phase angle between the voltage and the current?

What is the power factor of an RL circuit having a 45 degree phase angle between the voltage and the current?

Choice 1 mismatch

1.73

0.866

Choice 2 mismatch

0.5

1.0

Choice 3 mismatch

0.866

0.5

Choice 4 mismatch

0.577

0.707

E5D17

Answer mismatch

D

C

Question mismatch

How many watts are consumed in a circuit having a power factor of 0.6 if the input is 200V AC at 5 amperes?

What is the power factor of an RL circuit having a 30 degree phase angle between the voltage and the current?

Choice 1 mismatch

200 watts

1.73

Choice 2 mismatch

1000 watts

0.5

Choice 3 mismatch

1600 watts

0.866

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch
600 watts
0.577

E5D18
Answer mismatch
B
D

Question mismatch
How many watts are consumed in a circuit having a power factor of 0.71 if the apparent power is 500 VA?
How many watts are consumed in a circuit having a power factor of 0.6 if the input is 200V AC at 5 amperes?

Choice 1 mismatch
704 W
200 watts

Choice 2 mismatch
355 W
1000 watts

Choice 3 mismatch
252 W
1600 watts

Choice 4 mismatch
1.42 mW
600 watts

E6A02
Question mismatch
Which of the following semiconductor materials contains excess free electrons?
What type of semiconductor material contains more free electrons than pure germanium or silicon crystals?

E6A06
Question mismatch
What is the beta of a bipolar junction transistor?
What is meant by the beta of a bipolar junction transistor?

E6A08
Question mismatch

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

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

E6A09

Choice 3 mismatch

Any FET without a channel

An FET without a channel so no current flows with zero gate voltage

Choice 4 mismatch

Any FET for which holes are the majority carriers

An FET without a channel so maximum gate current flows

E6A12

Question mismatch

Why do many MOSFET devices have internally connected Zener diodes on the gates?

Why do many MOSFET devices have built-in gate-protective Zener diodes?

E6A13

Choice 1 mismatch

Common Mode Oscillating System

Common mode oscillating system

Choice 2 mismatch

Complementary Mica-Oxide Silicon

Complementary mica-oxide silicon

Choice 3 mismatch

Complementary Metal-Oxide Semiconductor

Complementary metal-oxide semiconductor

Choice 4 mismatch

Common Mode Organic Silicon

Complementary metal-oxide substrate

E6A14

Choice 1 mismatch

They are both low impedance

They cannot be compared without first knowing the supply voltage

Choice 4 mismatch

They are both high impedance

The input impedance of FETs and bipolar transistors is the same

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E6A15

Question mismatch

Which of the following semiconductor materials contains an excess of holes in the outer shell of electrons?

What two elements widely used in semiconductor devices exhibit both metallic and nonmetallic characteristics?

Choice 1 mismatch

N-type

Silicon and gold

Choice 2 mismatch

P-type

Silicon and germanium

Choice 3 mismatch

Superconductor-type

Galena and germanium

Choice 4 mismatch

Bipolar-type

Galena and bismuth

E6A16

Question mismatch

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

What type of semiconductor material contains fewer free electrons than pure germanium or silicon crystals?

Choice 1 mismatch

Holes

N-type

Choice 2 mismatch

Free electrons

P-type

Choice 3 mismatch

Free protons

Superconductor-type

Choice 4 mismatch

Free neutrons

Bipolar-type

E6A17

Answer mismatch

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

D
B

Question mismatch

What are the names of the three terminals of a field-effect transistor?
What are the majority charge carriers in N-type semiconductor material?

Choice 1 mismatch

Gate 1, gate 2, drain
Holes

Choice 2 mismatch

Emitter, base, collector
Free electrons

Choice 3 mismatch

Emitter, base 1, base 2
Free protons

Choice 4 mismatch

Gate, drain, source
Free neutrons

E6B01

Question mismatch

What is the most useful characteristic of a Zener diode?
What is the principal characteristic of a Zener diode?

Choice 1 mismatch

A constant current drop under conditions of varying voltage
A constant current under conditions of varying voltage

Choice 2 mismatch

A constant voltage drop under conditions of varying current
A constant voltage under conditions of varying current

E6B02

Answer mismatch

D
C

Question mismatch

What is an important characteristic of a Schottky diode as compared to an ordinary silicon diode when used as a power supply rectifier?
What is the principal characteristic of a tunnel diode?

Choice 1 mismatch

Much higher reverse voltage breakdown
A high forward resistance

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

Controlled reverse avalanche voltage

A very high PIV

Choice 3 mismatch

Enhanced carrier retention time

A negative resistance region

Choice 4 mismatch

Less forward voltage drop

A high forward current rating

E6B03

Answer mismatch

C

D

Question mismatch

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

What is an important characteristic of a Schottky Barrier diode as compared to an ordinary silicon diode when used as a power supply rectifier?

Choice 1 mismatch

Point contact

Much higher reverse voltage breakdown

Choice 2 mismatch

Zener

Controlled reverse avalanche voltage

Choice 3 mismatch

Tunnel

Enhanced carrier retention time

Choice 4 mismatch

Junction

Less forward voltage drop

E6B04

Answer mismatch

A

C

Question mismatch

What type of semiconductor device is designed for use as a voltage-controlled capacitor?

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

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch
Varactor diode
Point contact

Choice 2 mismatch
Tunnel diode
Zener

Choice 3 mismatch
Silicon-controlled rectifier
Tunnel

Choice 4 mismatch
Zener diode
Junction

E6B05
Answer mismatch
D
A

Question mismatch
What characteristic of a PIN diode makes it useful as an RF switch or attenuator?
What type of semiconductor device varies its internal capacitance as the voltage applied to its terminals varies?

Choice 1 mismatch
Extremely high reverse breakdown voltage
Varactor diode

Choice 2 mismatch
Ability to dissipate large amounts of power
Tunnel diode

Choice 3 mismatch
Reverse bias controls its forward voltage drop
Silicon-controlled rectifier

Choice 4 mismatch
A large region of intrinsic material
Zener diode

E6B06
Figure mismatch

E6-3

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

Which of the following is a common use of a hot-carrier diode?
In Figure E6-3, what is the schematic symbol for a varactor diode?

Choice 1 mismatch

As balanced mixers in FM generation
8

Choice 2 mismatch

As a variable capacitance in an automatic frequency control circuit
6

Choice 3 mismatch

As a constant voltage reference in a power supply
2

Choice 4 mismatch

As a VHF / UHF mixer or detector
1

E6B07

Answer mismatch

B
D

Question mismatch

What is the failure mechanism when a junction diode fails due to excessive current?
What is a common use of a hot-carrier diode?

Choice 1 mismatch

Excessive inverse voltage
As balanced mixers in FM generation

Choice 2 mismatch

Excessive junction temperature
As a variable capacitance in an automatic frequency control circuit

Choice 3 mismatch

Insufficient forward voltage
As a constant voltage reference in a power supply

Choice 4 mismatch

Charge carrier depletion
As a VHF / UHF mixer or detector

E6B08

Answer mismatch

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

A
B

Question mismatch

Which of the following describes a type of semiconductor diode?
What limits the maximum forward current rating in a junction diode?

Choice 1 mismatch

Metal-semiconductor junction
Peak inverse voltage

Choice 2 mismatch

Electrolytic rectifier
Junction temperature

Choice 3 mismatch

CMOS-field effect
Forward voltage

Choice 4 mismatch

Thermionic emission diode
Back EMF

E6B09

Answer mismatch

C
A

Question mismatch

What is a common use for point contact diodes?
Which of the following describes a type of semiconductor diode?

Choice 1 mismatch

As a constant current source
Metal-semiconductor junction

Choice 2 mismatch

As a constant voltage source
Electrolytic rectifier

Choice 3 mismatch

As an RF detector
CMOS-field effect

Choice 4 mismatch

As a high voltage rectifier
Thermionic emission diode

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E6B10

Figure mismatch

E6-3

Answer mismatch

B

C

Question mismatch

In Figure E6-3, what is the schematic symbol for a light-emitting diode?
What is a common use for point contact diodes?

Choice 1 mismatch

1

As a constant current source

Choice 2 mismatch

5

As a constant voltage source

Choice 3 mismatch

6

As an RF detector

Choice 4 mismatch

7

As a high voltage rectifier

E6B11

Figure mismatch

E6-3

Answer mismatch

A

B

Question mismatch

What is used to control the attenuation of RF signals by a PIN diode?
In Figure E6-3, what is the schematic symbol for a light-emitting diode?

Choice 1 mismatch

Forward DC bias current

1

Choice 2 mismatch

A sub-harmonic pump signal

5

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Reverse voltage larger than the RF signal

6

Choice 4 mismatch

Capacitance of an RF coupling capacitor

7

E6B12

Answer mismatch

C

D

Question mismatch

What is one common use for PIN diodes?

How are junction diodes rated?

Choice 1 mismatch

As a constant current source

Maximum forward current and capacitance

Choice 2 mismatch

As a constant voltage source

Maximum reverse current and PIV

Choice 3 mismatch

As an RF switch

Maximum reverse current and capacitance

Choice 4 mismatch

As a high voltage rectifier

Maximum forward current and PIV

E6B13

Answer mismatch

B

C

Question mismatch

What type of bias is required for an LED to emit light?

What is one common use for PIN diodes?

Choice 1 mismatch

Reverse bias

As a constant current source

Choice 2 mismatch

Forward bias

As a constant voltage source

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch
Zero bias
As an RF switch

Choice 4 mismatch
Inductive bias
As a high voltage rectifier

E6C03

Question mismatch

Which of the following describes tri-state logic?
What level of input voltage is a logic "high" in a TTL device operating with a positive 5-volt power supply?

Choice 1 mismatch
Logic devices with 0, 1, and high impedance output states
2.0 to 5.5 volts

Choice 2 mismatch
Logic devices that utilize ternary math
1.5 to 3.0 volts

Choice 3 mismatch
Low power logic devices designed to operate at 3 volts
1.0 to 1.5 volts

Choice 4 mismatch
Proprietary logic devices manufactured by Tri-State Devices
-5.0 to -2.0 volts

E6C04

Answer mismatch
B
C

Question mismatch

Which of the following is the primary advantage of tri-state logic?
What level of input voltage is a logic "low" in a TTL device operating with a positive 5-volt power-supply?

Choice 1 mismatch
Low power consumption
-2.0 to -5.5 volts

Choice 2 mismatch
Ability to connect many device outputs to a common bus
2.0 to 5.5 volts

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch
High speed operation
0.0 to 0.8 volts

Choice 4 mismatch
More efficient arithmetic operations
-0.8 to 0.4 volts

E6D01
Question mismatch
What is cathode ray tube (CRT) persistence?
How is the electron beam deflected in a vidicon?

Choice 1 mismatch
The time it takes for an image to appear after the electron beam is turned on
By varying the beam voltage

Choice 2 mismatch
The relative brightness of the display under varying conditions of ambient light
By varying the bias voltage on the beam forming grids inside the tube

Choice 3 mismatch
The ability of the display to remain in focus under varying conditions
By varying the beam current

Choice 4 mismatch
The length of time the image remains on the screen after the beam is turned off
By varying electromagnetic fields

E6D02
Answer mismatch
B
D

Question mismatch
Exceeding what design rating can cause a cathode ray tube (CRT) to generate X-rays?
What is cathode ray tube (CRT) persistence?

Choice 1 mismatch
The heater voltage
The time it takes for an image to appear after the electron beam is turned on

Choice 2 mismatch
The anode voltage
The relative brightness of the display under varying conditions of ambient light

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

The operating temperature

The ability of the display to remain in focus under varying conditions

Choice 4 mismatch

The operating frequency

The length of time the image remains on the screen after the beam is turned off

E6D03

Answer mismatch

C

A

Question mismatch

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

If a cathode ray tube (CRT) is designed to operate with an anode voltage of 25,000 volts, what will happen if the anode voltage is increased to 35,000 volts?

Choice 1 mismatch

Its phase shift changes rapidly with frequency

The image size will decrease

Choice 2 mismatch

It is a CMOS analog-to-digital converter

The image size will increase

Choice 3 mismatch

It samples an analog signal and passes it in stages from the input to the output

The image will become larger and brighter

Choice 4 mismatch

It is used in a battery charger circuit

There will be no apparent change

E6D04

Answer mismatch

A

B

Question mismatch

What function does a charge-coupled device (CCD) serve in a modern video camera?

Exceeding what design rating can cause a cathode ray tube (CRT) to generate X-rays?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

It stores photogenerated charges as signals corresponding to pixels
The heater voltage

Choice 2 mismatch

It generates the horizontal pulses needed for electron beam scanning
The anode voltage

Choice 3 mismatch

It focuses the light used to produce a pattern of electrical charges corresponding to the image
The operating temperature

Choice 4 mismatch

It combines audio and video information to produce a composite RF signal
The operating frequency

E6D05

Answer mismatch

B
C

Question mismatch

What is a liquid-crystal display (LCD)?
Which of the following is true of a charge-coupled device (CCD)?

Choice 1 mismatch

A modern replacement for a quartz crystal oscillator which displays its fundamental frequency
Its phase shift changes rapidly with frequency

Choice 2 mismatch

A display using a crystalline liquid which, in conjunction with polarizing filters, becomes opaque when voltage is applied
It is a CMOS analog-to-digital converter

Choice 3 mismatch

A frequency-determining unit for a transmitter or receiver
It samples an analog signal and passes it in stages from the input to the output

Choice 4 mismatch

A display that uses a glowing liquid to remain brightly lit in dim light
It is used in a battery charger circuit

E6D06

Answer mismatch

D
A

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

What core material property determines the inductance of a toroidal inductor?
What function does a charge-coupled device (CCD) serve in a modern video camera?

Choice 1 mismatch

Thermal impedance

It stores photogenerated charges as signals corresponding to pixels

Choice 2 mismatch

Resistance

It generates the horizontal pulses needed for electron beam scanning

Choice 3 mismatch

Reactivity

It focuses the light used to produce a pattern of electrical charges corresponding to the image

Choice 4 mismatch

Permeability

It combines audio and video information to produce a composite RF signal

E6D07

Question mismatch

What is the usable frequency range of inductors that use toroidal cores, assuming a correct selection of core material for the frequency being used?
What is a liquid-crystal display (LCD)?

Choice 1 mismatch

From a few kHz to no more than 30 MHz

A modern replacement for a quartz crystal oscillator which displays its fundamental frequency

Choice 2 mismatch

From less than 20 Hz to approximately 300 MHz

A display that uses a crystalline liquid to change the way light is refracted

Choice 3 mismatch

From approximately 10 Hz to no more than 3000 kHz

A frequency-determining unit for a transmitter or receiver

Choice 4 mismatch

From about 100 kHz to at least 1000 GHz

A display that uses a glowing liquid to remain brightly lit in dim light

E6D08

Answer mismatch

B

D

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

What is one important reason for using powdered-iron toroids rather than ferrite toroids in an inductor?

What material property determines the inductance of a toroidal inductor with a 10-turn winding?

Choice 1 mismatch

Powdered-iron toroids generally have greater initial permeability
Core load current

Choice 2 mismatch

Powdered-iron toroids generally maintain their characteristics at higher currents
Core resistance

Choice 3 mismatch

Powdered-iron toroids generally require fewer turns to produce a given inductance value
Core reactivity

Choice 4 mismatch

Powdered-iron toroids have higher power handling capacity
Core permeability

E6D09

Answer mismatch

C
B

Question mismatch

What devices are commonly used as VHF and UHF parasitic suppressors at the input and output terminals of transistorized HF amplifiers?

What is the usable frequency range of inductors that use toroidal cores, assuming a correct selection of core material for the frequency being used?

Choice 1 mismatch

Electrolytic capacitors
From a few kHz to no more than 30 MHz

Choice 2 mismatch

Butterworth filters
From less than 20 Hz to approximately 300 MHz

Choice 3 mismatch

Ferrite beads
From approximately 1000 Hz to no more than 3000 kHz

Choice 4 mismatch

Steel-core toroids
From about 100 kHz to at least 1000 GHz

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E6D10

Answer mismatch

A

B

Question mismatch

What is a primary advantage of using a toroidal core instead of a solenoidal core in an inductor?

What is one important reason for using powdered-iron toroids rather than ferrite toroids in an inductor?

Choice 1 mismatch

Toroidal cores confine most of the magnetic field within the core material
Powdered-iron toroids generally have greater initial permeabilities

Choice 2 mismatch

Toroidal cores make it easier to couple the magnetic energy into other components
Powdered-iron toroids generally have better temperature stability

Choice 3 mismatch

Toroidal cores exhibit greater hysteresis
Powdered-iron toroids generally require fewer turns to produce a given inductance value

Choice 4 mismatch

Toroidal cores have lower Q characteristics
Powdered-iron toroids have the highest power handling capacity

E6D11

Question mismatch

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?

What devices are commonly used as VHF and UHF parasitic suppressors at the input and output terminals of transistorized HF amplifiers?

Choice 1 mismatch

2 turns
Electrolytic capacitors

Choice 2 mismatch

4 turns
Butterworth filters

Choice 3 mismatch

43 turns
Ferrite beads

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch
229 turns
Steel-core toroids

E6D12

Question mismatch

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?

What is a primary advantage of using a toroidal core instead of a solenoidal core in an inductor?

Choice 1 mismatch

35 turns

Toroidal cores contain most of the magnetic field within the core material

Choice 2 mismatch

13 turns

Toroidal cores make it easier to couple the magnetic energy into other components

Choice 3 mismatch

79 turns

Toroidal cores exhibit greater hysteresis

Choice 4 mismatch

141 turns

Toroidal cores have lower Q characteristics

E6D13

Answer mismatch

D

C

Question mismatch

What type of CRT deflection is better when high-frequency waveforms are to be displayed on the screen?

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?

Choice 1 mismatch

Electromagnetic

2 turns

Choice 2 mismatch

Tubular

4 turns

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Radar
43 turns

Choice 4 mismatch

Electrostatic
229 turns

E6D14

Answer mismatch

C
A

Question mismatch

Which is NOT true of a charge-coupled device (CCD)?
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?

Choice 1 mismatch

It uses a combination of analog and digital circuitry
35 turns

Choice 2 mismatch

It can be used to make an audio delay line
13 turns

Choice 3 mismatch

It is commonly used as an analog-to-digital converter
79 turns

Choice 4 mismatch

It samples and stores analog signals
141 turns

E6D15

Answer mismatch

A
D

Question mismatch

What is the principle advantage of liquid-crystal display (LCD) devices over other types of display devices?
What type of CRT deflection is better when high-frequency waves are to be displayed on the screen?

Choice 1 mismatch

They consume less power
Electromagnetic

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

They can display changes instantly
Tubular

Choice 3 mismatch

They are visible in all light conditions
Radar

Choice 4 mismatch

They can be easily interchanged with other display devices
Electrostatic

E6D16

Question mismatch

What is one reason for using ferrite toroids rather than powdered-iron toroids in an inductor?
Which is NOT true of a charge-coupled device (CCD)?

Choice 1 mismatch

Ferrite toroids generally have lower initial permeabilities
It uses a combination of analog and digital circuitry

Choice 2 mismatch

Ferrite toroids generally have better temperature stability
It can be used to make an audio delay line

Choice 3 mismatch

Ferrite toroids generally require fewer turns to produce a given inductance value
It is commonly used as an analog-to-digital converter

Choice 4 mismatch

Ferrite toroids are easier to use with surface mount technology
It samples and stores analog signals

E6E01

Answer mismatch

D
B

Question mismatch

What is a crystal lattice filter?
Which of these filter bandwidths would be a good choice for use in a SSB radiotelephone transmitter?

Choice 1 mismatch

A power supply filter made with interlaced quartz crystals
6 kHz at -6 dB

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

An audio filter made with four quartz crystals that resonate at 1-kHz intervals

2.4 kHz at -6 dB

Choice 3 mismatch

A filter with wide bandwidth and shallow skirts made using quartz crystals

500 Hz at -6 dB

Choice 4 mismatch

A filter with narrow bandwidth and steep skirts made using quartz crystals

15 kHz at -6 dB

E6E02

Answer mismatch

A

C

Question mismatch

Which of the following factors has the greatest effect in helping determine the bandwidth and response shape of a crystal ladder filter?

Which of these filter bandwidths would be a good choice for use with standard double-sideband AM transmissions?

Choice 1 mismatch

The relative frequencies of the individual crystals

1 kHz at -6 dB

Choice 2 mismatch

The DC voltage applied to the quartz crystal

500 Hz at -6 dB

Choice 3 mismatch

The gain of the RF stage preceding the filter

6 kHz at -6 dB

Choice 4 mismatch

The amplitude of the signals passing through the filter

15 kHz at -6 dB

E6E03

Answer mismatch

A

D

Question mismatch

What is one aspect of the piezoelectric effect?

What is a crystal lattice filter?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

Physical deformation of a crystal by the application of a voltage
A power supply filter made with interlaced quartz crystals

Choice 2 mismatch

Mechanical deformation of a crystal by the application of a magnetic field
An audio filter made with four quartz crystals that resonate at 1-kHz intervals

Choice 3 mismatch

The generation of electrical energy by the application of light
A filter with wide bandwidth and shallow skirts made using quartz crystals

Choice 4 mismatch

Reversed conduction states when a P-N junction is exposed to light
A filter with narrow bandwidth and steep skirts made using quartz crystals

E6E04

Answer mismatch

A
D

Question mismatch

What is the most common input and output impedance of circuits that use MMICs?
What technique is used to construct low-cost, high-performance crystal ladder filters?

Choice 1 mismatch

50 ohms
Obtain a small quantity of custom-made crystals

Choice 2 mismatch

300 ohms
Choose a crystal with the desired bandwidth and operating frequency to match a desired center frequency

Choice 3 mismatch

450 ohms
Measure crystal bandwidth to ensure at least 20% coupling

Choice 4 mismatch

10 ohms
Measure crystal frequencies and carefully select units with a frequency variation of less than 10% of the desired filter bandwidth

E6E05

Question mismatch

Which of the following noise figure values is typical of a low-noise UHF

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

preamplifier?

Which of the following factors has the greatest effect in helping determine the bandwidth and response shape of a crystal ladder filter?

Choice 1 mismatch

2 dB

The relative frequencies of the individual crystals

Choice 2 mismatch

-10 dB

The DC voltage applied to the quartz crystal

Choice 3 mismatch

44 dBm

The gain of the RF stage preceding the filter

Choice 4 mismatch

-20 dBm

The amplitude of the signals passing through the filter

E6E06

Answer mismatch

D

A

Question mismatch

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

What is one aspect of the piezoelectric effect?

Choice 1 mismatch

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

Physical deformation of a crystal by the application of a voltage

Choice 2 mismatch

Plate current that is controlled by a control grid

Mechanical deformation of a crystal by the application of a magnetic field

Choice 3 mismatch

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

The generation of electrical energy by the application of light

Choice 4 mismatch

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

Reversed conduction states when a P-N junction is exposed to light

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E6E07

Answer mismatch

B

A

Question mismatch

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

What is the characteristic impedance of circuits in which almost all MMICs are designed to work?

Choice 1 mismatch

Ground-plane construction

50 ohms

Choice 2 mismatch

Microstrip construction

300 ohms

Choice 3 mismatch

Point-to-point construction

450 ohms

Choice 4 mismatch

Wave-soldering construction

10 ohms

E6E08

Answer mismatch

A

B

Question mismatch

How is power-supply voltage normally furnished to the most common type of monolithic microwave integrated circuit (MMIC)?

What is the typical noise figure of a monolithic microwave integrated circuit (MMIC) amplifier?

Choice 1 mismatch

Through a resistor and/or RF choke connected to the amplifier output lead
Less than 1 dB

Choice 2 mismatch

MMICs require no operating bias
Approximately 3.5 to 6 dB

Choice 3 mismatch

Through a capacitor and RF choke connected to the amplifier input lead
Approximately 8 to 10 dB

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

Directly to the bias-voltage (VCC IN) lead
More than 20 dB

E6E09

Answer mismatch

B
D

Question mismatch

Which of the following must be done to insure that a crystal oscillator provides the frequency specified by the crystal manufacturer?
What type of amplifier device consists of a small pill-type package with an input lead, an output lead and 2 ground leads?

Choice 1 mismatch

Provide the crystal with a specified parallel inductance
A junction field-effect transistor (JFET)

Choice 2 mismatch

Provide the crystal with a specified parallel capacitance
An operational amplifier integrated circuit (OAIC)

Choice 3 mismatch

Bias the crystal at a specified voltage
An indium arsenide integrated circuit (IAIC)

Choice 4 mismatch

Bias the crystal at a specified current
A monolithic microwave integrated circuit (MMIC)

E6E10

Answer mismatch

A
B

Question mismatch

What is the equivalent circuit of a quartz crystal?
What typical construction technique is used when building an amplifier for the microwave bands containing a monolithic microwave integrated circuit (MMIC)?

Choice 1 mismatch

Motional capacitance, motional inductance and loss resistance in series, with a shunt capacitance representing electrode and stray capacitance
Ground-plane "ugly" construction

Choice 2 mismatch

Motional capacitance, motional inductance, loss resistance, and a capacitor

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

representing electrode and stray capacitance all in parallel
Microstrip construction

Choice 3 mismatch

Motional capacitance, motional inductance, loss resistance, and a capacitor
represent electrode and stray capacitance all in series
Point-to-point construction

Choice 4 mismatch

Motional inductance and loss resistance in series, paralleled with motional
capacitance and a capacitor representing electrode and stray capacitance
Wave-soldering construction

E6E11

Answer mismatch

D

A

Question mismatch

Which of the following materials is likely to provide the highest frequency
of operation when used in MMICs?

How is the operating bias voltage normally supplied to the most common type
of monolithic microwave integrated circuit (MMIC)?

Choice 1 mismatch

Silicon

Through a resistor and/or RF choke connected to the amplifier output lead

Choice 2 mismatch

Silicon nitride

MMICs require no operating bias

Choice 3 mismatch

Silicon dioxide

Through a capacitor and RF choke connected to the amplifier input lead

Choice 4 mismatch

Gallium nitride

Directly to the bias-voltage (VCC IN) lead

E6E12

Question mismatch

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

What supply voltage do monolithic microwave integrated circuits (MMIC)
amplifiers typically require?

Choice 1 mismatch

An automatic notch filter

1 volt DC

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

A variable bandwidth crystal lattice filter
12 volts DC

Choice 3 mismatch

A special filter that emphasizes image responses
20 volts DC

Choice 4 mismatch

A filter that removes impulse noise
120 volts DC

E6F03

Question mismatch

What is the most common configuration of an optoisolator or optocoupler?
What is the most common configuration for an optocoupler?

E6F04

Answer mismatch

B
A

Question mismatch

What is the photovoltaic effect?
Which of the following is an optoisolator?

Choice 1 mismatch

The conversion of voltage to current when exposed to light
An LED and a phototransistor

Choice 2 mismatch

The conversion of light to electrical energy
A P-N junction that develops an excess positive charge when exposed to light

Choice 3 mismatch

The conversion of electrical energy to mechanical energy
An LED and a capacitor

Choice 4 mismatch

The tendency of a battery to discharge when used outside
A P-N junction that develops an excess negative charge when exposed to light

E6F05

Answer mismatch

A
B

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

Which of the following describes an optical shaft encoder?
What is an optical shaft encoder?

Choice 1 mismatch

A device which detects rotation of a control by interrupting a light source with a patterned wheel
An array of neon or LED indicators whose light transmission path is controlled by a rotating wheel

Choice 2 mismatch

A device which measures the strength a beam of light using analog to digital conversion
An array of optocouplers whose light transmission path is controlled by a rotating wheel

Choice 3 mismatch

A digital encryption device often used to encrypt spacecraft control signals
An array of neon or LED indicators mounted on a rotating wheel in a coded pattern

Choice 4 mismatch

A device for generating RTTY signals by means of a rotating light source.
An array of optocouplers mounted on a rotating wheel in a coded pattern

E6F06

Answer mismatch

A
D

Question mismatch

Which of these materials is affected the most by photoconductivity?
What characteristic of a crystalline solid will photoconductivity change?

Choice 1 mismatch

A crystalline semiconductor
The capacitance

Choice 2 mismatch

An ordinary metal
The inductance

Choice 3 mismatch

A heavy metal
The specific gravity

Choice 4 mismatch

A liquid semiconductor
The resistance

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E6F07

Answer mismatch

B

C

Question mismatch

What is a solid state relay?

Which material will exhibit the greatest photoconductive effect when illuminated by visible light?

Choice 1 mismatch

A relay using transistors to drive the relay coil

Potassium nitrate

Choice 2 mismatch

A device that uses semiconductor devices to implement the functions of an electromechanical relay

Lead sulfide

Choice 3 mismatch

A mechanical relay that latches in the on or off state each time it is pulsed

Cadmium sulfide

Choice 4 mismatch

A passive delay line

Sodium chloride

E6F08

Answer mismatch

C

B

Question mismatch

Why are optoisolators often used in conjunction with solid state circuits when switching 120 VAC?

Which material will exhibit the greatest photoconductive effect when illuminated by infrared light?

Choice 1 mismatch

Optoisolators provide a low impedance link between a control circuit and a power circuit

Potassium nitrate

Choice 2 mismatch

Optoisolators provide impedance matching between the control circuit and power circuit

Lead sulfide

Choice 3 mismatch

Optoisolators provide a very high degree of electrical isolation between a

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

control circuit and the circuit being switched
Cadmium sulfide

Choice 4 mismatch

Optoisolators eliminate the effects of reflected light in the control circuit
Sodium chloride

E6F09

Answer mismatch

D

A

Question mismatch

What is the efficiency of a photovoltaic cell?
Which of the following materials is affected the most by photoconductivity?

Choice 1 mismatch

The output RF power divided by the input dc power
A crystalline semiconductor

Choice 2 mismatch

The effective payback period
An ordinary metal

Choice 3 mismatch

The open-circuit voltage divided by the short-circuit current under full illumination
A heavy metal

Choice 4 mismatch

The relative fraction of light that is converted to current
A liquid semiconductor

E6F10

Question mismatch

What is the most common type of photovoltaic cell used for electrical power generation?
What characteristic of optoisolators is often used in power supplies?

Choice 1 mismatch

Selenium
They have low impedance between the light source and the phototransistor

Choice 2 mismatch

Silicon
They have very high impedance between the light source and the phototransistor

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Cadmium Sulfide

They have low impedance between the light source and the LED

Choice 4 mismatch

Copper oxide

They have very high impedance between the light source and the LED

E6F11

Answer mismatch

B

C

Question mismatch

Which of the following is the approximate open-circuit voltage produced by a fully-illuminated silicon photovoltaic cell?

What characteristic of optoisolators makes them suitable for use with a triac to form the solid-state equivalent of a mechanical relay for a 120 V AC household circuit?

Choice 1 mismatch

0.1 V

Optoisolators provide a low impedance link between a control circuit and a power circuit

Choice 2 mismatch

0.5 V

Optoisolators provide impedance matching between the control circuit and power circuit

Choice 3 mismatch

1.5 V

Optoisolators provide a very high degree of electrical isolation between a control circuit and a power circuit

Choice 4 mismatch

12 V

Optoisolators eliminate (isolate) the effects of reflected light in the control circuit

E6F12

Answer mismatch

C

D

Question mismatch

What absorbs the energy from light falling on a photovoltaic cell?

Which of the following types of photovoltaic cell has the highest efficiency?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch
Protons
Silicon

Choice 2 mismatch
Photons
Silver iodide

Choice 3 mismatch
Electrons
Selenium

Choice 4 mismatch
Holes
Gallium arsenide

E7A01
Question mismatch
Which of the following is a bistable circuit?
What is a bistable circuit?

Choice 1 mismatch
An "AND" gate
An "AND" gate

Choice 2 mismatch
An "OR" gate
An "OR" gate

E7A02
Question mismatch
How many output level changes are obtained for every two trigger pulses applied to the input of a T flip-flop circuit?
How many output level changes are obtained for every two trigger pulses applied to the input of a "T" flip-flop circuit?

E7A03
Question mismatch
Which of the following can divide the frequency of a pulse train by 2?
Which of the following can divide the frequency of pulse train by 2?

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

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

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

Choice 2 mismatch

J-K flip-flop

J-K Flip-Flop

Choice 3 mismatch

T flip-flop

T Flip-Flop

Choice 4 mismatch

Astable multivibrator

Astable Multivibrator

E7A07

Answer mismatch

D

B

Question mismatch

What logical operation does a NAND gate perform?

What logical operation does an AND gate perform?

Choice 1 mismatch

It produces a logic "0" at its output only when all inputs are logic "0"

It produces a logic "0" at its output only if all inputs are logic "1"

Choice 2 mismatch

It produces a logic "1" at its output only when all inputs are logic "1"

It produces a logic "1" at its output only if all inputs are logic "1"

Choice 3 mismatch

It produces a logic "0" at its output if some but not all of its inputs are logic "1"

It produces a logic "1" at its output if only one input is a logic "1"

Choice 4 mismatch

It produces a logic "0" at its output only when all inputs are logic "1"

It produces a logic "1" at its output if all inputs are logic "0"

E7A08

Answer mismatch

A

D

Question mismatch

What logical operation does an OR gate perform?

What logical operation does a NAND gate perform?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

It produces a logic "1" at its output if any or all inputs are logic "1"
It produces a logic "0" at its output only when all inputs are logic "0"

Choice 2 mismatch

It produces a logic "0" at its output if all inputs are logic "1"
It produces a logic "1" at its output only when all inputs are logic "1"

Choice 3 mismatch

It only produces a logic "0" at its output when all inputs are logic "1"
It produces a logic "0" at its output if some but not all of its inputs are logic "1"

Choice 4 mismatch

It produces a logic "1" at its output if all inputs are logic "0"
It produces a logic "0" at its output only when all inputs are logic "1"

E7A09

Answer mismatch

C

A

Question mismatch

What logical operation is performed by a two-input exclusive NOR gate?
What logical operation does an OR gate perform?

Choice 1 mismatch

It produces a logic "0" at its output only if all inputs are logic "0"
It produces a logic "1" at its output if any or all inputs are logic "1"

Choice 2 mismatch

It produces a logic "1" at its output only if all inputs are logic "1"
It produces a logic "0" at its output if all inputs are logic "1"

Choice 3 mismatch

It produces a logic "0" at its output if any single input is a logic "1"
It only produces a logic "0" at its output when all inputs are logic "1"

Choice 4 mismatch

It produces a logic "1" at its output if any single input is a logic "1"
It produces a logic "1" at its output if all inputs are logic "0"

E7A10

Question mismatch

What is a truth table?

What logical operation does a NOR gate perform?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

A table of logic symbols that indicate the high logic states of an op-amp
It produces a logic "0" at its output only if all inputs are logic "0"

Choice 2 mismatch

A diagram showing logic states when the digital device's output is true
It produces a logic "1" at its output only if all inputs are logic "1"

Choice 3 mismatch

A list of inputs and corresponding outputs for a digital device
It produces a logic "0" at its output if any or all inputs are logic "1"

Choice 4 mismatch

A table of logic symbols that indicates the low logic states of an op-amp
It produces a logic "1" at its output only when none of its inputs are logic "0"

E7A11

Answer mismatch

- D
- C

Question mismatch

What is the name for logic which represents a logic "1" as a high voltage?
What is a truth table?

Choice 1 mismatch

Reverse Logic

A table of logic symbols that indicate the high logic states of an op-amp

Choice 2 mismatch

Assertive Logic

A diagram showing logic states when the digital device's output is true

Choice 3 mismatch

Negative logic

A list of inputs and corresponding outputs for a digital device

Choice 4 mismatch

Positive Logic

A table of logic symbols that indicates the low logic states of an op-amp

E7A12

Answer mismatch

- C
- D

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

What is the name for logic which represents a logic "0" as a high voltage?
What is the name for logic which represents a logic "1" as a high voltage?

E7A13

Answer mismatch

B
C

Question mismatch

What is an SR or RS flip-flop?
What is the name for logic which represents a logic "0" as a high voltage?

Choice 1 mismatch

A speed-reduced logic device with high power capability
Reverse Logic

Choice 2 mismatch

A set/reset flip-flop whose output is low when R is high and S is low, high when S is high and R is low, and unchanged when both inputs are low
Assertive Logic

Choice 3 mismatch

A speed-reduced logic device with very low voltage operation capability
Negative logic

Choice 4 mismatch

A set/reset flip-flop that toggles whenever the T input is pulsed, unless both inputs are high
Positive Logic

E7B02

Answer mismatch

A
C

Question mismatch

What is a Class D amplifier?
Which class of amplifier, of the types shown, provides the highest efficiency?

Choice 1 mismatch

A type of amplifier that uses switching technology to achieve high efficiency
Class A

Choice 2 mismatch

A low power amplifier using a differential amplifier for improved linearity
Class B

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

An amplifier using drift-mode FETs for high efficiency
Class C

Choice 4 mismatch

A frequency doubling amplifier
Class AB

E7B03

Question mismatch

Which of the following forms the output of a class D amplifier circuit?
Where on the load line of a Class A common emitter amplifier would bias normally be set?

Choice 1 mismatch

A low-pass filter to remove switching signal components
Approximately half-way between saturation and cutoff

Choice 2 mismatch

A high-pass filter to compensate for low gain at low frequencies
Where the load line intersects the voltage axis

Choice 3 mismatch

A matched load resistor to prevent damage by switching transients
At a point where the bias resistor equals the load resistor

Choice 4 mismatch

A temperature-compensated load resistor to improve linearity
At a point where the load line intersects the zero bias current curve

E7B04

Answer mismatch

A
C

Question mismatch

Where on the load line of a Class A common emitter amplifier would bias normally be set?
What can be done to prevent unwanted oscillations in a power amplifier?

Choice 1 mismatch

Approximately half-way between saturation and cutoff
Tune the stage for maximum SWR

Choice 2 mismatch

Where the load line intersects the voltage axis
Tune both the input and output for maximum power

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

At a point where the bias resistor equals the load resistor
Install parasitic suppressors and/or neutralize the stage

Choice 4 mismatch

At a point where the load line intersects the zero bias current curve
Use a phase inverter in the output filter

E7B05

Answer mismatch

C

B

Question mismatch

What can be done to prevent unwanted oscillations in an RF power amplifier?
Which of the following amplifier types reduces or eliminates even-order harmonics?

Choice 1 mismatch

Tune the stage for maximum SWR
Push-push

Choice 2 mismatch

Tune both the input and output for maximum power
Push-pull

Choice 3 mismatch

Install parasitic suppressors and/or neutralize the stage
Class C

Choice 4 mismatch

Use a phase inverter in the output filter
Class AB

E7B06

Answer mismatch

B

D

Question mismatch

Which of the following amplifier types reduces or eliminates even-order harmonics?
Which of the following is a likely result when a Class C rather than a class AB amplifier is used to amplify a single-sideband phone signal?

Choice 1 mismatch

Push-push
Intermodulation products will be greatly reduced

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

Push-pull

Overall intelligibility will increase

Choice 3 mismatch

Class C

Part of the transmitted signal will be inverted

Choice 4 mismatch

Class AB

The signal may become distorted and occupy excessive bandwidth

E7B07

Answer mismatch

D

C

Question mismatch

Which of the following is a likely result when a Class C amplifier is used to amplify a single-sideband phone signal?

How can a vacuum-tube power amplifier be neutralized?

Choice 1 mismatch

Reduced intermodulation products

By increasing the grid drive

Choice 2 mismatch

Increased overall intelligibility

By reducing the grid drive

Choice 3 mismatch

Signal inversion

By feeding back an out-of-phase component of the output to the input

Choice 4 mismatch

Signal distortion and excessive bandwidth

By feeding back an in-phase component of the output to the input

E7B08

Answer mismatch

C

D

Question mismatch

How can an RF power amplifier be neutralized?

Which of the following describes how the loading and tuning capacitors are to be adjusted when tuning a vacuum tube RF power amplifier that employs a pi-network output circuit?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

By increasing the driving power

The loading capacitor is set to maximum capacitance and the tuning capacitor is adjusted for minimum allowable plate current

Choice 2 mismatch

By reducing the driving power

The tuning capacitor is set to maximum capacitance and the loading capacitor is adjusted for minimum plate permissible current

Choice 3 mismatch

By feeding a 180-degree out-of-phase portion of the output back to the input

The loading capacitor is adjusted to minimum plate current while alternately adjusting the tuning capacitor for maximum allowable plate current

Choice 4 mismatch

By feeding an in-phase component of the output back to the input

The tuning capacitor is adjusted for minimum plate current, while the loading capacitor is adjusted for maximum permissible plate current

E7B09

Figure mismatch

E7-1

Answer mismatch

D

B

Question mismatch

Which of the following describes how the loading and tuning capacitors are to be adjusted when tuning a vacuum tube RF power amplifier that employs a pi-network output circuit?

In Figure E7-1, what is the purpose of R1 and R2?

Choice 1 mismatch

The loading capacitor is set to maximum capacitance and the tuning capacitor is adjusted for minimum allowable plate current

Load resistors

Choice 2 mismatch

The tuning capacitor is set to maximum capacitance and the loading capacitor is adjusted for minimum plate permissible current

Fixed bias

Choice 3 mismatch

The loading capacitor is adjusted to minimum plate current while alternately adjusting the tuning capacitor for maximum allowable plate current

Self bias

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

The tuning capacitor is adjusted for minimum plate current, while the loading capacitor is adjusted for maximum permissible plate current

Feedback

E7B10

Answer mismatch

B

D

Question mismatch

In Figure E7-1, what is the purpose of R1 and R2?

In Figure E7-1, what is the purpose of R3?

Choice 1 mismatch

Load resistors

Fixed bias

Choice 2 mismatch

Fixed bias

Emitter bypass

Choice 3 mismatch

Self bias

Output load resistor

Choice 4 mismatch

Feedback

Self bias

E7B11

Answer mismatch

D

C

Question mismatch

In Figure E7-1, what is the purpose of R3?

What type of circuit is shown in Figure E7-1?

Choice 1 mismatch

Fixed bias

Switching voltage regulator

Choice 2 mismatch

Emitter bypass

Linear voltage regulator

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch
Output load resistor
Common emitter amplifier

Choice 4 mismatch
Self bias
Emitter follower amplifier

E7B12
Figure mismatch
E7-1
E7-2

Answer mismatch
C
A

Question mismatch
What type of circuit is shown in Figure E7-1?
In Figure E7-2, what is the purpose of R?

Choice 1 mismatch
Switching voltage regulator
Emitter load

Choice 2 mismatch
Linear voltage regulator
Fixed bias

Choice 3 mismatch
Common emitter amplifier
Collector load

Choice 4 mismatch
Emitter follower amplifier
Voltage regulation

E7B13
Question mismatch
In Figure E7-2, what is the purpose of R?
In Figure E7-2, what is the purpose of C2?

Choice 1 mismatch
Emitter load
Output coupling

Choice 2 mismatch
Fixed bias
Emitter bypass

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch
Collector load
Input coupling

Choice 4 mismatch
Voltage regulation
Hum filtering

E7B14
Figure mismatch
E7-2

Answer mismatch
A
C

Question mismatch
In Figure E7-2, what is the purpose of C2?
What is one way to prevent thermal runaway in a transistor amplifier?

Choice 1 mismatch
Output coupling
Neutralization

Choice 2 mismatch
Emitter bypass
Select transistors with high beta

Choice 3 mismatch
Input coupling
Use degenerative emitter feedback

Choice 4 mismatch
Hum filtering
All of the above

E7B15
Answer mismatch
C
A

Question mismatch
What is one way to prevent thermal runaway in a bipolar transistor amplifier?
What is the effect of intermodulation products in a linear power amplifier?

Choice 1 mismatch
Neutralization
Transmission of spurious signals

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

Select transistors with high beta
Creation of parasitic oscillations

Choice 3 mismatch

Use a resistor in series with the emitter
Low efficiency

Choice 4 mismatch

All of these choices are correct
All of the above

E7B16

Question mismatch

What is the effect of intermodulation products in a linear power amplifier?
Why are third-order intermodulation distortion products of particular concern in linear power amplifiers?

Choice 1 mismatch

Transmission of spurious signals
Because they are relatively close in frequency to the desired signal

Choice 2 mismatch

Creation of parasitic oscillations
Because they are relatively far in frequency from the desired signal

Choice 3 mismatch

Low efficiency
Because they invert the sidebands causing distortion

Choice 4 mismatch

All of these choices are correct
Because they maintain the sidebands, thus causing multiple duplicate signals

E7B17

Answer mismatch

A
C

Question mismatch

Why are third-order intermodulation distortion products of particular concern in linear power amplifiers?
Which of the following is a characteristic of a grounded-grid amplifier?

Choice 1 mismatch

Because they are relatively close in frequency to the desired signal
High power gain

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

Because they are relatively far in frequency from the desired signal
High filament voltage

Choice 3 mismatch

Because they invert the sidebands causing distortion
Low input impedance

Choice 4 mismatch

Because they maintain the sidebands, thus causing multiple duplicate signals
Low bandwidth

E7B18

Answer mismatch

C

D

Question mismatch

Which of the following is a characteristic of a grounded-grid amplifier?
What is a klystron?

Choice 1 mismatch

High power gain
A high speed multivibrator

Choice 2 mismatch

High filament voltage
An electron-coupled oscillator utilizing a pentode vacuum tube

Choice 3 mismatch

Low input impedance
An oscillator utilizing ceramic elements to achieve stability

Choice 4 mismatch

Low bandwidth
A VHF, UHF, or microwave vacuum tube that uses velocity modulation

E7B19

Answer mismatch

D

B

Question mismatch

What is a klystron?
What is a parametric amplifier?

Choice 1 mismatch

A high speed multivibrator

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

A type of bipolar operational amplifier with excellent linearity derived from use of very high voltage on the collector

Choice 2 mismatch

An electron-coupled oscillator utilizing a pentode vacuum tube
A low-noise VHF or UHF amplifier relying on varying reactance for amplification

Choice 3 mismatch

An oscillator utilizing ceramic elements to achieve stability
A high power amplifier for HF application utilizing the Miller effect to increase gain

Choice 4 mismatch

A VHF, UHF, or microwave vacuum tube that uses velocity modulation
An audio push-pull amplifier using silicon carbide transistors for extremely low noise

E7B20

Answer mismatch

B

A

Question mismatch

What is a parametric amplifier?
Which of the following devices is generally best suited for UHF or microwave power amplifier applications?

Choice 1 mismatch

A type of bipolar operational amplifier with excellent linearity derived from use of very high voltage on the collector
FET

Choice 2 mismatch

A low-noise VHF or UHF amplifier relying on varying reactance for amplification
Nuvistor

Choice 3 mismatch

A high power amplifier for HF application utilizing the Miller effect to increase gain
Silicon Controlled Rectifier

Choice 4 mismatch

An audio push-pull amplifier using silicon carbide transistors for extremely low noise
Triac

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E7C01

Question mismatch

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

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

Choice 1 mismatch

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

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

Choice 3 mismatch

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

An inductor is in parallel with the input, another inductor is in parallel with the output, and a capacitor is in series between the two

Choice 4 mismatch

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

A capacitor is in parallel with the input, another capacitor is in parallel with the output, and an inductor is in series between the two

E7C02

Question mismatch

A T-network with series capacitors and a parallel shunt inductor has which of the following properties?

A T-network with series capacitors and a parallel (shunt) inductor has which of the following properties?

Choice 1 mismatch

It is a low-pass filter

It transforms impedance and is a low-pass filter

Choice 2 mismatch

It is a band-pass filter

It transforms reactance and is a low-pass filter

Choice 3 mismatch

It is a high-pass filter

It transforms impedance and is a high-pass filter

Choice 4 mismatch

It is a notch filter

It transforms reactance and is a narrow bandwidth notch filter

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E7C03

Question mismatch

What advantage does a Pi-L-network have over a Pi-network for impedance matching between the final amplifier of a vacuum-tube transmitter and an antenna?

What advantage does a Pi-L-network have over a Pi-network for impedance matching between the final amplifier of a vacuum-tube type transmitter and an antenna?

E7C04

Question mismatch

How does an impedance-matching circuit transform a complex impedance to a resistive impedance?

How does a network transform a complex impedance to a resistive impedance?

Choice 1 mismatch

It introduces negative resistance to cancel the resistive part of impedance

It introduces negative resistance to cancel the resistive part of an impedance

Choice 2 mismatch

It introduces transconductance to cancel the reactive part of impedance

It introduces transconductance to cancel the reactive part of an impedance

Choice 3 mismatch

It cancels the reactive part of the impedance and changes the resistive part to a desired value

It cancels the reactive part of an impedance and transforms the resistive part to the desired value

Choice 4 mismatch

Network resistances are substituted for load resistances and reactances are matched to the resistances

Network resistances are substituted for load resistances

E7C06

Choice 1 mismatch

Gradual passband rolloff with minimal stop band ripple

Gradual passband rolloff with minimal stop-band ripple

Choice 2 mismatch

Extremely flat response over its pass band with gradually rounded stop band corners

Extremely flat response over its passband, with gradually rounded stop-band corners

Choice 3 mismatch

Extremely sharp cutoff with one or more notches in the stop band

Extremely sharp cutoff, with one or more infinitely deep notches in the stop band

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

Gradual passband rolloff with extreme stop band ripple
Gradual passband rolloff with extreme stop-band ripple

E7C07

Question mismatch

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

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

E7C09

Question mismatch

What type of digital signal processing filter might be used to generate an SSB signal?

What type of digital signal processing filter might be used in generating an SSB signal?

E7C10

Question mismatch

Which of the following filters would be the best choice for use in a 2 meter repeater duplexer?

Which of the following filters would be the best choice for use in a 2-meter repeater duplexer?

E7C11

Question mismatch

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?

Which of the following is the common name for a filter network which is equivalent to two L networks back-to-back?

E7C12

Question mismatch

Which of the following describes a Pi-L network used for matching a vacuum-tube final amplifier to a 50-ohm unbalanced output?

What is a Pi-L network, as used when matching a vacuum-tube final amplifier to a 50-ohm unbalanced output?

Choice 2 mismatch

A Pi network with an additional series inductor on the output

A network consisting of two series inductors and two shunt capacitors

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E7C13

Question mismatch

What is one advantage of a Pi matching network over an L matching network consisting of a single inductor and a single capacitor?

What is one advantage of a Pi matching network over an L matching network?

Choice 1 mismatch

The Q of Pi networks can be varied depending on the component values chosen

Q of Pi networks can be varied depending on the component values chosen

E7C14

Choice 2 mismatch

Single-Sideband voice

Single-Sideband Voice

E7D04

Question mismatch

Which of the following types of linear voltage regulator usually make the most efficient use of the primary power source?

Which of the following types of linear regulator makes the most efficient use of the primary power source?

Choice 1 mismatch

A series current source

A constant current source

E7D14

Question mismatch

What is one purpose of a "bleeder" resistor in a conventional (unregulated) power supply?

What is one purpose of a "bleeder" resistor in a conventional (unregulated) power supply?

E7D15

Question mismatch

What is the purpose of a "step-start" circuit in a high-voltage power supply?

What is the purpose of a "step-start" circuit in a high-voltage power supply?

E7D16

Choice 4 mismatch

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

All of these choices are correct
All of these answers are correct

E7D17

Choice 4 mismatch

It uses a large power-factor compensation capacitor to create "free power" from the unused portion of the AC cycle

It uses a large power-factor compensation capacitor to create "free" power from the unused portion of the AC cycle

E7E01

Question mismatch

Which of the following can be used to generate FM phone emissions?

Which of the following can be used to generate FM-phone emissions?

E7E03

Question mismatch

How does an analog phase modulator function?

What is the fundamental principle of a phase modulator?

Choice 1 mismatch

By varying the tuning of a microphone preamplifier to produce PM signals

It varies the tuning of a microphone preamplifier to produce PM signals

Choice 2 mismatch

By varying the tuning of an amplifier tank circuit to produce AM signals

It varies the tuning of an amplifier tank circuit to produce AM signals

Choice 3 mismatch

By varying the tuning of an amplifier tank circuit to produce PM signals

It varies the tuning of an amplifier tank circuit to produce PM signals

Choice 4 mismatch

By varying the tuning of a microphone preamplifier to produce AM signals

It varies the tuning of a microphone preamplifier to produce AM signals

E7E05

Question mismatch

What circuit is added to an FM transmitter to boost the higher audio frequencies?

What circuit is added to an FM transmitter to proportionally attenuate the lower audio frequencies?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E7E06

Question mismatch

Why is de-emphasis commonly used in FM communications receivers?
What circuit is added to an FM receiver to restore attenuated lower audio frequencies?

Choice 1 mismatch

For compatibility with transmitters using phase modulation
A de-emphasis network

Choice 2 mismatch

To reduce impulse noise reception
A heterodyne suppressor

Choice 3 mismatch

For higher efficiency
An audio prescaler

Choice 4 mismatch

To remove third-order distortion products
A pre-emphasis network

E7E07

Answer mismatch

B
D

Question mismatch

What is meant by the term baseband in radio communications?
What is one result of the process of mixing two signals?

Choice 1 mismatch

The lowest frequency band that the transmitter or receiver covers
The elimination of noise in a wideband receiver by phase comparison

Choice 2 mismatch

The frequency components present in the modulating signal
The elimination of noise in a wideband receiver by phase differentiation

Choice 3 mismatch

The unmodulated bandwidth of the transmitted signal
The recovery of the intelligence from a modulated RF signal

Choice 4 mismatch

The basic oscillator frequency in an FM transmitter that is multiplied to increase the deviation and carrier frequency
The creation of new signals at the sum and difference frequencies

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E7E08

Choice 3 mismatch

The two input frequencies along with their sum and difference frequencies
The original frequencies, and the sum and difference frequencies

E7E10

Answer mismatch

A
B

Question mismatch

How does a diode detector function?
What is the process of detection?

Choice 1 mismatch

By rectification and filtering of RF signals
The extraction of weak signals from noise

Choice 2 mismatch

By breakdown of the Zener voltage
The recovery of information from a modulated RF signal

Choice 3 mismatch

By mixing signals with noise in the transition region of the diode
The modulation of a carrier

Choice 4 mismatch

By sensing the change of reactance in the diode with respect to frequency
The mixing of noise with a received signal

E7E11

Answer mismatch

C
A

Question mismatch

Which of the following types of detector is well suited for demodulating SSB signals?
How does a diode detector function?

Choice 1 mismatch

Discriminator
By rectification and filtering of RF signals

Choice 2 mismatch

Phase detector
By breakdown of the Zener voltage

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Product detector

By mixing signals with noise in the transition region of the diode

Choice 4 mismatch

Phase comparator

By sensing the change of reactance in the diode with respect to frequency

E7E12

Answer mismatch

D

C

Question mismatch

What is a frequency discriminator stage in a FM receiver?

Which of the following types of detector is well suited for demodulating SSB signals?

Choice 1 mismatch

An FM generator circuit

Discriminator

Choice 2 mismatch

A circuit for filtering two closely adjacent signals

Phase detector

Choice 3 mismatch

An automatic band-switching circuit

Product detector

Choice 4 mismatch

A circuit for detecting FM signals

Phase comparator

E7E13

Question mismatch

Which of the following describes a common means of generating an SSB signal when using digital signal processing?

What is a frequency discriminator?

Choice 1 mismatch

Mixing products are converted to voltages and subtracted by adder circuits

An FM generator circuit

Choice 2 mismatch

A frequency synthesizer removes the unwanted sidebands

A circuit for filtering two closely adjacent signals

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Emulation of quartz crystal filter characteristics
An automatic band-switching circuit

Choice 4 mismatch

The quadrature method
A circuit for detecting FM signals

E7E14

Answer mismatch

C
D

Question mismatch

What is meant by direct conversion when referring to a software defined receiver?
Which of the following describes a common means of generating a SSB signal when using digital signal processing?

Choice 1 mismatch

Software is converted from source code to object code during operation of the receiver
Mixing products are converted to voltages and subtracted by adder circuits

Choice 2 mismatch

Incoming RF is converted to the IF frequency by rectification to generate the control voltage for a voltage controlled oscillator
A frequency synthesizer removes the unwanted sidebands

Choice 3 mismatch

Incoming RF is mixed to "baseband" for analog-to-digital conversion and subsequent processing
Emulation of quartz crystal filter characteristics

Choice 4 mismatch

Software is generated in machine language, avoiding the need for compilers
The phasing or quadrature method

E7F01

Choice 1 mismatch

It converts the output of a JK flip flop to that of an RS flip-flop
It converts the output of a JK flip-flop to that of an RS flip-flop

Choice 4 mismatch

It divides a higher frequency signal so a low-frequency counter can display the input frequency
It divides a higher frequency signal so a low-frequency counter can display the operating frequency

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E7F05

Answer mismatch

D

B

Question mismatch

Which of the following is a technique for providing high stability oscillators needed for microwave transmission and reception?

Which of the following circuits can be combined to produce a 100 kHz fundamental signal with harmonics at 100 kHz intervals?

Choice 1 mismatch

Use a GPS signal reference

A 10 MHz oscillator and a flip-flop

Choice 2 mismatch

Use a rubidium stabilized reference oscillator

A 1 MHz oscillator and a decade counter

Choice 3 mismatch

Use a temperature-controlled high Q dielectric resonator

A 1 MHz oscillator and a flip-flop

Choice 4 mismatch

All of these choices are correct

A 100 kHz oscillator and a phase detector

E7F06

Answer mismatch

C

D

Question mismatch

What is one purpose of a marker generator?

Which of these choices best describes a crystal marker generator?

Choice 1 mismatch

To add audio markers to an oscilloscope

A low-stability oscillator that sweeps through a band of frequencies

Choice 2 mismatch

To provide a frequency reference for a phase locked loop

An oscillator often used in aircraft to determine the craft's location relative to the inner and outer markers at airports

Choice 3 mismatch

To provide a means of calibrating a receiver's frequency settings

A crystal-controlled oscillator with an output frequency and amplitude that can be varied over a wide range

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

To add time signals to a transmitted signal

A crystal-controlled oscillator that generates a series of reference signals at known frequency intervals

E7F07

Answer mismatch

A

D

Question mismatch

What determines the accuracy of a frequency counter?

Which type of circuit would be a good choice for generating a series of harmonically related receiver calibration signals?

Choice 1 mismatch

The accuracy of the time base

A Wein-bridge oscillator followed by a class-A amplifier

Choice 2 mismatch

The speed of the logic devices used

A Foster-Seeley discriminator

Choice 3 mismatch

Accuracy of the AC input frequency to the power supply

A phase-shift oscillator

Choice 4 mismatch

Proper balancing of the mixer diodes

A crystal oscillator followed by a frequency divider

E7F08

Question mismatch

Which of the following is performed by a frequency counter?

What is one purpose of a marker generator?

Choice 1 mismatch

Determining the frequency deviation with an FM discriminator

To add audio markers to an oscilloscope

Choice 2 mismatch

Mixing the incoming signal with a WWV reference

To provide a frequency reference for a phase locked loop

Choice 3 mismatch

Counting the number of input pulses occurring within a specific period of time

To provide a means of calibrating a receiver's frequency settings

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

Converting the phase of the measured signal to a voltage which is proportional to the frequency
To add time signals to a transmitted signal

E7F09

Question mismatch

What is the purpose of a frequency counter?
What determines the accuracy of a frequency counter?

Choice 1 mismatch

To provide a digital representation of the frequency of a signal
The accuracy of the time base

Choice 2 mismatch

To generate a series of reference signals at known frequency intervals
The speed of the logic devices used

Choice 3 mismatch

To display all frequency components of a transmitted signal
Accuracy of the AC input frequency to the power supply

Choice 4 mismatch

To provide a signal source at a very accurate frequency
Proper balancing of the mixer diodes

E7F10

Answer mismatch

B
C

Question mismatch

What alternate method of determining frequency, other than by directly counting input pulses, is used by some counters?
How does a conventional frequency counter determine the frequency of a signal?

Choice 1 mismatch

GPS averaging
It counts the total number of pulses in a circuit

Choice 2 mismatch

Period measurement plus mathematical computation
It monitors a WWV reference signal for comparison with the measured signal

Choice 3 mismatch

Prescaling
It counts the number of input pulses occurring within a specific period of time

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

D/A conversion

It converts the phase of the measured signal to a voltage which is proportional to the frequency

E7F11

Answer mismatch

C

A

Question mismatch

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

What is the purpose of a frequency counter?

Choice 1 mismatch

It can run on battery power for remote measurements

To provide a digital representation of the frequency of a signal

Choice 2 mismatch

It does not require an expensive high-precision time base

To generate a series of reference signals at known frequency intervals

Choice 3 mismatch

It provides improved resolution of low-frequency signals within a comparable time period

To display all frequency components of a transmitted signal

Choice 4 mismatch

It can directly measure the modulation index of an FM transmitter

To provide a signal source at a very accurate frequency

E7G01

Question mismatch

What primarily determines the gain and frequency characteristics of an op-amp RC active filter?

What determines the gain and frequency characteristics of an op-amp RC active filter?

Choice 3 mismatch

The input voltage and frequency of the op-amp's DC power supply

The input voltage and frequency of the op-amp's DC power supply

Choice 4 mismatch

The output voltage and smoothness of the op-amp's DC power supply

The output voltage and smoothness of the op-amp's DC power supply

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E7G02

Answer mismatch

D

C

Question mismatch

What is the effect of ringing in a filter?

What causes ringing in a filter?

Choice 1 mismatch

An echo caused by a long time delay

The slew rate of the filter

Choice 2 mismatch

A reduction in high frequency response

The bandwidth of the filter

Choice 3 mismatch

Partial cancellation of the signal over a range of frequencies

The frequency and phase response of the filter

Choice 4 mismatch

Undesired oscillations added to the desired signal

The gain of the filter

E7G03

Question mismatch

Which of the following is an advantage of using an op-amp instead of LC elements in an audio filter?

What are the advantages of using an op-amp instead of LC elements in an audio filter?

Choice 1 mismatch

Op-amps are more rugged

Op-amps are more rugged and can withstand more abuse than can LC elements

E7G04

Question mismatch

Which of the following is a type of capacitor best suited for use in high-stability op-amp RC active filter circuits?

Which of the following capacitor types is best suited for use in high-stability op-amp RC active filter circuits?

Choice 4 mismatch

Paper

Paper dielectric

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E7G06

Answer mismatch

D

A

Question mismatch

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

What steps are typically followed when selecting the external components for an op-amp RC active filter?

Choice 1 mismatch

As a high-pass filter used to block RFI at the input to receivers

Standard capacitor values are chosen first, the resistances are calculated, and resistors of the nearest standard value are used

Choice 2 mismatch

As a low-pass filter used between a transmitter and a transmission line

Standard resistor values are chosen first, the capacitances are calculated, and capacitors of the nearest standard value are used

Choice 3 mismatch

For smoothing power-supply output

Standard resistor and capacitor values are used, the circuit is tested, and additional resistors are added to make any needed adjustments

Choice 4 mismatch

As an audio filter in a receiver

Standard resistor and capacitor values are used, the circuit is tested, and additional capacitors are added to make any needed adjustments

E7G07

Figure mismatch

E7-4

Answer mismatch

C

D

Question mismatch

What magnitude of voltage gain can be expected from the circuit in Figure E7-4 when R_1 is 10 ohms and R_F is 470 ohms?

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

Choice 1 mismatch

0.21

As a high-pass filter used to block RFI at the input to receivers

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

94

As a low-pass filter used between a transmitter and a transmission line

Choice 3 mismatch

47

For smoothing power-supply output

Choice 4 mismatch

24

As an audio receiving filter

E7G08

Question mismatch

How does the gain of an ideal operational amplifier vary with frequency?

D Which of the following is a type of active op-amp filter circuit?

Choice 1 mismatch

It increases linearly with increasing frequency

Regenerative feedback resonator

Choice 2 mismatch

It decreases linearly with increasing frequency

Helical resonator

Choice 3 mismatch

It decreases logarithmically with increasing frequency

Gilbert cell

Choice 4 mismatch

It does not vary with frequency

Sallen-Key

E7G09

Answer mismatch

D

C

Question mismatch

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?

What voltage gain can be expected from the circuit in Figure E7-4 when R1 is 10 ohms and RF is 470 ohms?

Choice 1 mismatch

0.23 volts

0.21

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch
2.3 volts
94

Choice 3 mismatch
-0.23 volts
47

Choice 4 mismatch
-2.3 volts
24

E7G10
Figure mismatch
E7-4

Answer mismatch
C
D

Question mismatch
What absolute voltage gain can be expected from the circuit in Figure E7-4 when R_1 is 1800 ohms and R_F is 68 kilohms?
How does the gain of a theoretically ideal operational amplifier vary with frequency?

Choice 1 mismatch
1
It increases linearly with increasing frequency

Choice 2 mismatch
0.03
It decreases linearly with increasing frequency

Choice 3 mismatch
38
It decreases logarithmically with increasing frequency

Choice 4 mismatch
76
It does not vary with frequency

E7G11
Answer mismatch
B
D

Question mismatch
What absolute voltage gain can be expected from the circuit in Figure E7-4

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

when R1 is 3300 ohms and RF is 47 kilohms?

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 is applied to the input?

Choice 1 mismatch

28

0.23 volts

Choice 2 mismatch

14

2.3 volts

Choice 3 mismatch

7

-0.23 volts

Choice 4 mismatch

0.07

-2.3 volts

E7G12

Figure mismatch

E7-4

Answer mismatch

A

C

Question mismatch

What is an integrated circuit operational amplifier?

What voltage gain can be expected from the circuit in Figure E7-4 when R1 is 1800 ohms and RF is 68 kilohms?

Choice 1 mismatch

A high-gain, direct-coupled differential amplifier with very high input and very low output impedance

1

Choice 2 mismatch

A digital audio amplifier whose characteristics are determined by components external to the amplifier

0.03

Choice 3 mismatch

An amplifier used to increase the average output of frequency modulated amateur signals to the legal limit

38

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

An RF amplifier used in the UHF and microwave regions

76

E7G13

Figure mismatch

E7-4

Answer mismatch

C

B

Question mismatch

What is meant by the term op-amp input-offset voltage?

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

Choice 1 mismatch

The output voltage of the op-amp minus its input voltage

28

Choice 2 mismatch

The difference between the output voltage of the op-amp and the input voltage required in the immediately following stage

14

Choice 3 mismatch

The differential input voltage needed to bring the open-loop output voltage to zero

7

Choice 4 mismatch

The potential between the amplifier input terminals of the op-amp in an open-loop condition

0.07

E7G14

Answer mismatch

D

A

Question mismatch

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

What is an operational amplifier?

Choice 1 mismatch

100 ohms

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

A high-gain, direct-coupled differential amplifier whose characteristics are determined by components external to the amplifier

Choice 2 mismatch

1000 ohms

A high-gain, direct-coupled audio amplifier whose characteristics are determined by components external to the amplifier

Choice 3 mismatch

Very low

An amplifier used to increase the average output of frequency modulated amateur signals to the legal limit

Choice 4 mismatch

Very high

A program subroutine that calculates the gain of an RF amplifier

E7G15

Answer mismatch

A

C

Question mismatch

What is the typical output impedance of an integrated circuit op-amp?
What is meant by the term "op-amp input-offset voltage"?

Choice 1 mismatch

Very low

The output voltage of the op-amp minus its input voltage

Choice 2 mismatch

Very high

The difference between the output voltage of the op-amp and the input voltage required in the immediately following stage

Choice 3 mismatch

100 ohms

The potential between the amplifier input terminals of the op-amp in a closed-loop condition

Choice 4 mismatch

1000 ohms

The potential between the amplifier input terminals of the op-amp in an open-loop condition

E7H01

Question mismatch

What are three oscillator circuits used in Amateur Radio equipment?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

What are three major oscillator circuits often used in Amateur Radio equipment?

E7H02

Choice 3 mismatch

It must have positive feedback with a gain greater than 1

It must have a positive feedback loop with a gain greater than 1

E7H06

Question mismatch

Which of the following oscillator circuits are commonly used in VFOs?

Which type of oscillator circuits are commonly used in VFOs?

Choice 4 mismatch

Negative feedback and balanced feedback

Negative feedback and Balanced feedback

E7H07

Choice 2 mismatch

A crystal oscillator in which variable frequency is obtained by placing the crystal in a strong magnetic field

An crystal oscillator in which variable frequency is obtained by placing the crystal in a strong magnetic field

E7H09

Answer mismatch

A

C

Question mismatch

What type of frequency synthesizer circuit uses a phase accumulator, lookup table, digital to analog converter and a low-pass anti-alias filter?

What type of frequency synthesizer circuit uses a stable voltage-controlled oscillator, programmable divider, phase detector, loop filter and a reference frequency source?

E7H10

Answer mismatch

B

A

Question mismatch

What information is contained in the lookup table of a direct digital

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

frequency synthesizer?

What type of frequency synthesizer circuit uses a phase accumulator, lookup table, digital to analog converter and a low-pass anti-alias filter?

Choice 1 mismatch

The phase relationship between a reference oscillator and the output waveform
A direct digital synthesizer

Choice 2 mismatch

The amplitude values that represent a sine-wave output
A hybrid synthesizer

Choice 3 mismatch

The phase relationship between a voltage-controlled oscillator and the output waveform
A phase locked loop synthesizer

Choice 4 mismatch

The synthesizer frequency limits and frequency values stored in the radio memories
A diode-switching matrix synthesizer

E7H11

Answer mismatch

C

B

Question mismatch

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

What information is contained in the lookup table of a direct digital frequency synthesizer?

Choice 1 mismatch

Broadband noise

The phase relationship between a reference oscillator and the output waveform

Choice 2 mismatch

Digital conversion noise

The amplitude values that represent a sine-wave output

Choice 3 mismatch

Spurious signals at discrete frequencies

The phase relationship between a voltage-controlled oscillator and the output waveform

Choice 4 mismatch

Nyquist limit noise

The synthesizer frequency limits and frequency values stored in the radio memories

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E7H12

Answer mismatch

D

C

Question mismatch

Which of the following is a principal component of a direct digital synthesizer (DDS)?

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

Choice 1 mismatch

Phase splitter

Broadband noise

Choice 2 mismatch

Hex inverter

Digital conversion noise

Choice 3 mismatch

Chroma demodulator

Spurs at discrete frequencies

Choice 4 mismatch

Phase accumulator

Nyquist limit noise

E7H13

Answer mismatch

A

D

Question mismatch

What is the capture range of a phase-locked loop circuit?

Which of these circuits would be classified as a principal component of a direct digital synthesizer (DDS)?

Choice 1 mismatch

The frequency range over which the circuit can lock

Phase splitter

Choice 2 mismatch

The voltage range over which the circuit can lock

Hex inverter

Choice 3 mismatch

The input impedance range over which the circuit can lock

Chroma demodulator

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

The range of time it takes the circuit to lock
Phase accumulator

E7H14

Question mismatch

What is a phase-locked loop circuit?

What circuit is often used in conjunction with a direct digital synthesizer (DDS) to expand the available tuning range?

Choice 1 mismatch

An electronic servo loop consisting of a ratio detector, reactance modulator, and voltage-controlled oscillator
Binary expander

Choice 2 mismatch

An electronic circuit also known as a monostable multivibrator
J-K flip-flop

Choice 3 mismatch

An electronic servo loop consisting of a phase detector, a low-pass filter, a voltage-controlled oscillator, and a stable reference oscillator
Phase locked loop

Choice 4 mismatch

An electronic circuit consisting of a precision push-pull amplifier with a differential input
Componder

E7H15

Answer mismatch

D
A

Question mismatch

Which of these functions can be performed by a phase-locked loop?
What is the capture range of a phase-locked loop circuit?

Choice 1 mismatch

Wide-band AF and RF power amplification
The frequency range over which the circuit can lock

Choice 2 mismatch

Comparison of two digital input signals, digital pulse counter
The voltage range over which the circuit can lock

Choice 3 mismatch

Photovoltaic conversion, optical coupling
The input impedance range over which the circuit can lock

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

Frequency synthesis, FM demodulation

The range of time it takes the circuit to lock

E7H16

Answer mismatch

B

C

Question mismatch

Why is the short-term stability of the reference oscillator important in the design of a phase locked loop (PLL) frequency synthesizer?

What is a phase-locked loop circuit?

Choice 1 mismatch

Any amplitude variations in the reference oscillator signal will prevent the loop from locking to the desired signal

An electronic servo loop consisting of a ratio detector, reactance modulator, and voltage-controlled oscillator

Choice 2 mismatch

Any phase variations in the reference oscillator signal will produce phase noise in the synthesizer output

An electronic circuit also known as a monostable multivibrator

Choice 3 mismatch

Any phase variations in the reference oscillator signal will produce harmonic distortion in the modulating signal

An electronic servo loop consisting of a phase detector, a low-pass filter and voltage-controlled oscillator

Choice 4 mismatch

Any amplitude variations in the reference oscillator signal will prevent the loop from changing frequency

An electronic circuit consisting of a precision push-pull amplifier with a differential input

E7H17

Answer mismatch

C

D

Question mismatch

Why is a phase-locked loop often used as part of a variable frequency synthesizer for receivers and transmitters?

Which of these functions can be performed by a phase-locked loop?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

It generates FM sidebands

Wide-band AF and RF power amplification

Choice 2 mismatch

It eliminates the need for a voltage controlled oscillator

Comparison of two digital input signals, digital pulse counter

Choice 3 mismatch

It makes it possible for a VFO to have the same degree of frequency stability as a crystal oscillator

Photovoltaic conversion, optical coupling

Choice 4 mismatch

It can be used to generate or demodulate SSB signals by quadrature phase synchronization

Frequency synthesis, FM demodulation

E7H18

Answer mismatch

A

B

Question mismatch

What are the major spectral impurity components of phase-locked loop synthesizers?

Why is a stable reference oscillator normally used as part of a phase locked loop (PLL) frequency synthesizer?

Choice 1 mismatch

Phase noise

Any amplitude variations in the reference oscillator signal will prevent the loop from locking to the desired signal

Choice 2 mismatch

Digital conversion noise

Any phase variations in the reference oscillator signal will produce phase noise in the synthesizer output

Choice 3 mismatch

Spurious signals at discrete frequencies

Any phase variations in the reference oscillator signal will produce harmonic distortion in the modulating signal

Choice 4 mismatch

Nyquist limit noise

Any amplitude variations in the reference oscillator signal will prevent the loop from changing frequency

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E8A04

Question mismatch

What is equivalent to the root-mean-square value of an AC voltage?

What is the equivalent to the root-mean-square value of an AC voltage?

E8A05

Choice 2 mismatch

By measuring the voltage with a D'Arsonval meter

By measuring the voltage with a D'Arsonval meter

E8A06

Question mismatch

What is the approximate ratio of PEP-to-average power in a typical single-sideband phone signal?

What is the approximate ratio of PEP-to-average power in a typical voice-modulated single-sideband phone signal?

E8A12

Choice 4 mismatch

All of these choices are correct

All of these answers are correct

E8A13

Choice 4 mismatch

All of these choices are correct

All of these answers are correct

E8A15

Question mismatch

What would the waveform of a stream of digital data bits look like on a conventional oscilloscope?

What would the waveform of a digital data stream signal look like on a conventional oscilloscope?

E8B05

Question mismatch

What is the deviation ratio of an FM-phone signal having a maximum frequency swing of plus-or-minus 5 kHz when the maximum modulation frequency is 3 kHz?

What is the deviation ratio of an FM-phone signal having a maximum frequency swing of plus-or-minus 5 kHz and accepting a maximum modulation rate of 3 kHz?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E8B06

Question mismatch

What is the deviation ratio of an FM-phone signal having a maximum frequency swing of plus or minus 7.5 kHz when the maximum modulation frequency is 3.5 kHz?

What is the deviation ratio of an FM-phone signal having a maximum frequency swing of plus or minus 7.5 kHz and accepting a maximum modulation frequency of 3.5 kHz?

E8B07

Question mismatch

When using a pulse-width modulation system, why is the transmitter's peak power greater than its average power?

When using a pulse-width modulation system, why is the transmitter's peak power greater than its average power?

E8B09

Answer mismatch

B

A

Question mismatch

What is meant by deviation ratio?

How are the pulses of a pulse-modulated signal usually transmitted?

Choice 1 mismatch

The ratio of the audio modulating frequency to the center carrier frequency
A pulse of relatively short duration is sent; a relatively long period of time separates each pulse

Choice 2 mismatch

The ratio of the maximum carrier frequency deviation to the highest audio modulating frequency

A pulse of relatively long duration is sent; a relatively short period of time separates each pulse

Choice 3 mismatch

The ratio of the carrier center frequency to the audio modulating frequency
A group of short pulses are sent in a relatively short period of time; a relatively long period of time separates each group

Choice 4 mismatch

The ratio of the highest audio modulating frequency to the average audio modulating frequency

A group of short pulses are sent in a relatively long period of time; a relatively short period of time separates each group

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E8B10

Answer mismatch

C

B

Question mismatch

Which of these methods can be used to combine several separate analog information streams into a single analog radio frequency signal?
What is meant by deviation ratio?

Choice 1 mismatch

Frequency shift keying

The ratio of the audio modulating frequency to the center carrier frequency

Choice 2 mismatch

A diversity combiner

The ratio of the maximum carrier frequency deviation to the highest audio modulating frequency

Choice 3 mismatch

Frequency division multiplexing

The ratio of the carrier center frequency to the audio modulating frequency

Choice 4 mismatch

Pulse compression

The ratio of the highest audio modulating frequency to the average audio modulating frequency

E8B11

Answer mismatch

B

C

Question mismatch

Which of the following describes frequency division multiplexing?
Which of these methods can be used to combine several separate analog information streams into a single analog radio frequency signal?

Choice 1 mismatch

The transmitted signal jumps from band to band at a predetermined rate
Frequency shift keying

Choice 2 mismatch

Two or more information streams are merged into a "baseband", which then modulates the transmitter
A diversity combiner

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

The transmitted signal is divided into packets of information
Frequency division multiplexing

Choice 4 mismatch

Two or more information streams are merged into a digital combiner, which then pulse position modulates the transmitter
Pulse compression

E8B12

Question mismatch

What is digital time division multiplexing?
Which of the following describes frequency division multiplexing?

Choice 1 mismatch

Two or more data streams are assigned to discrete sub-carriers on an FM transmitter
The transmitted signal jumps from band to band at a predetermined rate

Choice 2 mismatch

Two or more signals are arranged to share discrete time slots of a data transmission
Two or more information streams are merged into a "baseband", which then modulates the transmitter

Choice 3 mismatch

Two or more data streams share the same channel by transmitting time of transmission as the sub-carrier
The transmitted signal is divided into packets of information

Choice 4 mismatch

Two or more signals are quadrature modulated to increase bandwidth efficiency
Two or more information streams are merged into a digital combiner, which then pulse position modulates the transmitter

E8C02

Choice 1 mismatch

Baudot uses four data bits per character, ASCII uses seven or eight; Baudot uses one character as a shift code, ASCII has no shift code
Baudot uses four data bits per character, ASCII uses seven; Baudot uses one character as a shift code, ASCII has no shift code

Choice 2 mismatch

Baudot uses five data bits per character, ASCII uses seven or eight; Baudot uses two characters as shift codes, ASCII has no shift code
Baudot uses five data bits per character, ASCII uses seven; Baudot uses two characters as shift codes, ASCII has no shift code

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Baudot uses six data bits per character, ASCII uses seven or eight; Baudot has no shift code, ASCII uses two characters as shift codes

Baudot uses six data bits per character, ASCII uses seven; Baudot has no shift code, ASCII uses two characters as shift codes

E8C05

Question mismatch

What is the necessary bandwidth of a 13-WPM international Morse code transmission?

What technique is used to minimize the bandwidth requirements of a PSK-31 signal?

Choice 1 mismatch

Approximately 13 Hz

Zero-sum character encoding

Choice 2 mismatch

Approximately 26 Hz

Reed-Solomon character encoding

Choice 3 mismatch

Approximately 52 Hz

Use of sinusoidal data pulses

Choice 4 mismatch

Approximately 104 Hz

Use of trapezoidal data pulses

E8C06

Question mismatch

What is the necessary bandwidth of a 170-hertz shift, 300-baud ASCII transmission?

What is the necessary bandwidth of a 13-WPM international Morse code transmission?

Choice 1 mismatch

0.1 Hz

Approximately 13 Hz

Choice 2 mismatch

0.3 kHz

Approximately 26 Hz

Choice 3 mismatch

0.5 kHz

Approximately 52 Hz

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch
1.0 kHz
Approximately 104 Hz

E8C07
Answer mismatch
A
C

Question mismatch
What is the necessary bandwidth of a 4800-Hz frequency shift, 9600-baud ASCII FM transmission?
What is the necessary bandwidth of a 170-hertz shift, 300-baud ASCII transmission?

Choice 1 mismatch
15.36 kHz
0.1 Hz

Choice 2 mismatch
9.6 kHz
0.3 kHz

Choice 3 mismatch
4.8 kHz
0.5 kHz

Choice 4 mismatch
5.76 kHz
1.0 kHz

E8C08
Answer mismatch
D
A

Question mismatch
What term describes a wide-bandwidth communications system in which the transmitted carrier frequency varies according to some predetermined sequence?
What is the necessary bandwidth of a 4800-Hz frequency shift, 9600-baud ASCII FM transmission?

Choice 1 mismatch
Amplitude compandored single sideband
15.36 kHz

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

AMTOR
9.6 kHz

Choice 3 mismatch

Time-domain frequency modulation
4.8 kHz

Choice 4 mismatch

Spread-spectrum communication
5.76 kHz

E8C09

Answer mismatch

A
D

Question mismatch

Which of these techniques causes a digital signal to appear as wide-band noise to a conventional receiver?

What term describes a wide-bandwidth communications system in which the transmitted carrier frequency varies according to some predetermined sequence?

Choice 1 mismatch

Spread-spectrum
Amplitude compandored single sideband

Choice 2 mismatch

Independent sideband
AMTOR

Choice 3 mismatch

Regenerative detection
Time-domain frequency modulation

Choice 4 mismatch

Exponential addition
Spread-spectrum communication

E8C10

Question mismatch

What spread-spectrum communications technique alters the center frequency of a conventional carrier many times per second in accordance with a pseudo-random list of channels?

Which of these techniques causes a digital signal to appear as wide-band noise to a conventional receiver?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch
Frequency hopping
Spread-spectrum

Choice 2 mismatch
Direct sequence
Independent sideband

Choice 3 mismatch
Time-domain frequency modulation
Regenerative detection

Choice 4 mismatch
Frequency compandored spread-spectrum
Exponential addition

E8C11
Answer mismatch
B
A

Question mismatch
What spread-spectrum communications technique uses a high speed binary bit stream to shift the phase of an RF carrier?
What spread-spectrum communications technique alters the center frequency of a conventional carrier many times per second in accordance with a pseudo-random list of channels?

Choice 3 mismatch
Binary phase-shift keying
Time-domain frequency modulation

Choice 4 mismatch
Phase compandored spread-spectrum
Frequency compandored spread-spectrum

E8C12
Answer mismatch
D
B

Question mismatch
What is the advantage of including a parity bit with an ASCII character stream?
What spread-spectrum communications technique uses a high speed binary bit stream to shift the phase of an RF carrier?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

Faster transmission rate
Frequency hopping

Choice 2 mismatch

The signal can overpower interfering signals
Direct sequence

Choice 3 mismatch

Foreign language characters can be sent
Binary phase-shift keying

Choice 4 mismatch

Some types of errors can be detected
Phase compandored spread-spectrum

E8C13

Answer mismatch

B
D

Question mismatch

What is one advantage of using JT-65 coding?
What makes spread-spectrum communications resistant to interference?

Choice 1 mismatch

Uses only a 65 Hz bandwidth
Interfering signals are removed by a frequency-agile crystal filter

Choice 2 mismatch

The ability to decode signals which have a very low signal to noise ratio
Spread-spectrum transmitters use much higher power than conventional carrier-frequency transmitters

Choice 3 mismatch

Easily copied by ear if necessary
Spread-spectrum transmitters can hunt for the best carrier frequency to use within a given RF spectrum

Choice 4 mismatch

Permits fast-scan TV transmissions over narrow bandwidth
Only signals using the correct spreading sequence are received

E8D01

Question mismatch

Which of the following is the easiest voltage amplitude parameter to measure when viewing a pure sine wave signal on an analog oscilloscope?
What is the easiest voltage amplitude parameter to measure when viewing a pure sine wave signal on an oscilloscope?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E8D04

Question mismatch

What is the PEP output of a transmitter that develops a peak voltage of 30 volts into a 50-ohm load?

What is the PEP output of a transmitter that has a maximum peak of 30 volts to a 50-ohm load as observed on an oscilloscope?

E8D06

Choice 3 mismatch

It makes it easier to detect high SWR on the feed line

It makes it easier to detect high SWR on the feed-line

Choice 4 mismatch

It can determine if any flat-topping is present during modulation peaks

It can determine if any "flat-topping" is present during modulation peaks

E8D10

Question mismatch

What type of meter should be used to monitor the output signal of a voice-modulated single-sideband transmitter to ensure you do not exceed the maximum allowable power?

What is the polarization of an electromagnetic wave if its magnetic field is parallel to the surface of the Earth?

Choice 1 mismatch

An SWR meter reading in the forward direction

Circular

Choice 2 mismatch

A modulation meter

Horizontal

Choice 3 mismatch

An average reading wattmeter

Elliptical

Choice 4 mismatch

A peak-reading wattmeter

Vertical

E8D11

Question mismatch

What is the average power dissipated by a 50-ohm resistive load during one complete RF cycle having a peak voltage of 35 volts?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

What is the polarization of an electromagnetic wave if its magnetic field is perpendicular to the surface of the Earth?

Choice 1 mismatch

12.2 watts

Horizontal

Choice 2 mismatch

9.9 watts

Circular

Choice 3 mismatch

24.5 watts

Elliptical

Choice 4 mismatch

16 watts

Vertical

E8D12

Answer mismatch

D

A

Question mismatch

What is the peak voltage of a sinusoidal waveform if an RMS-reading voltmeter reads 34 volts?

At approximately what speed do electromagnetic waves travel in free space?

Choice 1 mismatch

123 volts

300 million meters per second

Choice 2 mismatch

96 volts

186,300 meters per second

Choice 3 mismatch

55 volts

186,300 feet per second

Choice 4 mismatch

48 volts

300 million miles per second

E8D13

Answer mismatch

B

D

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

Which of the following is a typical value for the peak voltage at a standard U.S. household electrical outlet?

What type of meter should be used to monitor the output signal of a voice-modulated single-sideband transmitter to ensure you do not exceed the maximum allowable power?

Choice 1 mismatch

240 volts

An SWR meter reading in the forward direction

Choice 2 mismatch

170 volts

A modulation meter

Choice 3 mismatch

120 volts

An average reading wattmeter

Choice 4 mismatch

340 volts

A peak-reading wattmeter

E8D14

Answer mismatch

C

A

Question mismatch

Which of the following is a typical value for the peak-to-peak voltage at a standard U.S. household electrical outlet?

What is the average power dissipated by a 50-ohm resistive load during one complete RF cycle having a peak voltage of 35 volts?

Choice 1 mismatch

240 volts

12.2 watts

Choice 2 mismatch

120 volts

9.9 watts

Choice 3 mismatch

340 volts

24.5 watts

Choice 4 mismatch

170 volts

16 watts

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E8D15

Answer mismatch

A

D

Question mismatch

Which of the following is a typical value for the RMS voltage at a standard U.S. household electrical power outlet?

If an RMS reading voltmeter reads 34 volts on a sinusoidal waveform, what is the peak voltage?

Choice 1 mismatch

120V AC

123 volts

Choice 2 mismatch

340V AC

96 volts

Choice 3 mismatch

85V AC

55 volts

Choice 4 mismatch

170V AC

48 volts

E8D16

Answer mismatch

A

B

Question mismatch

What is the RMS value of a 340-volt peak-to-peak pure sine wave?

Which of the following is a typical value for the peak voltage at a common household electrical outlet?

Choice 1 mismatch

120V AC

240 volts

Choice 2 mismatch

170V AC

170 volts

Choice 3 mismatch

240V AC

120 volts

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch
300V AC
340 volts

E9A01

Question mismatch

Which of the following describes an isotropic antenna?
Which of the following describes an isotropic Antenna?

Choice 2 mismatch

A horizontally polarized antenna used to compare Yagi antennas
A horizontal antenna used to compare Yagi antennas

E9A02

Question mismatch

How much gain does a 1/2-wavelength dipole in free space have compared to an isotropic antenna?
How much gain does a 1/2-wavelength dipole have compared to an isotropic antenna?

E9A04

Choice 1 mismatch

To match impedances in order to minimize standing wave ratio on the transmission line
To match impedances for maximum power transfer from a feed line

E9A05

Question mismatch

Which of the following factors may affect the feed point impedance of an antenna?
Which of the following factors determine the radiation resistance of an antenna?

Choice 1 mismatch

Transmission-line length
Transmission-line length and antenna height

Choice 2 mismatch

Antenna height, conductor length/diameter ratio and location of nearby conductive objects
Antenna height and conductor length/diameter ratio, and location of nearby conductive objects

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Constant feed point impedance

It is a physical constant and is the same for all antennas

E9A06

Answer mismatch

D

C

Question mismatch

What is included in the total resistance of an antenna system?

What is the term for the ratio of the radiation resistance of an antenna to the total resistance of the system?

Choice 1 mismatch

Radiation resistance plus space impedance

Effective radiated power

Choice 2 mismatch

Radiation resistance plus transmission resistance

Radiation conversion loss

Choice 3 mismatch

Transmission-line resistance plus radiation resistance

Antenna efficiency

Choice 4 mismatch

Radiation resistance plus ohmic resistance

Beamwidth

E9A07

Answer mismatch

C

D

Question mismatch

What is a folded dipole antenna?

What is included in the total resistance of an antenna system?

Choice 1 mismatch

A dipole one-quarter wavelength long

Radiation resistance plus space impedance

Choice 2 mismatch

A type of ground-plane antenna

Radiation resistance plus transmission resistance

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

A dipole constructed from one wavelength of wire forming a very thin loop
Transmission-line resistance plus radiation resistance

Choice 4 mismatch

A dipole configured to provide forward gain
Radiation resistance plus ohmic resistance

E9A08

Answer mismatch

A
C

Question mismatch

What is meant by antenna gain?
What is a folded dipole antenna?

Choice 1 mismatch

The ratio relating the radiated signal strength of an antenna in the
direction of maximum radiation to that of a reference antenna
A dipole one-quarter wavelength long

Choice 2 mismatch

The ratio of the signal in the forward direction to that in the opposite
direction
A type of ground-plane antenna

Choice 3 mismatch

The ratio of the amount of power radiated by an antenna compared to the
transmitter output power
A dipole constructed from one wavelength of wire forming a very thin loop

Choice 4 mismatch

The final amplifier gain minus the transmission-line losses, including any
phasing lines present
A hypothetical antenna used in theoretical discussions to replace the
radiation resistance

E9A09

Answer mismatch

B
A

Question mismatch

What is meant by antenna bandwidth?
What is meant by antenna gain?

Choice 1 mismatch

Antenna length divided by the number of elements

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

The numerical ratio relating the radiated signal strength of an antenna in the direction of maximum radiation to that of a reference antenna

Choice 2 mismatch

The frequency range over which an antenna satisfies a performance requirement
The numerical ratio of the signal in the forward direction to that in the opposite direction

Choice 3 mismatch

The angle between the half-power radiation points
The ratio of the amount of power radiated by an antenna compared to the transmitter output power

Choice 4 mismatch

The angle formed between two imaginary lines drawn through the element ends
The final amplifier gain minus the transmission-line losses (including any phasing lines present)

E9A10

Question mismatch

How is antenna efficiency calculated?
What is meant by antenna bandwidth?

Choice 1 mismatch

$(\text{radiation resistance} / \text{transmission resistance}) \times 100\%$
Antenna length divided by the number of elements

Choice 2 mismatch

$(\text{radiation resistance} / \text{total resistance}) \times 100\%$
The frequency range over which an antenna satisfies a performance requirement

Choice 3 mismatch

$(\text{total resistance} / \text{radiation resistance}) \times 100\%$
The angle between the half-power radiation points

Choice 4 mismatch

$(\text{effective radiated power} / \text{transmitter output}) \times 100\%$
The angle formed between two imaginary lines drawn through the element ends

E9A11

Answer mismatch

A
B

Question mismatch

Which of the following choices is a way to improve the efficiency of a ground-mounted quarter-wave vertical antenna?
How is antenna efficiency calculated?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 1 mismatch

Install a good radial system

$(\text{radiation resistance} / \text{transmission resistance}) \times 100\%$

Choice 2 mismatch

Isolate the coax shield from ground

$(\text{radiation resistance} / \text{total resistance}) \times 100\%$

Choice 3 mismatch

Shorten the radiating element

$(\text{total resistance} / \text{radiation resistance}) \times 100\%$

Choice 4 mismatch

Reduce the diameter of the radiating element

$(\text{effective radiated power} / \text{transmitter output}) \times 100\%$

E9A12

Answer mismatch

C

A

Question mismatch

Which of the following factors determines ground losses for a ground-mounted vertical antenna operating in the 3-30 MHz range?

How can the efficiency of an HF quarter-wave grounded vertical antenna be improved?

Choice 1 mismatch

The standing-wave ratio

By installing a good radial system

Choice 2 mismatch

Distance from the transmitter

By isolating the coax shield from ground

Choice 3 mismatch

Soil conductivity

By shortening the vertical

Choice 4 mismatch

Take-off angle

By reducing the diameter of the radiating element

E9A13

Answer mismatch

A

C

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Question mismatch

How much gain does an antenna have compared to a 1/2-wavelength dipole when it has 6 dB gain over an isotropic antenna?

Which is the most important factor that determines ground losses for a ground-mounted vertical antenna operating in the 3-30 MHz range?

Choice 1 mismatch

3.85 dB

The standing-wave ratio

Choice 2 mismatch

6.0 dB

Base current

Choice 3 mismatch

8.15 dB

Soil conductivity

Choice 4 mismatch

2.79 dB

Base impedance

E9A14

Answer mismatch

B

A

Question mismatch

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

How much gain does an antenna have over a 1/2-wavelength dipole when it has 6 dB gain over an isotropic antenna?

Choice 1 mismatch

6.17 dB

3.85 dB

Choice 2 mismatch

9.85 dB

6.0 dB

Choice 3 mismatch

12.5 dB

8.15 dB

Choice 4 mismatch

14.15 dB

2.79 dB

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E9A15

Answer mismatch

C

B

Question mismatch

What is meant by the radiation resistance of an antenna?

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

Choice 1 mismatch

The combined losses of the antenna elements and feed line

6.17 dB

Choice 2 mismatch

The specific impedance of the antenna

9.85 dB

Choice 3 mismatch

The value of a resistance that would dissipate the same amount of power as that radiated from an antenna

12.5 dB

Choice 4 mismatch

The resistance in the atmosphere that an antenna must overcome to be able to radiate a signal

14.15 dB

E9B01

Figure mismatch

E9-1

Answer mismatch

B

C

Question mismatch

In the antenna radiation pattern shown in Figure E9-1, what is the 3-dB beamwidth?

What determines the free-space polarization of an antenna?

Choice 1 mismatch

75 degrees

The orientation of its magnetic field (H Field)

Choice 2 mismatch

50 degrees

The orientation of its free-space characteristic impedance

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

25 degrees

The orientation of its electric field (E Field)

Choice 4 mismatch

30 degrees

Its elevation pattern

E9B02

Question mismatch

In the antenna radiation pattern shown in Figure E9-1, what is the front-to-back ratio?

In the antenna radiation pattern shown in Figure E9-1, what is the 3-dB beamwidth?

Choice 1 mismatch

36 dB

75 degrees

Choice 2 mismatch

18 dB

50 degrees

Choice 3 mismatch

24 dB

25 degrees

Choice 4 mismatch

14 dB

30 degrees

E9B03

Question mismatch

In the antenna radiation pattern shown in Figure E9-1, what is the front-to-side ratio?

In the antenna radiation pattern shown in Figure E9-1, what is the front-to-back ratio?

Choice 1 mismatch

12 dB

36 dB

Choice 2 mismatch

14 dB

18 dB

Choice 3 mismatch

18 dB

24 dB

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch
24 dB
14 dB

E9B04
Figure mismatch

E9-1

Answer mismatch
D
B

Question mismatch
What may occur when a directional antenna is operated at different frequencies within the band for which it was designed?
In the antenna radiation pattern shown in Figure E9-1, what is the front-to-side ratio?

Choice 1 mismatch
Feed point impedance may become negative
12 dB

Choice 2 mismatch
The E-field and H-field patterns may reverse
14 dB

Choice 3 mismatch
Element spacing limits could be exceeded
18 dB

Choice 4 mismatch
The gain may change depending on frequency
24 dB

E9B05
Answer mismatch
B
D

Question mismatch
What usually occurs if a Yagi antenna is designed solely for maximum forward gain?
What may occur when a directional antenna is operated at different frequencies within the band for which it was designed?

Choice 1 mismatch
The front-to-back ratio increases
Feed-point impedance may become negative

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

The front-to-back ratio decreases
The E-field and H-field patterns may reverse

Choice 3 mismatch

The frequency response is widened over the whole frequency band
Element spacing limits could be exceeded

Choice 4 mismatch

The SWR is reduced
The gain may exhibit significant variations

E9B06

Answer mismatch

A

B

Question mismatch

If the boom of a Yagi antenna is lengthened and the elements are properly retuned, what usually occurs?
What usually occurs if a Yagi antenna is designed solely for maximum forward gain?

Choice 1 mismatch

The gain increases
The front-to-back ratio increases

Choice 2 mismatch

The SWR decreases
The front-to-back ratio decreases

Choice 3 mismatch

The front-to-back ratio increases
The frequency response is widened over the whole frequency band

Choice 4 mismatch

The gain bandwidth decreases rapidly
The SWR is reduced

E9B07

Answer mismatch

C

A

Question mismatch

How does the total amount of radiation emitted by a directional gain antenna compare with the total amount of radiation emitted from an isotropic antenna, assuming each is driven by the same amount of power?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

If the boom of a Yagi antenna is lengthened and the elements are properly retuned, what usually occurs?

Choice 1 mismatch

The total amount of radiation from the directional antenna is increased by the gain of the antenna
The gain increases

Choice 2 mismatch

The total amount of radiation from the directional antenna is stronger by its front to back ratio
The SWR decreases

Choice 3 mismatch

They are the same
The front-to-back ratio increases

Choice 4 mismatch

The radiation from the isotropic antenna is 2.15 dB stronger than that from the directional antenna
The gain bandwidth decreases rapidly

E9B08

Answer mismatch

A
C

Question mismatch

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

How does the total amount of radiation emitted by a directional (gain) antenna compare with the total amount of radiation emitted from an isotropic antenna, assuming each is driven by the same amount of power?

Choice 1 mismatch

Note the two points where the signal strength of the antenna is 3 dB less than maximum and compute the angular difference
The total amount of radiation from the directional antenna is increased by the gain of the antenna

Choice 2 mismatch

Measure the ratio of the signal strengths of the radiated power lobes from the front and rear of the antenna
The total amount of radiation from the directional antenna is stronger by its front to back ratio

Choice 3 mismatch

Draw two imaginary lines through the ends of the elements and measure the angle between the lines
There is no difference between the two antennas

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

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

The radiation from the isotropic antenna is 2.15 dB stronger than that from the directional antenna

E9B09

Answer mismatch

B

A

Question mismatch

What type of computer program technique is commonly used for modeling antennas?

How can the approximate beamwidth of a directional antenna be determined?

Choice 1 mismatch

Graphical analysis

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

Choice 2 mismatch

Method of Moments

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

Choice 3 mismatch

Mutual impedance analysis

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

Choice 4 mismatch

Calculus differentiation with respect to physical properties

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

E9B10

Answer mismatch

A

B

Question mismatch

What is the principle of a Method of Moments analysis?

What type of computer program technique is commonly used for modeling antennas?

Choice 1 mismatch

A wire is modeled as a series of segments, each having a uniform value of

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

current
Graphical analysis

Choice 2 mismatch
A wire is modeled as a single sine-wave current generator
Method of Moments

Choice 3 mismatch
A wire is modeled as a series of points, each having a distinct location in space
Mutual impedance analysis

Choice 4 mismatch
A wire is modeled as a series of segments, each having a distinct value of voltage across it
Calculus differentiation with respect to physical properties

E9B11
Answer mismatch
C
A

Question mismatch
What is a disadvantage of decreasing the number of wire segments in an antenna model below the guideline of 10 segments per half-wavelength?
What is the principle of a Method of Moments analysis?

Choice 1 mismatch
Ground conductivity will not be accurately modeled
A wire is modeled as a series of segments, each having a distinct value of current

Choice 2 mismatch
The resulting design will favor radiation of harmonic energy
A wire is modeled as a single sine-wave current generator

Choice 3 mismatch
The computed feed point impedance may be incorrect
A wire is modeled as a series of points, each having a distinct location in space

Choice 4 mismatch
The antenna will become mechanically unstable
A wire is modeled as a series of segments, each having a distinct value of voltage across it

E9B12
Answer mismatch

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

D
C

Question mismatch

What is the far-field of an antenna?

What is a disadvantage of decreasing the number of wire segments in an antenna model below the guideline of 10 segments per half-wavelength?

Choice 1 mismatch

The region of the ionosphere where radiated power is not refracted
Ground conductivity will not be accurately modeled

Choice 2 mismatch

The region where radiated power dissipates over a specified time period
The resulting design will favor radiation of harmonic energy

Choice 3 mismatch

The region where radiated field strengths are obstructed by objects of reflection

The computed feed-point impedance may be incorrect

Choice 4 mismatch

The region where the shape of the antenna pattern is independent of
The antenna will become mechanically unstable

E9B13

Answer mismatch

B
C

Question mismatch

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

Which of the following is a disadvantage of NEC-based antenna modeling programs?

Choice 1 mismatch

Next Element Comparison

They can only be used for simple wire antennas

Choice 2 mismatch

Numerical Electromagnetics Code

They are not capable of generating both vertical and horizontal polarization patterns

Choice 3 mismatch

National Electrical Code

Computing time increases as the number of wire segments is increased

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch
Numeric Electrical Computation
All of these answers are correct

E9B14
Answer mismatch
D
B

Question mismatch
What type of information can be obtained by submitting the details of a proposed new antenna to a modeling program?
What does the abbreviation NEC stand for when applied to antenna modeling programs?

Choice 1 mismatch
SWR vs. frequency charts
Next Element Comparison

Choice 2 mismatch
Polar plots of the far-field elevation and azimuth patterns
Numerical Electromagnetics Code

Choice 3 mismatch
Antenna gain
National Electrical Code

Choice 4 mismatch
All of these choices are correct
Numeric Electrical Computation

E9C04
Question mismatch
Which of the following describes a basic unterminated rhombic antenna?
Which of the following describes a basic rhombic antenna?

Choice 1 mismatch
Unidirectional; four-sides, each side one quarter-wavelength long; terminated in a resistance equal to its characteristic impedance
Unidirectional; four-sided, each side one quarter-wavelength long; terminated in a resistance equal to its characteristic impedance

Choice 2 mismatch
Bidirectional; four-sides, each side one or more wavelengths long; open at the end opposite the transmission line connection
Bidirectional; four-sided, each side one or more wavelengths long; open at the end opposite the transmission line connection

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

Four-sides; an LC network at each corner except for the transmission connection;

Four-sided; an LC network at each corner except for the transmission connection;

Choice 4 mismatch

Four-sides, each of a different physical length

Four-sided, each side of a different physical length

E9C05

Answer mismatch

C

A

Question mismatch

What are the disadvantages of a terminated rhombic antenna for the HF bands?

What are the main advantages of a terminated rhombic antenna?

Choice 1 mismatch

The antenna has a very narrow operating bandwidth

Wide frequency range, high gain and high front-to-back ratio

Choice 2 mismatch

The antenna produces a circularly polarized signal

High front-to-back ratio, compact size and high gain

Choice 3 mismatch

The antenna requires a large physical area and 4 separate supports

Unidirectional radiation pattern, high gain and compact size

Choice 4 mismatch

The antenna is more sensitive to man-made static than any other type

Bidirectional radiation pattern, high gain and wide frequency range

E9C06

Answer mismatch

B

C

Question mismatch

What is the effect of a terminating resistor on a rhombic antenna?

What are the disadvantages of a terminated rhombic antenna for the HF bands?

Choice 1 mismatch

It reflects the standing waves on the antenna elements back to the transmitter

The antenna has a very narrow operating bandwidth

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 2 mismatch

It changes the radiation pattern from bidirectional to unidirectional
The antenna produces a circularly polarized signal

Choice 3 mismatch

It changes the radiation pattern from horizontal to vertical polarization
The antenna requires a large physical area and 4 separate supports

Choice 4 mismatch

It decreases the ground loss
The antenna is more sensitive to man-made static than any other type

E9C07

Figure mismatch

E9-2

Answer mismatch

A
B

Question mismatch

What type of antenna pattern over real ground is shown in Figure E9-2?
What is the effect of a terminating resistor on a rhombic antenna?

Choice 1 mismatch

Elevation

It reflects the standing waves on the antenna elements back to the transmitter

Choice 2 mismatch

Azimuth

It changes the radiation pattern from bidirectional to unidirectional

Choice 3 mismatch

Radiation resistance

It changes the radiation pattern from horizontal to vertical polarization

Choice 4 mismatch

Polarization

It decreases the ground loss

E9C08

Answer mismatch

C
A

Question mismatch

What is the elevation angle of peak response in the antenna radiation pattern

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

shown in Figure E9-2?

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

Choice 1 mismatch

45 degrees

Elevation

Choice 2 mismatch

75 degrees

Azimuth

Choice 3 mismatch

7.5 degrees

Radiation resistance

Choice 4 mismatch

25 degrees

Polarization

E9C09

Answer mismatch

B

C

Question mismatch

What is the front-to-back ratio of the radiation pattern shown in Figure E9-2?

What is the elevation angle of peak response in the antenna radiation pattern shown in Figure E9-2?

Choice 1 mismatch

15 dB

45 degrees

Choice 2 mismatch

28 dB

75 degrees

Choice 3 mismatch

3 dB

7.5 degrees

Choice 4 mismatch

24 dB

25 degrees

E9C10

Answer mismatch

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

A
B

Question mismatch

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

What is the front-to-back ratio of the radiation pattern shown in Figure E9-2?

Choice 1 mismatch

4
15 dB

Choice 2 mismatch

3
28 dB

Choice 3 mismatch

1
3 dB

Choice 4 mismatch

7
24 dB

E9C11

Figure mismatch

E9-2

Answer mismatch

D
A

Question mismatch

How is the far-field elevation pattern of a vertically polarized antenna affected by being mounted over seawater versus rocky ground?

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

Choice 1 mismatch

The low-angle radiation decreases
4

Choice 2 mismatch

The high-angle radiation increases
3

Choice 3 mismatch

Both the high- and low-angle radiation decrease
1

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 4 mismatch

The low-angle radiation increases

7

E9C12

Question mismatch

When constructing a Beverage antenna, which of the following factors should be included in the design to achieve good performance at the desired frequency?

How is the far-field elevation pattern of a vertically polarized antenna affected by being mounted over seawater versus rocky ground?

Choice 1 mismatch

Its overall length must not exceed 1/4 wavelength

The low-angle radiation decreases

Choice 2 mismatch

It must be mounted more than 1 wavelength above ground

The high-angle radiation increases

Choice 3 mismatch

It should be configured as a four-sided loop

Both the high- and low-angle radiation decrease

Choice 4 mismatch

It should be one or more wavelengths long

The low-angle radiation increases

E9C13

Answer mismatch

C

D

Question mismatch

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

When constructing a Beverage antenna, which of the following factors should be included in the design to achieve good performance at the desired frequency?

Choice 1 mismatch

It causes increased SWR

Its overall length must not exceed 1/4 wavelength

Choice 2 mismatch

It changes the impedance angle of the matching network

It must be mounted more than 1 wavelength above ground

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

It reduces low-angle radiation

It should be configured as a four-sided loop

Choice 4 mismatch

It reduces losses in the radiating portion of the antenna

It should be one or more wavelengths long

E9D01

Question mismatch

How does the gain of an ideal parabolic dish antenna change when the operating frequency is doubled?

How does the gain of a parabolic dish antenna change when the operating frequency is doubled?

Choice 3 mismatch

Gain increases by 6 dB

Gain increases 6 dB

Choice 4 mismatch

Gain increases by 3 dB

Gain increases 3 dB

E9D02

Question mismatch

How can linearly polarized Yagi antennas be used to produce circular polarization?

What is one way to produce circular polarization when using linearly polarized antennas?

E9D04

Choice 1 mismatch

In order to track the satellite as it orbits the Earth

In order to track the satellite as it orbits the earth

E9D05

Question mismatch

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

For a shortened vertical antenna, where should a loading coil be placed to minimize losses and produce the most effective performance?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E9D07

Choice 2 mismatch

It radiates the harmonics and fundamental equally well
It can only be used for single-band operation

E9D10

Question mismatch

What is the approximate feed point impedance at the center of a two-wire folded dipole antenna?
What is the approximate feed-point impedance at the center of a folded dipole antenna?

E9D11

Question mismatch

What is the function of a loading coil as used with an HF mobile antenna?
Why is a loading coil often used with an HF mobile antenna?

Choice 1 mismatch

To increase the SWR bandwidth
To improve reception

E9D12

Question mismatch

What is one advantage of using a trapped antenna?
What is an advantage of using a trapped antenna?

Choice 4 mismatch

It may be used for multiband operation
It may be used for multi-band operation

E9D13

Question mismatch

What happens to feed point impedance at the base of a fixed-length HF mobile antenna as the frequency of operation is lowered?
What happens at the base feed-point of a fixed-length HF mobile antenna as the frequency of operation is lowered?

Choice 1 mismatch

The radiation resistance decreases and the capacitive reactance decreases
The resistance decreases and the capacitive reactance decreases

Choice 2 mismatch

The radiation resistance decreases and the capacitive reactance increases
The resistance decreases and the capacitive reactance increases

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Choice 3 mismatch

The radiation resistance increases and the capacitive reactance decreases
The resistance increases and the capacitive reactance decreases

Choice 4 mismatch

The radiation resistance increases and the capacitive reactance increases
The resistance increases and the capacitive reactance increases

E9D14

Question mismatch

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

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

Choice 1 mismatch

A resistive wire, such as a spark plug wire

A resistive wire, such as a spark-plug wire

Choice 2 mismatch

A wide flat copper strap

A thin, flat copper strap several inches wide

Choice 4 mismatch

A single 12 or 10-gauge stainless steel wire

A single 12 or 10 gauge stainless steel wire

E9D15

Question mismatch

Which of the following would provide the best RF ground for your station?

Which of these choices would provide the best RF ground for your station?

Choice 2 mismatch

An electrically-short connection to a metal water pipe

A connection to a metal waterpipe

Choice 3 mismatch

An electrically-short connection to 3 or 4 interconnected ground rods driven into the Earth

A connection to 3 or 4 interconnected ground rods driven into the Earth

Choice 4 mismatch

An electrically-short connection to 3 or 4 interconnected ground rods via a series RF choke

A connection to 3 or 4 interconnected ground rods via a series RF choke

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E9E02

Choice 3 mismatch
The epsilon match
The omega match

E9E03

Question mismatch

What is the name of the matching system that uses a section of transmission line connected in parallel with the feed line at or near the feed point?
What is the name of the matching system that uses a short perpendicular section of transmission line connected to the feed line near the antenna?

E9E04

Choice 1 mismatch

To provide DC isolation between the feed line and the antenna
To provide DC isolation between the feed-line and the antenna

Choice 2 mismatch

To cancel the inductive reactance of the matching network
To compensate for the inductive reactance of the matching network

E9E07

Question mismatch

What term best describes the interactions at the load end of a mismatched transmission line?
What parameter best describes the interactions at the load end of a mismatched transmission line?

Choice 4 mismatch

Dielectric constant
Dielectric Constant

E9E08

Question mismatch

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

E9E09

Question mismatch

Which of these matching systems is an effective method of connecting a 50-ohm coaxial cable feed line to a grounded tower so it can be used as a vertical antenna?

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

Which of these matching systems is an effective method of connecting a 50-ohm coaxial cable feed-line to a grounded tower so it can be used as a vertical antenna?

Choice 4 mismatch

All of these choices are correct

All of these answers are correct

E9E10

Question mismatch

Which of these choices is an effective way to match an antenna with a 100-ohm feed point impedance to a 50-ohm coaxial cable feed line?

Which of these choices is an effective way to match an antenna with a 100-ohm terminal impedance to a 50-ohm coaxial cable feed-line?

Choice 1 mismatch

Connect a 1/4-wavelength open stub of 300-ohm twin-lead in parallel with the coaxial feed line where it connects to the antenna

Connect a 1/4-wavelength open stub of 300-ohm twin-lead in parallel with the coaxial feed-line where it connects to the antenna

E9E11

Question mismatch

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?

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?

Choice 1 mismatch

Use a 50-ohm 1:1 balun between the antenna and feed line

Use a 50-ohm 1:1 balun between the antenna and feed-line

Choice 2 mismatch

Use the universal stub matching technique

Use the "universal stub" matching technique

E9E12

Question mismatch

What is the primary purpose of a phasing line when used with an antenna having multiple driven elements?

What is the primary purpose of a "phasing line" when used with an antenna having multiple driven elements?

Choice 2 mismatch

It prevents reflected power from traveling back down the feed line and causing harmonic radiation from the transmitter

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

It prevents reflected power from traveling back down the feed-line and causing harmonic radiation from the transmitter

E9E13

Question mismatch

What is the purpose of a Wilkinson divider?

What is the purpose of a "Wilkinson divider"?

E9F02

Question mismatch

Which of the following determines the velocity factor of a transmission line?

What determines the velocity factor in a transmission line?

E9F05

Question mismatch

What is the approximate physical length of a solid polyethylene dielectric coaxial transmission line that is electrically one-quarter wavelength long at 14.1 MHz?

What is the physical length of a coaxial transmission line that is electrically one-quarter wavelength long at 14.1 MHz? (Assume a velocity factor of 0.66.)

E9F06

Question mismatch

What is the approximate physical length of an air-insulated, parallel conductor transmission line that is electrically one-half wavelength long at 14.10 MHz?

What is the physical length of a parallel conductor feed line that is electrically one-half wavelength long at 14.10 MHz? (Assume a velocity factor of 0.95.)

E9F07

Question mismatch

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

What characteristic will 450-ohm ladder line have at 50 MHz, as compared to 0.195-inch-diameter coaxial cable (such as RG-58)?

E9F09

Question mismatch

What is the approximate physical length of a solid polyethylene dielectric

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

coaxial transmission line that is electrically one-quarter wavelength long at 7.2 MHz?

What would be the physical length of a typical coaxial transmission line that is electrically one-quarter wavelength long at 7.2 MHz? (Assume a velocity factor of 0.66)

E9F10

Question mismatch

What impedance does a 1/8-wavelength transmission line present to a generator when the line is shorted at the far end?

What kind of impedance does a 1/8-wavelength transmission line present to a generator when the line is shorted at the far end?

E9F11

Question mismatch

What impedance does a 1/8-wavelength transmission line present to a generator when the line is open at the far end?

What kind of impedance does a 1/8-wavelength transmission line present to a generator when the line is open at the far end?

E9F12

Answer mismatch

D

B

Question mismatch

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

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

Choice 1 mismatch

The same as the characteristic impedance of the line

A very high impedance

Choice 2 mismatch

The same as the input impedance to the generator

A very low impedance

Choice 3 mismatch

Very high impedance

The same as the characteristic impedance of the line

Choice 4 mismatch

Very low impedance

The same as the input impedance to the final generator stage

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E9F13

Question mismatch

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

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

Choice 1 mismatch

Very high impedance

A very high impedance

Choice 2 mismatch

Very low impedance

A very low impedance

E9F14

Question mismatch

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

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

Choice 1 mismatch

Very high impedance

A very high impedance

Choice 2 mismatch

Very low impedance

A very low impedance

E9F15

Question mismatch

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

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

Choice 1 mismatch

Very high impedance

A very high impedance

Choice 2 mismatch

Very low impedance

A very low impedance

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E9F16

Question mismatch

Which of the following is a significant difference between foam-dielectric coaxial cable and solid-dielectric cable, assuming all other parameters are the same?

What is the primary difference between foam-dielectric coaxial cable as opposed to solid-dielectric cable, assuming all other parameters are the same?

Choice 4 mismatch

All of these choices are correct

All of these answers are correct

E9H01

Question mismatch

What is the effective radiated power relative to a dipole of a repeater station with 150 watts transmitter power output, 2-dB feed line loss, 2.2-dB duplexer loss and 7-dBd antenna gain?

What is the effective radiated power of a repeater station with 150 watts transmitter power output, 2-dB feed line loss, 2.2-dB duplexer loss and 7-dBd antenna gain?

E9H02

Question mismatch

What is the effective radiated power relative to a dipole of a repeater station with 200 watts transmitter power output, 4-dB feed line loss, 3.2-dB duplexer loss, 0.8-dB circulator loss and 10-dBd antenna gain?

What is the effective radiated power of a repeater station with 200 watts transmitter power output, 4-dB feed line loss, 3.2-dB duplexer loss, 0.8-dB circulator loss and 10-dBd antenna gain?

E9H03

Question mismatch

What is the effective isotropic radiated power of a repeater station with 200 watts transmitter power output, 2-dB feed line loss, 2.8-dB duplexer loss, 1.2-dB circulator loss and 7-dBi antenna gain?

What is the effective radiated power of a repeater station with 200 watts transmitter power output, 2-dB feed line loss, 2.8-dB duplexer loss, 1.2-dB circulator loss and 7-dBd antenna gain?

E9H04

Question mismatch

What term describes station output, including the transmitter, antenna and everything in between, when considering transmitter power and system gains and losses?

What term describes station output (including the transmitter, antenna and

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

everything in between), when considering transmitter power and system gains and losses?

E9H06

Choice 3 mismatch

Antenna headings from several different receiving locations are used to locate the signal source

Antenna headings from several different receiving stations are used to locate the signal source

E9H07

Question mismatch

Why is it advisable to use an RF attenuator on a receiver being used for direction finding?

Why is an RF attenuator desirable in a receiver used for direction finding?

Choice 1 mismatch

It narrows the bandwidth of the received signal to improve signal to noise ratio

It narrows the bandwidth of the received signal

Choice 2 mismatch

It compensates for the effects of an isotropic antenna, thereby improving directivity

It eliminates the effects of isotropic radiation

Choice 3 mismatch

It reduces loss of received signals caused by antenna pattern nulls, thereby increasing sensitivity

It reduces loss of received signals caused by antenna pattern nulls

Choice 4 mismatch

It prevents receiver overload which could make it difficult to determine peaks or nulls

It prevents receiver overload from extremely strong signals

E9H09

Question mismatch

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

What is a receiving loop antenna?

Choice 4 mismatch

A vertical antenna coupled to a feed line through an inductive loop of wire

Any antenna coupled to a feed line through an inductive loop of wire

Question Pool Comparison Amateur Extra (2012 – 2016) and Amateur Extra (2008 – 2012)

E9H10

Question mismatch

How can the output voltage of a multi-turn receiving loop antenna be increased?

How can the output voltage of a receiving loop antenna be increased?

Choice 3 mismatch

By winding adjacent turns in opposing directions

By reducing either the number of wire turns in the loop or the area of the loop structure

Choice 4 mismatch

By increasing either the number of wire turns in the loop or the area of the loop structure or both

By increasing either the number of wire turns in the loop or the area of the loop structure

E9H11

Question mismatch

What characteristic of a cardioid-pattern antenna is useful for direction finding?

Why is an antenna with a cardioid pattern desirable for a direction-finding system?

Choice 1 mismatch

A very sharp peak

The broad-side responses of the cardioid pattern can be aimed at the desired station

Choice 2 mismatch

A very sharp single null

The response characteristics of the cardioid pattern can assist in determining the direction of the desired station

Choice 3 mismatch

Broad band response

The extra side lobes in the cardioid pattern can pinpoint the direction of the desired station

Choice 4 mismatch

High-radiation angle

The high-radiation angle of the cardioid pattern is useful for short-distance direction finding