Basic Qualification Question Bank

Many thanks to George Demetre VE6JZZ, who brought order out of chaos and gave our efforts a very professional look.

Below is a revised version of the Basic Qualification Question Bank that is integrated with the Canadian Amateur Radio Basic Qualification Study Guide 8th and 9th editions published by Coax Publication. It includes all the questions of the latest version released by Innovation, Science and Economic Development, formerly called Industry Canada (IC), in June 2017. We will stick with ISED or IC for short. Before you decide that there is no way that one can master all the questions one should be aware of how the exam is set up. As you go through the question bank you will see that it is divided up into sections, 8 in total, and 102 sub-sections. Within each sub-section you will notice a lot of duplication. So if you can do one question then you can do all the similar questions. The exam is generated by computer and it seems as if they pick one question from each sub-section for a total of 100.

Refer to the following question to see how this works.

B-001-001-001
RIC-3
Authority to make "Radiocommunication Regulations" is derived from:

- the Radiocommunication Regulations
- Standards for the Operation of Radio Stations in the Amateur Radio Service
- the ITU Radio Regulations
- the Radiocommunication Act

< the Radiocommunication Act >

Just below the question number, you will find the section of the study guide (8th and 9th editions) or the Industry Canada (IC) document (RIC-3, RIC-9, RBR-4, Safety Code 6, EMCAB-2, CPC-2-0-03) where you will find the answer. When you find the answer, you might find it helpful to use a highlighter to block off the appropriate text. With the 9th edition we have moved some of the text from where it was found in the 8th edition. In these situations you will see the following section references: 2.4BSG8; 2.5BSG9. This translates to Section 2.4 in the 8th Edition; Section 2.5 in the 9th Edition. For some questions, comments have been added.

The numbering of the answers has been replaced with bullets. The correct answer for a question by enclosing it inside < >. This approach allows for a quicker update of this document when IC updates the Question Bank.

Many of the questions on regulations in the question bank are derived from IC documents mentioned above, which you can download from the Coax Publications Student Success Pages or the Industry Canada website. Others rely on common sense to figure out the correct answer. For some, despite our best efforts to show you where to find the correct answer, there is no source such as the IC documents quoted above. You simply have to memorize the answer!

ITU REGIONS

The International Telecommunication Union (ITU), in its International Radio Regulations, divides the world into three ITU regions for the purposes of managing the global radio spectrum. Each region has its own set of frequency allocations, the primary reason for defining the regions.

> **Region 1** comprises Europe, Africa, the Middle East west of the Persian Gulf including Iraq, the former Soviet Union and Mongolia. The western boundary is defined by Line B.
>
> **Region 2** covers the Americas, which includes Canada, Greenland and some of the eastern Pacific Islands. The eastern boundary is defined by Line B.
>
> **Region 3** contains most of non-former-Soviet-Union Asia, east of and including Iran, and most of Oceania.

Line B is a line running from the North Pole along meridian 10° West of Greenwich to its intersection with parallel 72° North; thence by great circle arc to the intersection of meridian 50° West and parallel 40° North; thence by great circle arc to the intersection of meridian 20° West and parallel 10° South; thence along meridian 20° West to the South Pole.

Radio communications worldwide are regulated cooperatively by the ITU, the International Telecommunications Union, a branch of the United Nations. All sovereign countries have the right to be represented there and to have their opinion considered when new regulations or changes are being considered. Canada is represented on most working committees. A subset of a region is the countries within a region. So if one is operating outside of Canada one must follow not only the ITU regulations but those of the country you are visiting.

B-001-020-005
****

BSG8 - See above; 17.4BSG9
In addition to complying with the Radiocommunication Act and Regulations, Canadian radio amateurs must also comply with the regulations of the:

- International Amateur Radio Union
- International Telecommunication Union
- American Radio Relay League
- Radio Amateurs of Canada Inc.

< International Telecommunication Union >

B-001-021-001
****

BSG8 - See above; 17.4BSG9
In which International Telecommunication Union Region is Canada?

- Region 1
- Region 2
- Region 4
- Region 3

< Region 2 >

B-001-021-002
****

RIC-3 – Sec. 5.1
A Canadian radio amateur, operating his station in the state of Florida, is subject to which frequency band limits?

- ITU Region 1
- Those applicable to US radio amateurs
- ITU Region 2
- ITU Region 3

< Those applicable to US radio amateurs >

A subset of a region are the countries within a region. So if one is operating outside of Canada, one must follow not only the ITU regulations but those of the country you are visiting.

B-001-021-003
****

RIC-3 – Sec. 5.1
A Canadian radio amateur, operating his station 7 kilometres (4 miles) offshore from the coast of Florida, is subject to which frequency band limits?

- ITU Region 1
- ITU Region 2
- Those applicable to US radio amateurs
- Those applicable to Canadian radio amateurs

< Those applicable to US radio amateurs >

A subset of a region are the countries within a region. So if one is operating outside of Canada one must follow not only the ITU regulations but those of the country you are visiting. At this distance one is still considered to be in US waters.

B-001-021-004
****

BSG8 – see below; 17.4BSG9
Australia, Japan, and Southeast Asia are in which ITU Region?

- Region 1
- Region 2
- Region 4
- Region 3

< Region 3 >

See map above

B-001-021-005
****

BSG8 – see below; 17.4BSG9
Canada is located in ITU Region:

- Region 2
- Region 1
- Region 3
- Region 4

< Region 2 >

See map above

Regulations and Policies - 001

1-1 Radio licences, applicability, eligibility of licence holder

B-001-001-001
****
RIC-3
Authority to make regulations governing radiocommunications is derived from:

- the Radiocommunication Regulations
- the Standards for the Operation of Radio Stations in the Amateur Radio Service
- The ITU Radio Regulations
- the Radiocommunication Act

< the Radiocommunication Act >

B-001-001-002
****
RIC-3
Authority to make "Standards for the Operation of Radio Stations in the Amateur Radio Service" is derived from:

- the ITU Radio Regulations
- the Radiocommunication Act
- the Radiocommunication Regulations
- the Standards for the Operation of Radio Stations in the Amateur Radio Service

< the Radiocommunication Act >

B-001-001-003
****
17.1
The Department that is responsible for the administration of the Radiocommunication Act is:

- Communications Canada
- National Defense
- Industry Canada
- Transport Canada

< Industry Canada >

B-001-001-004
****
17.1, RBR-4 – Sec. 1
The "amateur radio service" is defined in:

- the Radiocommunication Regulations
- the Radiocommunication Act
- the Standards for the Operation of Radio Stations in the Amateur Radio Service
- the FCC's Part 97 rules

< the Radiocommunication Regulations >

1-2 Licence fee, term, posting requirements, change of address

B-001-002-001
****

17.1, RBR-4 – Sec. 15
What must you do to notify your mailing address changes?

- Write amateur organizations advising them of your new address, enclosing your certificate
- Contact Industry Canada and provide details of your address change
- Telephone your local club, and give them your new address
- Contact an accredited examiner and provide details of your address change

< Contact Industry Canada and provide details of your address change >

B-001-002-002
****

An Amateur Radio Operator Certificate is valid for:

- one year
- life
- five years
- three years

< life >

B-001-002-003
****

RBR-4 – Sec. 15
Whenever a change of address is made:

- Industry Canada must be notified within 14 days of operation at the new address
- the station shall not be operated until a change of address card is forwarded to Industry Canada
- within the same province there is no need to notify Industry Canada
- Industry Canada must be advised of any change in postal address

< Industry Canada must be advised of any change in postal address >

B-001-002-004
****

The Amateur Radio Operator Certificate:

- must be put on file
- must be kept in a safe place
- must be kept on the person to whom it is issued
- must be retained at the station

< must be retained at the station >

B-001-002-005
****
17.1, RIC-3 – Sec. 38
The holder of an Amateur Radio Operator Certificate shall, at the request of a duly appointed radio inspector, produce the certificate, or a copy thereof, to the inspector, within _____ hours after the request.

- 72
- 48
- 12
- 24

< 48 >

B-001-002-006
****
The fee for an Amateur Radio Operator Certificate is:

- $32
- $10
- $24
- free

< free >

B-001-002-007
****
The Amateur Radio Operator Certificate should be:

- retained in a safety deposit box
- retained on the radio amateur's person
- retained in the radio amateur's vehicle
- retained at the address provided to Industry Canada

< retained at the address provided to Industry Canada >

1-3 Licence suspension or revocation, powers of radio inspectors, offences and punishments

B-001-003-001
****
Out of amateur band transmissions:

- must be identified with your call sign
- are permitted
- are permitted for short tests only
- are prohibited - penalties could be assessed to the control operator

< are prohibited - penalties could be assessed to the control operator >

B-001-003-002
****
12.16BSG8; 12.14BSG9
If an amateur pretends there is an emergency and transmits the word “MAYDAY,” what is this called?

- An emergency test transmission
- Nothing special: “MAYDAY” has no meaning in an emergency
- False or deceptive signals
- A traditional greeting in May

< False or deceptive signals >

B-001-003-003
****
A person found guilty of transmitting a false or fraudulent distress signal, or interfering with, or obstructing any radio communication, without lawful cause, may be liable, on summary conviction, to a penalty of:

- a fine of $10 000
- a prison term of two years
- a fine of $1 000
- a fine, not exceeding $5 000, or a prison term of one year, or both

< a fine, not exceeding $5 000, or a prison term of one year, or both >

B-001-003-004
****
What government document states the offences and penalties for non compliance of the rules governing radiocommunications?

- The Radiocommunication Act
- The Official Radio Rules of Canada
- The Radiocommunication Regulations
- The Radiocommunication Law Reform Act of 2002

< The Radiocommunication Act >

B-001-003-005
****
Which of the following is NOT correct? The Minister may suspend an Amateur Radio Operator Certificate:

- With no notice, or opportunity to make representation thereto
- Where the holder has contravened the Radiocommunication Act, its Regulations, or the terms and conditions of the certificate
- Where the certificate was obtained through misrepresentation
- Where the holder has failed to comply with a request to pay fees or interest due

< With no notice, or opportunity to make representation thereto >

B-001-003-006
****
Which of the following statements is NOT correct?

- Where entry is refused, and is necessary to perform his duties under the Act, a radio inspector may obtain a warrant
- In executing a warrant, a radio inspector shall not use force, unless accompanied by a peace officer, and force is authorized
- The person in charge of a place entered by a radio inspector shall give the inspector information that the inspector requests
- A radio inspector may enter a dwelling without the consent of the occupant and without a warrant

< A radio inspector may enter a dwelling without the consent of the occupant and without a warrant >

1-4 Operator certificates, applicability, eligibility, equivalents, reciprocal recognition

B-001-004-001
****
17.1, RIC-3 – Sec. 4.1
What age must you be to hold an Amateur Radio Operator Certificate with Basic Qualification?

- 18 years or older
- 14 years or older
- There are no age limits
- 70 years or younger

< There are no age limits >

B-001-004-002
****
17.1, RIC-3 Sec.42
Which examination must be passed before an Amateur Radio Operator Certificate is issued?

- Advanced
- Basic
- Personality test
- Morse code

< Basic >

B-001-004-003
****
RIC-3 – Sec.1.2
Holders of which one of the following certificates may be issued an Amateur Radio Operator Certificate?

- Canadian Restricted Operator Certificate – Maritime (ROC-M)
- Canadian Restricted Operator's Certificate – Maritime Commercial (ROC-MC)
- Canadian Restricted Operator Certificate – Aeronautical (ROC-A)
- Canadian Radiocommunication Operator General Certificate Maritime (RGMC)

< Canadian Radiocommunication Operator General Certificate Maritime (RGMC) >

B-001-004-004
****
After an Amateur Radio Operator Certificate with Basic Qualification is issued, the holder may be examined for additional qualifications in the following order:

- Morse code after passing the Basic with Honours
- Advanced after passing Morse code
- any order
- Morse code after passing the Advanced

< any order >

B-001-004-005
****
RIC-3 - S2.2
One Morse code qualification is available for the Amateur Radio Operator Certificate. It is:

- 12 w.p.m.
- 7 w.p.m.
- 15 w.p.m.
- 5 w.p.m.

< 5 w.p.m. >

B-001-004-006
****
The holder of an Amateur Radio Operator Certificate with the Basic Qualification is authorized to operate following stations:

- any authorized station except stations authorized in the amateur, aeronautical or maritime services
- a station authorized in the amateur service
- a station authorized in the aeronautical service
- a station authorized in the maritime service

< a station authorized in the amateur service >

The obvious answer is "a station authorized in the amateur service".

B-001-004-007
****

What conditions must candidates to amateur radio certification meet?

- Have a valid address in Canada
- Be a Canadian citizen
- Be a Canadian citizen or permanent resident
- Be at least 14 years of age and a Canadian citizen or permanent resident

< Have a valid address in Canada >

1-5 Operation, repair and maintenance of radio apparatus on behalf of other persons

B-001-005-001
****

Radio apparatus may be installed, placed in operation, repaired or maintained by the holder of an Amateur Radio Operator Certificate with Advanced Qualification on behalf of another person:

- pending the granting of a radio authorization, if the apparatus covers the amateur and commercial frequency bands
- pending the granting of a radio authorization, if the apparatus covers the amateur frequency bands only
- if the transmitter of a station, for which a radio authorization is to be applied for, is type approved and crystal controlled
- if the other person is the holder of an Amateur Radio Operator Certificate to operate in the amateur radio service

< if the other person is the holder of an Amateur Radio Operator Certificate to operate in the amateur radio service >

The privileges of the Advanced Qualification extend only to the Amateur Radio Service. The word "pending" negates "pending the granting of a radio authorization, if the apparatus covers the amateur and commercial frequency bands" and "pending the granting of a radio authorization, if the apparatus covers the amateur frequency bands only". Also, the phase 'radio authorization is to be applied for' negates "if the transmitter of a station, for which a radio authorization is to be applied for, is type approved and crystal controlled". The only answer is the other person must already be a holder of a certificate.

B-001-005-002
****

RIC-3 – S1.4

The holder of an Amateur Radio Operator Certificate may design and build from scratch transmitting equipment for use in the amateur radio service provided that person has the:

- Basic qualification
- Advanced qualification
- Basic and Morse code qualification
- Morse code with Honours qualification

< Advanced qualification >

B-001-005-003
****
RIC-3 - S1.4
Where a friend is not the holder of any type of radio operator certificate, you, as a holder of an Amateur Radio Operator Certificate with Basic Qualification, may, on behalf of your friend:

- modify and repair the radio apparatus but not install it
- not install, place in operation, modify, repair, maintain, or permit the operation of the radio apparatus
- install an amateur station, but not operate or permit the operation of the apparatus
- install and operate the radio apparatus, using your own call sign

< not install, place in operation, modify, repair, maintain, or permit the operation of the radio apparatus >

The key words are repair and modify. Also, the friend is not a holder of a radio operator certificate.

B-001-005-004
****
A radio amateur with Basic and Morse code qualifications may install an amateur station for another person:

- only if the other person is the holder of a valid Amateur Radio Operator Certificate
- only if the final power input does not exceed 100 watts
- only if the station is for use on one of the VHF bands
- only if the DC power input to the final stage does not exceed 200 watts

< only if the other person is the holder of a valid Amateur Radio Operator Certificate >

All of the other answers are red herrings.

1-6 Operation of radio apparatus, terms of licence, applicable standards, exempt apparatus

B-001-006-001
****
An amateur station with a maximum input to the final stage of 2 watts:

- must be operated by a person with an Amateur Certificate and call sign
- must be licensed by Industry Canada
- need not be licensed in isolated areas only
- is exempt from regulatory control by Industry Canada

< must be operated by a person with an Amateur Certificate and call sign >

B-001-006-002

****

An amateur station may be used to communicate with:

- any stations which are identified for special contests
- armed forces stations during special contests and training exercises
- any station transmitting in the amateur bands
- stations operated under similar authorizations

< stations operated under similar authorizations >

Cannot be "any stations which are identified for special contests" if you do not have HF privileges and the contest station is on 20 metres. Cannot be "armed forces stations during special contests and training exercises" as the armed forces does not operate on the amateurs bands. Cannot be "any station transmitting in the amateur bands" if you do not have HF privileges and the contest station is on 20 metres.

B-001-006-003

****

Which of the following statements is NOT correct?

- A courteous radio amateur refrains from using offensive language
- A radio amateur may not operate, or permit to be operated, a radio apparatus which he knows is not performing to the Radiocommunication Regulations
- A radio amateur may use a linear amplifier to amplify the output of a licence-exempt transmitter outside of any amateur radio allocations
- A considerate radio amateur does not transmit unnecessary signals

< A radio amateur may use a linear amplifier to amplify the output of a licence-exempt transmitter outside of any amateur radio allocations >

"A radio amateur may use a linear amplifier to amplify the output of a licence-exempt transmitter outside of any amateur radio allocations" is the best answer. If you hold an Amateur Radio certificate, it authorizes you to transmit on specific frequencies. To transmit on frequencies for which you do not have authorization is breaking the law.

B-001-006-004
****
RIC-3
Which of the following statements is NOT correct?

- A radio amateur may operate or permit the operation of radio apparatus only where the apparatus is maintained to the Radiocommunication Regulations tolerances
- A person may operate an amateur radio station when the person complies with the Standards for the Operation of Radio Stations in the Amateur Radio Service
- An amateur radio operator transmitting unnecessary or offensive signals does not violate accepted practice
- Except for a certified radio amateur operating with authorized amateur radio allocations, no person shall possess or operate any device for the purpose of amplifying the output power of a licence-exempt radio apparatus

< An amateur radio operator transmitting unnecessary or offensive signals does not violate accepted practice >

Sending unnecessary transmissions, especially without identifying yourself every 30 minutes, is a violation of the law.

B-001-006-005
****
Which of the following statements is NOT correct? A person may operate radio apparatus, authorized in the amateur service:

- only where the person complies with the Standards for the Operation of Radio Stations in the Amateur Radio Service
- only where the apparatus is maintained within the performance standards set by Industry Canada regulations and policies
- except for the amplification of the output power of licence-exempt radio apparatus outside authorized amateur radio service allocations
- on aeronautical, marine or land mobile frequencies

< on aeronautical, marine or land mobile frequencies >

You are licensed ONLY for the frequencies assigned to the Amateur Service. This means "on aeronautical, marine or land mobile frequencies" is incorrect.

B-001-006-006
****

Some VHF and UHF FM radios purchased for use in the amateur service can also be programmed to communicate on frequencies used for land mobile service. Under what conditions is this permissible?

- The equipment has an RF output of 2 watts or less
- The equipment is used in remote areas north of 60 degrees latitude
- The radio is certified under the proper Radio Standards Specification for use in Canada and is licenced by Industry Canada on the specified frequencies
- The radio operator has Restricted Operator's Certificate

< The radio is certified under the proper Radio Standards Specification for use in Canada and is licenced by Industry Canada on the specified frequencies >

You can wade through RSS -119 — Radio Transmitters and Receivers Operating in the Land Mobile and Fixed Services in the Frequency Range 27.41-960 MHz, but it all boils down to: "The radio is certified under the proper Radio Standards Specification for use in Canada and is licenced by Industry Canada on the specified frequencies."

1-7 Content restrictions - non-superfluous, profanity, secret code, music, non-commercial

B-001-007-001
****

RIC-3 – Sec.47
Which of the following CANNOT be discussed on an amateur club net?

- Emergency planning
- Business planning
- Recreation planning
- Code practice planning

< Business planning >

B-001-007-002
****

RIC-3 – Sec. 47
When is a radio amateur allowed to broadcast information to the general public?

- Only when broadcasts last less than 1 hour
- Only when broadcasts last longer than 15 minutes
- Never
- Only when the operator is being paid

< Never >

B-001-007-003
****
RIC-3 – Sec. 6
When may false or deceptive amateur signals or communications be transmitted?

- When playing a harmless “practical joke”
- When you need to hide the meaning of a message for secrecy
- Never
- When operating a beacon transmitter in a “fox hunt” exercise

< Never >

B-001-007-004
****
RIC-3 – Sec.47
Which of the following one-way communications may not be transmitted in the amateur service?

- Broadcasts intended for the general public
- Radio control commands to model craft
- Brief transmissions to make adjustments to the station
- Morse code practice

< Broadcasts intended for the general public >

B-001-007-005
****
RIC-3 – Sec. 47
You wish to develop and use a new digital encoding technique to transmit data over amateur radio spectrum. Under what conditions is this permissible?

- When it includes sending the amateur station’s call sign
- When the encoding technique is published in the public domain
- When it is used for music streaming content
- When it is used for commercial traffic

< When the encoding technique is published in the public domain >

B-001-007-006
****
RIC-3 – Sec.47
When may an amateur station in two-way communication transmit an encoded message?

- When transmitting above 450 MHz
- Only when the encoding or cipher is not secret
- During a declared communications emergency
- During contests

< Only when the encoding or cipher is not secret >

B-001-007-007
****
12.2, 12.3, 12.6BSG8; 12.2, 12.3, 12.6.1BSG9
What are the restrictions on the use of abbreviations or procedural signals in the amateur service?

- Only “10 codes” are permitted
- They may be used if the signals or codes are not secret
- There are no restrictions
- They are not permitted because they obscure the meaning of a message to government monitoring stations

< They may be used if the signals or codes are not secret >

B-001-007-008
****
What should you do to keep your station from retransmitting music or signals from a non-amateur station?

- Turn up the volume of your transmitter
- Speak closer to the microphone to increase your signal strength
- Adjust your transceiver noise blanker
- Turn down the volume of background audio

< Turn down the volume of background audio >

Just common sense!

B-001-007-009
****
RIC-3 – Sec. 47
The transmission of a secret code by the operator of an amateur station:

- is permitted for third-part traffic
- is not permitted
- is permitted for contests
- must be approved by Industry Canada

< is not permitted >

B-001-007-010
****
RIC-3 – Sec. 47
A radio amateur may be engaged in communication that include the transmission of:

- commercially recorded material
- Q signals
- programming that originates from a broadcasting undertaking
- radiocommunication in support of industrial, business, or professional activities

< Q signals >

B-001-007-011
****
RIC-3 – Sec. 47
In the amateur radio service, business communications:

- are not permitted under any circumstance
- are permitted on some bands
- are only permitted if they are used the safety of life or immediate protection of property
- are not prohibited by regulation

< are not permitted under any circumstance >

1-8 Installation and operating restrictions - number of stations, repeaters, home-built, club stations

B-001-008-001
****
Where may the holder of an Amateur Radio Operator Certificate operate an amateur radio station in Canada?

- anywhere in Canada during times of emergency
- only at the address shown on Industry Canada records
- anywhere in your call sign prefix area
- anywhere in Canada

< anywhere in Canada >

B-001-008-002
****
6.12
Which type of station may transmit one-way communications?

- HF station
- VHF station
- Beacon station
- Repeater station

< Beacon station >

B-001-008-003
****
Amateur radio operators may install or operate radio apparatus:

- at any location in Canada
- only at the address which is on record at Industry Canada
- at the address which is on record at Industry Canada and at one other location
- at the address which is on record at Industry Canada and in two mobiles

< at any location in Canada >

B-001-008-004
****
11.4, RIC-3 – Sec. 1.
In order to install any radio apparatus, to be used specifically for receiving and automatically retransmitting radiotelephone communications within the same frequency band, a radio amateur must hold an Amateur Radio Operator Certificate, with a minimum of:

- Basic and Advanced qualifications
- Basic and Morse code qualifications
- Basic Qualification
- Basic and Honours qualification

< Basic and Advanced qualifications >

B-001-008-005
****
RIC-3 – Sec. 1.4
In order to install any radio apparatus, to be used specifically for an amateur radio club station, the radio amateur must hold an Amateur Radio Operator Certificate, with a minimum of the following qualifications:

- Basic with Honours
- Basic and Advanced
- Basic, Advanced and Morse code
- Basic

< Basic and Advanced >

B-001-008-006
****
RIC-3 – Sec. 1.4
In order to install or operate a transmitter or RF amplifier that is neither professionally designed nor commercially manufactured for use in the amateur service, a radio amateur must hold an Amateur Operator's Certificate, with a minimum of which qualifications?

- Basic and Morse code
- Basic, Advanced and Morse code
- Basic and Advanced
- Basic with Honours

< Basic and Advanced >

1-9 Participation in communications by visitors, use of station by others

B-001-009-001
****
RIC-3 – Sec. 1.5
Who is responsible for the proper operation of an amateur station?

- The person who owns the station equipment
- Only the control operator
- Both the control operator and the station owner
- Only the station owner who is the holder of an Amateur Radio Operator Certificate

< Both the control operator and the station owner >

B-001-009-002
****
If you transmit from another amateur's station, who is responsible for its proper operation?

- Both of you
- You
- The station owner, unless the station records show that you were the control operator at the time
- The station owner

< Both of you >

B-001-009-003
****
What is your responsibility as a station owner?

- You must notify Industry Canada if another amateur acts as the control operator
- You are responsible for the proper operation of the station in accordance with the regulations
- You must allow another amateur to operate your station upon request
- You must be present whenever the station is operated

< You are responsible for the proper operation of the station in accordance with the regulations >

B-001-009-004
****
Who may be the control operator of an amateur station?

- Any qualified amateur chosen by the station owner
- Any person over 21 years of age with a Basic Qualification
- Any person over 21 years of age with Basic and Morse code qualifications
- Any person over 21 years of age

< Any qualified amateur chosen by the station owner >

B-001-009-005
****
When must an amateur station have a control operator?

- Only when training another amateur
- Whenever the station is transmitting
- A control operator is not needed
- Whenever the station receiver is operated

< Whenever the station is transmitting >

B-001-009-006
****
When an amateur station is transmitting, where must the control operator be?

- Anywhere within 50 km of the station location
- At the station's control point
- Anywhere in the same building as the transmitter
- At the station's entrance, to control entry to the room

< At the station's control point >

B-001-009-007
****
17.1
Why can't family members without qualifications transmit using your amateur station if they are alone with your equipment?

- They must first know how to use the right abbreviations and Q signals
- They must first know the right frequencies and emission modes for transmitting
- They must hold suitable amateur radio qualifications before they are allowed to be control operators
- They must not use your equipment without your permission

< They must hold suitable amateur radio qualifications before they are allowed to be control operators >

B-001-009-008
****
RIC-3 – Sec. 1.5
The owner of an amateur station may:

- permit anyone to take part in communications only if prior written permission is received from Industry Canada
- permit anyone to use the station without restrictions
- permit anyone to use the station and take part in communications
- permit any person to operate the station under the supervision and in the presence of the holder of the amateur operator certificate

< permit any person to operate the station under the supervision and in the presence of the holder of the amateur operator certificate >

B-001-009-009
****

RIC-3 – Sec. 1.5
Which of the following statements is CORRECT?

- A person, holding only Basic Qualification, may operate another station on 14.2 MHz
- Radio amateurs may permit any person to operate the station without supervision
- Any person may operate a station in the amateur radio service
- Any person may operate an amateur station under supervision, and in the presence of, a person holding appropriate qualifications

< Any person may operate an amateur station under supervision, and in the presence of, a person holding appropriate qualifications >

1-10 Interference, determination, protection from interference

B-001-010-001
****

RBR-4 – Sec.8,
What is a transmission called that disturbs other communications?

- Transponder signals
- Unidentified transmissions
- Harmful interference
- Interrupted CW

< Harmful interference >

B-001-010-002
****

RBR-4 – Sec. 8
When may you deliberately interfere with another station's communications?

- Only if the station begins transmitting on a frequency you are using
- You may expect, and cause, deliberate interference because it can't be helped during crowded band conditions
- Never
- Only if the station is operating illegally

< Never >

B-001-010-003
****
5.6
If the regulations say that the amateur service is a secondary user of a frequency band, and another service is a primary user, what does this mean?

- Amateurs are allowed to use the frequency band only if they do not cause interference to primary users
- Nothing special: all users of a frequency band have equal rights to operate
- Amateurs are only allowed to use the frequency band during emergencies
- Amateurs must increase transmitter power to overcome any interference caused by primary users

< Amateurs are allowed to use the frequency band only if they do not cause interference to primary users >

B-001-010-004
****
What rule applies if two amateur stations want to use the same frequency?

- Both station operators have an equal right to operate on the frequency
- The station operator with a lesser qualification must yield the frequency to an operator of a higher qualification
- The station operator with a lower power output must yield the frequency to the station with a higher power output
- Station operators in ITU Regions 1 and 3 must yield the frequency to stations in ITU Region 2

< Both station operators have an equal right to operate on the frequency >

B-001-010-005
****
RBR-4 – Sec. 8
What name is given to a form of interference that seriously degrades, obstructs or repeatedly interrupts a radiocommunication service?

- Disruptive interference
- Harmful interference
- Intentional interference
- Adjacent interference

< Harmful interference >

B-001-010-006
****
RBR-4 Sec. 8
Where interference to the reception of radiocommunications is caused by the operation of an amateur station:

- the Minister may require that the necessary steps for the prevention of the interference be taken by the radio amateur
- the amateur station operator is not obligated to take any action
- the amateur station operator may continue to operate without restrictions
- the amateur station operator may continue to operate and the necessary steps can be taken when the amateur operator can afford it

< the Minister may require that the necessary steps for the prevention of the interference be taken by the radio amateur >

B-001-010-007
****
5.6
Radio amateur operation must not cause interference to other radio services operating in which of the following bands?

- 14.0 to 14.2 MHz
- 430.0 to 450.0 MHz
- 7.0 to 7.1 MHz
- 144.0 to 148.0 MHz

< 430.0 to 450.0 MHz >

Amateurs are secondary users on the 430 - 450 MHz band.

B-001-010-008
****
RBR-4; 5.8BSG9
Radio amateur operations ARE NOT protected from interference caused by another service operating in which of the following frequency bands?

- 902 to 928 MHz
- 144 to 148 MHz
- 222 to 225 MHz
- 50 to 54 MHz

< 902 to 928 MHz >

Amateurs are secondary users on 902 - 928 MHz band. This is an ISM band, the "home" of such things as baby monitors and wireless power meters used by your local electrical utility! These are all licence exempt.

B-001-010-009
****
RBR-4 – Sec.8
Which of the following is NOT correct? The operator of an amateur station:

- may make trials or tests, except if there is a possibility of interference with other stations
- may make trials or tests, even though there is a possibility of interfering with other stations
- shall not cause harmful interference to a station in another service which has primary use of that band
- may conduct technical experiments using the station apparatus

< may make trials or tests, even though there is a possibility of interfering with other stations >

B-001-010-010
****
RBR-4; 5.8BSG9
Which of these amateur bands may be heavily occupied by licence exempt devices?

- 3.5 to 4.0 MHz
- 430 to 450 MHz
- 135.7 to 137.8 kHz
- 902 to 928 MHz

< 902 to 928 MHz >

Amateurs are secondary users on 902 - 928 MHz band. This is the "home" of baby monitors and wireless power meters used by your local electrical utility! These are all licence exempt.

B-001-010-011
****
RBR-4; 5.8BSG9
The amateur radio service is authorized to share a portion of what Industrial Scientific Medical (ISM) band that is heavily used by licence exempt devices?

- 1240 to 1300 MHz
- 2300 to 2450 MHz
- 430 to 450 MHz
- 144 to 148 MHz

< 2300 to 2450 MHz >

Amateurs have been allocated access to 2300 - 2450 MHz. A portion of this falls into the ISM band, 2400 – 2500 MHz. If you operate in this band, you may have to contend with interference from licence exempt devices used for industrial, scientific, and medical purposes.

1-11 Emergency communications (real or simulated), communication with non-amateur stations

B-001-011-001
****
17.1
Amateur radio stations may communicate:

- with any station involved in a real or simulated emergency
- only with other amateur stations
- with anyone who uses international Morse code
- with non amateur stations

< only with other amateur stations >

B-001-011-002
****
During relief operations in the days following a disaster, when may an amateur use his equipment to communicate on frequencies outside amateur bands?

- When relaying messages on behalf of government agencies
- When messages are destined to agencies without amateur radio support
- When normal communication systems are overloaded, damaged or disrupted
- Never

< Never >

B-001-011-003
****
If you hear an unanswered distress signal on an amateur band where you do not have privileges to communicate:

- you should offer assistance
- you may offer assistance using international Morse code only
- you may offer assistance after contacting Industry Canada for permission to do so
- you may not offer assistance

< you should offer assistance >

B-001-011-004
****
RIC-3 – Sec.47
In the amateur radio service, it is permissible to broadcast:

- commercially recorded material
- programming that originates from a broadcast undertaking
- radio communications required for the immediate safety of life of individuals or the immediate protection of property
- music

< radio communications required for the immediate safety of life of individuals or the immediate protection of property >

B-001-011-005
****
An amateur radio station in distress may:

- use any means of radiocommunication
- only use radiocommunication bands for which the operator is qualified to use
- use any means of radiocommunication, but only on internationally recognized emergency channels
- only use Morse code communications on internationally recognized emergency channels

< use any means of radiocommunication >

B-001-011-006
****
During a disaster, when may an amateur station make transmissions necessary to meet essential communication needs and assist relief operations?

- When normal communication systems are overloaded, damaged or disrupted
- Never: only official emergency stations may transmit in a disaster
- When normal communication systems are working but are not convenient
- Only when the local emergency net is activated

< When normal communication systems are overloaded, damaged or disrupted >

B-001-011-007
****
During an emergency, what power output limitations must be observed by a station in distress?

- 1500 watts PEP
- 200 watts PEP
- There are no limitations during an emergency
- 1000 watts PEP during daylight hours, reduced to 200 watts PEP during the night

< There are no limitations during an emergency >

B-001-011-008
****
During a disaster:

- use only frequencies in the 40 metre band
- use any United Nations approved frequency
- most communications are handled by nets using predetermined frequencies in amateur bands. Operators not directly involved with disaster communications are requested to avoid making unnecessary transmissions on or near frequencies being used for disaster communications
- use only frequencies in the 80 metre band

<most communications are handled by nets using predetermined frequencies in amateur bands. Operators not directly involved with disaster communications are requested to avoid making unnecessary transmissions on or near frequencies being used for disaster communications>

B-001-011-009
****
Messages from recognized public service agencies may be handled by amateur radio stations:

- using Morse code only
- when Industry Canada has issued a special authorization
- only on the 7 and 14 MHz bands
- during peace time and civil emergencies and exercises

< during peace time and civil emergencies and exercises >

B-001-011-010
****
It is permissible to interfere with the working of another station if:

- the other station is not operating according to the Radiocommunication Regulations
- you both wish to contact the same station
- the other station is interfering with your transmission
- your station is directly involved with a distress situation

< your station is directly involved with a distress situation >

1-12 Non-remuneration, privacy of communications

B-001-012-001
****
RIC-3 – Sec.49
What kind of payment is allowed for third-party messages sent by an amateur station?

- Donation of amateur equipment
- Donation of equipment repairs
- Any amount agreed upon in advance
- No payment of any kind is allowed

< No payment of any kind is allowed >

B-001-012-002
****
Radiocommunications transmitted by stations other than a broadcasting station may be divulged or used:

- if it is transmitted by an amateur station
- if transmitted by any station using the international Morse code
- if transmitted in English or French
- during peacetime civil emergencies

< if it is transmitted by an amateur station >

B-001-012-003
****
RIC-3 – Sec.49
The operator of an amateur station:

- shall charge no less than $10 for each message that the person transmits or receives
- shall charge no more than $10 for each message that the person transmits or receives
- may accept a gift or gratuity in lieu of remuneration for any message that the person transmits or receives
- shall not demand or accept remuneration in any form, in respect of a radiocommunication that the person transmits or receives

< shall not demand or accept remuneration in any form, in respect of a radiocommunication that the person transmits or receives >

B-001-012-004
****
Which of the following is NOT an exception from the penalties under the Act, for divulging, intercepting or using information obtained through radiocommunication, other than broadcasting?

- Where it is for the purpose of preserving or protecting property, or for the prevention of harm to a person
- Where it is for the purpose of giving evidence in a criminal or civil proceeding in which persons are required to give evidence
- Where it is on behalf of Canada, for the purpose of international or national defence or security
- Where it is to provide information for a journalist

< Where it is to provide information for a journalist >

1-13 Station identification, call signs, prefixes

B-001-013-001
****
RBR-4 – Schedule IV
Which of the following call signs is a valid Canadian amateur radio call sign?

- BY7HY
- KA9OLS
- VA3XYZ
- SM2CAN

< VA3XYZ >

B-001-013-002
****
12.4, RBR-3BSG8; 12.5.4, RBR-3BSG9
How often must an amateur station be identified?

- At least once during each transmission
- At the beginning and end of each transmission
- At least every thirty minutes, and at the beginning and at the end of a contact
- At the beginning of a contact and at least every thirty minutes after that

< At least every thirty minutes, and at the beginning and at the end of a contact >

B-001-013-003
****
RBR-4 – Sec. 9.1, 9.3
What do you transmit to identify your amateur station?

- Your call sign
- Your "handle"
- Your first name and your location
- Your full name

< Your call sign >

B-001-013-004
****
12.4, RBR-4 – Sec.9.1, 9.3BSG8; 12.5.3, RBR-4 – Sec.9.1, 9.3BSG9
What identification, if any, is required when two amateur stations begin communications?

- No identification is required
- Both stations must transmit both call signs
- One of the stations must give both stations' call signs
- Each station must transmit its own call sign

< Each station must transmit its own call sign >

B-001-013-005
****
12.4, RBR-4 – Sec.9.1, 9.3BSG8; 12.5.4, RBR-4 – Sec.9.1, 9.3BSG9
What identification, if any, is required when two amateur stations end communications?

- Both stations must transmit both call signs
- Each station must transmit its own call sign
- No identification is required
- One of the stations must transmit both stations' call signs

< Each station must transmit its own call sign >

B-001-013-006
****
12.4, RBR-3BSG8; 12.5.4, RBR-3BSG9
What is the longest period of time an amateur station can transmit, without transmitting its call sign?

- 20 minutes
- 15 minutes
- 10 minutes
- 30 minutes

<30 minutes >

B-001-013-007
****
When may an amateur transmit unidentified communications?

- Only for two-way or third-party communications
- Never, except to control a model craft
- Only for brief tests not meant as messages
- Only if it does not interfere with others

< Never, except to control a model craft >

B-001-013-008
****
RBR-4 – Sec 9.3
What language may you use when identifying your station?

- Any language of a country which is a member of the International Telecommunication Union
- English or French
- Any language being used for a contact
- Any language being used for a contact, providing Canada has a third-party communications agreement with that country

< English or French >

B-001-013-009
****
12.4, RBR-3BSG8; 12.5.4, RBR-3BSG9
The call sign of an amateur station must be transmitted:

- at intervals not greater than three minutes when using voice communications
- at intervals not greater than ten minutes when using Morse code
- when requested to do so by the station being called
- at the beginning and at the end of each exchange of communications and at intervals not greater than 30 minutes

< at the beginning and at the end of each exchange of communications and at intervals not greater than 30 minutes >

B-001-013-010
****
12.4, RBR-3BSG8; 12.5.4, RBR-3BSG9
The call sign of an amateur station must be sent:

- at the beginning and end of each exchange of communications, and at least every 30 minutes, while in communications
- every minute
- every 15 minutes
- once after initial contact

< at the beginning and end of each exchange of communications, and at least every 30 minutes, while in communications >

B-001-013-011
****
RBR-4 Schedule IV, 1.8BSG8; 17.9BSG9
The call sign of a Canadian amateur radio station would normally start with the letters:

- VA, VE , VO or VY
- GA, GE, MO or VQ
- A, K, N or W
- EA, EI, RO or UY

< VA, VE , VO or VY >

1-14 Foreign amateur operation in Canada, banned countries, third-party messages

B-001-014-001
****
RIC-3 – Sec. 5.3
If a non-amateur friend is using your station to talk to someone in Canada, and a foreign station breaks in to talk to your friend, what should you do?

- Since you can talk to foreign amateurs, your friend may keep talking as long as you are the control operator
- Report the incident to the foreign amateur's government
- Stop all discussions and quickly sign off
- Have your friend wait until you determine from the foreign station if their administration permits third-party traffic

< Have your friend wait until you determine from the foreign station if their administration permits third-party traffic >

B-001-014-002
****
RIC-3 – Sec. 1.5
If you let an unqualified third party use your amateur station, what must you do at your station's control point?

- You must key the transmitter and make the station identification
- You must monitor and supervise the communication only if contacts are made on frequencies below 30 MHz
- You must monitor and supervise the communication only if contacts are made in countries which have no third party communications
- You must continuously monitor and supervise the third party's participation

< You must continuously monitor and supervise the third party's participation >

B-001-014-003
****
17.4BSG8; 17.7BSG9
Radio amateurs may use their stations to transmit international communications on behalf of a third party only if:

- prior remuneration has been received
- such communications have been authorized by the countries concerned
- the amateur station has received written authorization from Industry Canada to pass third party traffic
- the communication is transmitted by secret code

< such communications have been authorized by the countries concerned >

B-001-014-004
****
RBR4 – Sec. 6
A person operating a Canadian amateur station is forbidden to communicate with amateur stations of another country:

- when that country has notified the International Telecommunication Union that it objects to such communications
- without written permission from Industry Canada
- until he has properly identified his station
- unless he is passing third- party traffic

< when that country has notified the International Telecommunication Union that it objects to such communications >

B-001-014-005
****
RBR4 – Sec.6, 17.4BSG8; 17.7BSG9
International communications on behalf of third parties may be transmitted by an amateur station only if:

- the countries concerned have authorized such communications
- English or French is used to identify the station at the end of each transmission
- the countries for which the traffic is intended have registered their consent to such communications with the ITU
- radiotelegraphy is used

< the countries concerned have authorized such communications >

B-001-014-006
****
17.4BSG8; 17.7BSG9
Amateur third party communications is:

- a simultaneous communication between three operators
- none of these answers
- the transmission of non-commercial or personal messages to or on behalf of a third party
- the transmission of commercial or secret messages

< the transmission of non-commercial or personal messages to or on behalf of a third party >

B-001-014-007
****
RIC-3 – Sect. 5.3, 17.4BSG8; RIC-3 – Sect. 5.3, 17.7BSG9
International third party amateur radio communication in case of emergencies or disaster relief is expressly permitted unless:

- internet service is working in the foreign country involved
- specifically prohibited by the foreign administration concerned
- satellite communication can be originated in the disaster area
- the foreign administration in a declared state of war

< specifically prohibited by the foreign administration concerned >

B-001-014-008
****
No source document found
One of the following is not considered to be communications on behalf of a third party, even though the message is originated by, or addressed to, a non-amateur:

- messages addressed to points within Canada
- all messages received from Canadian stations
- messages originated from Canadian Forces Affiliate Radio Service (CFARS)
- messages that are handled within a local network

< messages originated from Canadian Forces Affiliate Radio Service (CFARS)>

B-001-014-009
****
No source document found
One of the following is not considered to be communications on behalf of a third party, even though the message may be originated by, or addressed to, a non-amateur:

- all messages originated by Canadian amateur stations
- messages addressed to points within Canada from the United States
- messages that are handled within local networks during a simulated emergency exercise
- messages that originate from the United States Military Auxiliary Radio System (MARS)

< messages that originate from the United States Military Auxiliary Radio System (MARS) >

B-001-014-010
****
RIC-3 – Sec. 5.1
Which of the following is NOT correct? While operating in Canada, a radio amateur licensed by the Government of the United States, must:

- add to his call sign the Canadian call sign prefix for the geographic location of the station
- qualify his identification when operating phone by adding to the call sign the word "mobile" or "portable" or when Morse code by adding a slash "/"
- identify with the call sign assigned by the FCC
- obtain a Canadian amateur certificate before operating in Canada

< obtain a Canadian amateur certificate before operating in Canada >

B-001-014-011
****
RIC-3 Sec 5.3, 17.4BSG8; RIC-3 Sec 5.3, 17.7BSG9
Which of the following statements is NOT correct? A Canadian radio amateur may, on amateur frequencies:

- pass messages originating from or destined to the United States Military Auxiliary Radio System (MARS)
- pass messages originating from or destined to the Canadian Forces Affiliate Radio Service (CFARS)
- communicate with a similar station of a country which has not notified ITU that it objects to such communications
- pass third-party traffic with all duly licensed amateur stations in any country which is a member of the ITU

< pass third-party traffic with all duly licensed amateur stations in any country which is a member of the ITU >

1-15 Frequency bands and qualification requirements

B-001-015-001
****
No source document found
If you let another amateur with additional qualifications than yours control your station, what operating privileges are allowed?

- All the emission privileges of the additional qualifications, but only the frequency privileges of your qualifications
- All the frequency privileges of the additional qualifications, but only the emission privileges of your qualifications
- Only the privileges allowed by your qualifications
- Any privileges allowed by the additional qualifications

< Only the privileges allowed by your qualifications >

B-001-015-002
****
No source document found
If you are the control operator at the station of another amateur who has additional qualifications to yours, what operating privileges are you allowed?

- All the emission privileges of the additional qualifications, but only the frequency privileges of your qualifications
- All the frequency privileges of the additional qualifications, but only the emission privileges of your qualifications
- Only the privileges allowed by your qualifications
- Any privileges allowed by the additional qualifications

< Only the privileges allowed by your qualifications >

B-001-015-003
****
RBR4 – Schedule I Notes
In addition to passing the Basic written examination, what must you do before you are allowed to use amateur frequencies below 30 MHz?

- You must pass a Morse code or Advanced test or attain a mark of 80% on the Basic exam
- You must notify Industry Canada that you intend to operate on the HF bands
- You must pass a Morse code test
- You must attend a class to learn about HF communications

< You must pass a Morse code or Advanced test or attain a mark of 80% on the Basic exam >

B-001-015-004
****
The holder of an amateur radio certificate may operate radio controlled models:

- if the frequency used is below 30 MHz
- if only pulse modulation is used
- on all frequencies above 30 MHz
- if the control transmitter does not exceed 15 kHz of occupied bandwidth

< on all frequencies above 30 MHz >

B-001-015-005
****
5.6
In Canada, the 75/80 metre amateur band corresponds in frequency to:

- 4.0 to 4.5 MHz
- 4.5 to 5.0 MH z
- 3.5 to 4.0 MHz
- 3.0 to 3.5 MHz

< 3.5 to 4.0 MHz >

B-001-015-006
****
5.6
In Canada, the 160 metre amateur band corresponds in frequency to:

- 2.0 to 2.25 MHz
- 2.25 to 2.5 MHz
- 1.8 to 2.0 MHz
- 1.5 to 2.0 MHz

< 1.8 to 2.0 MHz >

B-001-015-007
****
5.6
In Canada, the 40 metre amateur band corresponds in frequency to:

- 6.5 to 6.8 MHz
- 6.0 to 6.3 MHz
- 7.7 to 8.0 MHz
- 7.0 to 7.3 MHz

< 7.0 to 7.3 MHz >

B-001-015-008
****
5.6
In Canada, the 20 metre amateur band corresponds in frequency to:

- 13.500 to 14.000 MHz
- 15.000 to 15.750 MHz
- 16.350 to 16.830 MHz
- 14.000 to 14.350 MHz

< 14.000 to 14.350 MHz >

B-001-015-009
****
5.6
In Canada, the 15 metre amateur band corresponds in frequency to:

- 14.000 to 14.350 MHz
- 28.000 to 29.700 MHZ
- 21.000 to 21.450 MHz
- 18.068 to 18.168 MHz

< 21.000 to 21.450 MHz >

B-001-015-010
****
5.6
In Canada, the 10 metre amateur band corresponds in frequency to:

- 21.000 to 21.450 MHz
- 50.000 to 54.000 MHz
- 28.000 to 29.700 MHz
- 24.890 to 24.990 MHz

< 28.000 to 29.700 MHz >

B-001-015-011
****
5.6
In Canada, radio amateurs may use which of the following for radio control of models:

- 50 to 54, 144 to 148, and 220 to 225 MHz only
- all amateur frequency bands above 30 MHz
- 50 to 54 MHz only
- all amateur frequency bands

< all amateur frequency bands above 30 MHz >

1-16 Maximum bandwidth by frequency bands

B-001-016-001
****
5.6, RBR-4 – page 5
What is the maximum authorized bandwidth within the frequency range of 50 to 148 MHz?

- The total bandwidth shall not exceed 10 times that of a CW emission
- 30 kHz
- 20 kHz
- The total bandwidth shall not exceed that of a single-sideband phone emission

<30 kHz >

B-001-016-002
****
5.6, RBR-4 – page 5
The maximum bandwidth of an amateur station's transmission allowed in the band 28 to 29.7 MHz is:

- 20 kHz
- 6 kHz
- 30 kHz
- 15 kHz

< 20 kHz >

B-001-016-003
****
5.6, RBR-4 – page 5
Except for one band, the maximum bandwidth of an amateur station's transmission allowed between 7 and 28 MHz is:

- 30 kHz
- 6 kHz
- 15 kHz
- 20 kHz

< 6 kHz >

B-001-016-004
****
5.6, RBR-4 – page 5
The maximum bandwidth of an amateur station's transmission allowed in the band 144 to 148 MHz is:

- 15 kHz
- 30 kHz
- 6 kHz
- 20 kHz

< 30 kHz >

B-001-016-005
****
5.6, RBR-4 – page 5
The maximum bandwidth of an amateur station's transmission allowed in the band 50 to 54 MHz is:

- 30 kHz
- 20 kHz
- 6 kHz
- 15 kHz

< 30 kHz >

B-001-016-006
****
5.6
Which of the following bands of amateur frequencies has a maximum allowed bandwidth of less than 6 kHz? That band is:

- 10.1 to 10.15 MHz
- 18.068 to 18.168 MHz
- 24.89 to 24.99 MHz
- 1.8 to 2.0 MHz

< 10.1 to 10.15 MHz >

B-001-016-007
****
RBR-4 – page 5, 6.9
Single sideband is not permitted in the band:

- 18.068 to 18.168 MHz
- 24.89 to 24.99 MHz
- 7.0 to 7.3 MHz
- 10.1 to 10.15 MHz

< 10.1 to 10.15 MHz >

B-001-016-008
****

5, RBR-4 – page 5

What precaution must an amateur radio operator take when transmitting near band edges?

- Make sure that the emission mode is compatible with agreed band plans
- Watch the standing wave ratio so as not to damage the transmitter
- Ensure that the bandwidth required on either side of the carrier frequency does not fall out of band
- Restrict operation to telegraphy

< Ensure that the bandwidth required on either side of the carrier frequency does not fall out of band >

In RBR-4 and Chapter 5, there is a table of bands and frequency ranges available for use by Amateur Radio operators in Canada. On said table there is another column of data, labeled Maximum Bandwidth. Let's explore this in concert with the other data in the table. We will use the 20 m band, which covers 14.000 to 14.350 MHz. We refer to 14.000 MHz and 14.350 MHz as the band edges, the lower and higher frequency limits of the band. Operating beyond either one of these is forbidden, but we can operate within the band edges. The trouble comes when we operate close to either band edge. If you were to transmit on 14.348 MHz you could actually in violation of the regulations. Your signal at 14.348 MHz is called the carrier frequency, but as you will see further on, it is actually a complex wave with a frequency that can be as low as 14.345 MHz and as high as 14.351 MHz. This is a warning to you to ensure that the bandwidth required on either side of the carrier frequency does not fall out of band.

B-001-016-009
****

12.10BSG8; 12.8.2BSG9

Which of the following answers is NOT correct? Based on the bandwidth required, the following modes may be transmitted on these frequencies:

- AMTOR on 14.08 MHz
- 300 bps packet on 10.145 MHz
- fast-scan television (ATV) on 440 MHz
- fast-scan television (ATV) on 145 MHz

< fast-scan television (ATV) on 145 MHz >

B-001-016-010
****

5.6, 12.10BSG8; 5.6, 12.8.2BSG9

Which of the following answers is NOT correct? Based on the bandwidth required, the following modes may be transmitted on these frequencies:

- frequency modulation (FM) on 29.6 MHz
- single-sideband (SSB) on 3.76 MHz
- fast-scan television (ATV) on 14.23 MHz
- slow-scan television (SSTV) on 14.23 MHz

< fast-scan television (ATV) on 14.23 MHz >

B-001-016-011
****
6.9
Which of the following answers is NOT correct? Based on the bandwidth required, the following modes may be transmitted on these frequencies?

- single-sideband (SSB) on 10.12 MHz
- frequency modulation (FM) on 29.6 MHz
- Morse radiotelegraphy (CW) on 10.11 MHz
- 300 bps packet on 10.148 MHz

< single-sideband (SSB) on 10.12 MHz >

No SSB on 30m band

1-17 Restrictions on capacity and power output by qualifications

B-001-017-001
****
13.15
What amount of transmitter power should radio amateurs use at all times?

- The minimum legal power necessary to communicate
- 25 watts PEP output
- 250 watts PEP output
- 2000 watts PEP output

< The minimum legal power necessary to communicate >

B-001-017-002
****
1.4
What is the most FM transmitter power a holder of only Basic Qualification may use on 147 MHz?

- 1000 watts DC input
- 200 watts PEP output
- 250 W DC input
- 25 watts PEP output

< 250 W DC input >

B-001-017-003
****
13.15
Where in your station can you verify that legal power limits are respected?

- On the antenna itself, after the transmission line
- At the power supply terminals inside the transmitter or amplifier
- At the antenna connector of the transmitter or amplifier
- At the power amplifier RF input terminals inside the transmitter or amplifier

< At the antenna connector of the transmitter or amplifier >

> *In S13.15 you will find the classic procedure for measuring the power output of a transmitter. However standards change and there is a move towards accepting power measurements at the antenna terminals of the transmitter. This is why many SWR meters, which are placed in the transmission path from transmitter to antenna, have a dual function and can serve as a power meter with the flick of a switch.*

B-001-017-004
****
13.15
What is the maximum transmitting output power an amateur station may use on 3750 kHz if the operator has Basic and Morse code qualifications?

- 560 watts PEP output for SSB operation
- 1000 watts PEP output for SSB operation
- 1500 watts PEP output for SSB operation
- 2000 watts PEP output for SSB operation

< 560 watts PEP output for SSB operation >

B-001-017-005
****
13.15
What is the maximum transmitting power an amateur station may use for SSB operation on 7055 kHz, if the operator has Basic with Honours qualifications?

- 200 watts PEP output
- 560 watts PEP output
- 1000 watts PEP output
- 2000 watts PEP output

< 560 watts PEP output >

B-001-017-006
****
13.15
The DC power input to the anode or collector circuit of the final RF stage of a transmitter, used by a holder of an Amateur Radio Operator Certificate with Advanced Qualification, shall not exceed:

- 250 watts
- 500 watts
- 750 watts
- 1000 watts

< 1000 watts >

B-001-017-007
****
13.15
The maximum DC input to the final stage of an amateur transmitter, when the operator is the holder of both the Basic and Advanced qualifications, is:

- 250 watts
- 1500 watts
- 500 watts
- 1000 watts

< 1000 watts >

B-001-017-008
****
13.15
The operator of an amateur station, who is the holder of a Basic Qualification, shall ensure that the station power, when expressed as RF output power measured across an impedance matched load, does not exceed:

- 560 watts peak-envelope power, for transmitters producing any type of single sideband emission
- 2500 watts peak power
- 1000 watts carrier power for transmitters producing other emissions
- 150 watts peak power

< 560 watts peak-envelope power, for transmitters producing any type of single sideband emission >

B-001-017-009
****
13.15
The holder of an Amateur Radio Operator Certificate with Basic Qualification is limited to a maximum of _____ watts when expressed as direct current input power to the anode or collector circuit of the transmitter stage supplying radio frequency energy to the antenna:

- 1000
- 750
- 100
- 250

< 250 >

B-001-017-010
****
RBR-4 Sec. 10.1 (b), BSG8; 13.15BSG9
Which of the following is the most powerful equipment the holder of a Basic with Honours certificate can legally operate at full power?

- 100 watts carrier power HF transmitter
- 200 watts carrier power HF transceiver
- 600 watts PEP HF linear amplifier
- 160 watts carrier power VHF amplifier

< 160 watts carrier power VHF amplifier >

This is a sneaky "fine print" question based on RBR-4.

From RBR-4, Section 10.1 (b) (ii), "190 W carrier power from transmitters that produce any other type of emission". This means that "200 watts of carrier power HF transceiver" and "600 watts PEP HF linear amplifier" are both too high. The choice is between "100 watts carrier power HF transmitter" and "160 watts carrier power VHF amplifier", both of which are legal. The question is asking for the most powerful

1-18 Unmodulated carriers, retransmission

B-001-018-001
****
11.4
What kind of amateur station automatically retransmits the signals of other stations?

- Remote-control station
- Beacon station
- Repeater station
- Space station control and telemetry link

< Repeater station >

B-001-018-002
****
RBR-4 – Sec. 11
An unmodulated carrier may be transmitted only:

- if the output to the final RF amplifier is kept under 5W
- when transmitting SSB
- in frequency bands below 30 MHz
- for brief tests on frequencies below 30 MHz

< for brief tests on frequencies below 30 MHz >

B-001-018-003
****
RBR-4 – Sec. 11.2
Radiotelephone signals in a frequency band below _____ MHz cannot be automatically retransmitted, unless these signals are received from a station operated by a person qualified to transmit on frequencies below the above frequency:

- 29.5 MHz
- 29.7 MHz
- 50 MHz
- 144 MHz

< 29.5 MHz >

B-001-018-004
****
1.4BSG8; 1.2BSG9
Which of the following statements is NOT correct? Radiotelephone signals may be retransmitted:

- in the 21 MHz band, when received in a VHF band, from a station operated by a person with only Basic Qualification
- in the 29.5 - 29.7 MHz band, when received in a VHF band, from a station operated by a person with only Basic Qualifications
- in the 50 - 54 MHz frequency band, when received from a station operated by a person with only Basic Qualification
- in the 144 - 148 MHz frequency band, when received from a station operated by a person with only Basic Qualification

< in the 21 MHz band, when received in a VHF band, from a station operated by a person with only Basic Qualification >

With only the Basic Qualification, without Honours, one is not permitted to operate below 30 MHz so technically both of "in the 21 MHz band and 29.5 – 29.7 band" are wrong. IC has opted for "in the 21 MHz band" as the NOT correct answer to choose.

1-19 Amplitude modulation, frequency stability, measurements

B-001-019-001
****
13.8
When operating on frequencies below 148 MHz:

- an overmodulation indicator must be used
- the frequency stability must be comparable to crystal control
- the bandwidth for any emission must not exceed 3 kHz
- the frequency stability of the transmitter must be at least two parts per million over a period of one hour

< the frequency stability must be comparable to crystal control >

B-001-019-002
****
13.4
A reliable means to prevent or indicate overmodulation must be employed at an amateur station if:

- DC input power to the anode or collector circuit of the final RF stage is in excess of 250 watts
- radiotelegraphy is used
- persons other than the holder of the authorization use the station
- radiotelephony is used

< radiotelephony is used >

B-001-019-003
****
13.4
An amateur station using radiotelephony must install a device for indicating or preventing:

- overmodulation
- resonance
- antenna power
- plate voltage

< overmodulation >

B-001-019-004
****
13.4
The maximum percentage of modulation permitted in the use of radiotelephony by an amateur station is:

- 100 percent
- 75 percent
- 50 percent
- 90 percent

< 100 percent >

B-001-019-005
****
11.12
All amateur stations, regardless of the mode of transmission used, must be equipped with:

- a DC power meter
- an overmodulation indicating device
- a dummy antenna
- a reliable means of determining the operating radio frequency

< a reliable means of determining the operating radio frequency >

B-001-019-006
****
13.4
The maximum percentage of modulation permitted in the use of radiotelephony by an amateur station is:

- 100 percent
- 90 percent
- 75 percent
- 50 percent

< 100 percent >

1-20 International Telecommunication Union (ITU) Radio Regulations, applicability

B-001-020-001
****
What type of messages may be transmitted to an amateur station in a foreign country?

- Messages of any type, if the foreign country allows third-party communications with Canada
- Messages that are not religious, political, or patriotic in nature
- Messages of any type
- Messages of a technical nature or personal remarks of relative unimportance

< Messages of a technical nature or personal remarks of relative unimportance >

B-001-020-002
****
The operator of an amateur station shall ensure that:

- all communications are conducted in secret code
- charges are properly applied to all third-party communications
- communications are limited to messages of a technical or personal nature
- communications are exchanged only with commercial stations

< communications are limited to messages of a technical or personal nature >

B-001-020-003
****
Which of the following is NOT a provision of the ITU Radio Regulations, which apply to Canadian radio amateurs?

- It is forbidden to transmit international messages on behalf of third parties, unless those countries make special arrangements
- Radiocommunications between countries shall be forbidden, if the administration of one of the countries objects
- Administrations shall take such measures as they judge necessary to verify the operational and technical qualifications of amateurs
- Transmissions between countries shall not include any messages of a technical nature, or remarks of a personal character

< Transmissions between countries shall not include any messages of a technical nature, or remarks of a personal character >

This is just a re-wording the previous questions.

B-001-020-004
****
The ITU Radio Regulations limit those radio amateurs, who have not demonstrated proficiency in Morse code, to frequencies above:

- 3.5 MHz
- 28 MHz
- none of the other answers
- 1.8 MHz

< none of the other answers >

CW is no longer required to obtain an amateur radio certificate.

B-001-020-005
****
In addition to complying with the Radiocommunication Act and Regulations, Canadian radio amateurs must also comply with the regulations of the:

- International Amateur Radio Union
- International Telecommunication Union
- American Radio Relay League
- Radio Amateurs of Canada Inc.

< International Telecommunication Union >

1-21 Operation outside Canada, ITU regions, reciprocal privileges, international licences

B-001-021-001
****

BSG8: See above 17.4BSG9
In which International Telecommunication Union Region is Canada?

- Region 1
- Region 2
- Region 4
- Region 3

< Region 2 >

B-001-021-002
****

RIC-3 – Sec. 5.1
A Canadian radio amateur, operating his station in the state of Florida, is subject to which frequency band limits?

- ITU Region 1
- Those applicable to US radio amateurs
- ITU Region 2
- ITU Region 3

< Those applicable to US radio amateurs >

A subset of a region is the countries within a region. So if one is operating outside of Canada, one must follow not only the ITU regulations but those of the country you are visiting.

B-001-021-003
****

RIC-3 – Sec. 5.1
A Canadian radio amateur, operating his station 7 kilometres (4 miles) offshore from the coast of Florida, is subject to which frequency band limits?

- ITU Region 1
- ITU Region 2
- Those applicable to US radio amateurs
- Those applicable to Canadian radio amateurs

< Those applicable to US radio amateurs >

A subset of a region is the countries within a region. So if one is operating outside of Canada one must follow not only the ITU regulations but those of the country you are visiting. At this distance, one is still considered to be in US waters.

B-001-021-004
****
BSG8: See above 17.4BSG9
Australia, Japan, and Southeast Asia are in which ITU Region?

- Region 1
- Region 2
- Region 4
- Region 3

< Region 3 >

See map above.

B-001-021-005
****
BSG8: See above 17.4BSG9
Canada is located in ITU Region:

- Region 2
- Region 1
- Region 3
- Region 4

< Region 2 >

See map above.

1-22 Examinations – Department's fees, delegated examinations, fees, disabled accommodation

B-001-022-001
****
RIC-3 – Sec. 3
Which of these statements is NOT correct?

- The fee for taking an examination for an Amateur Radio Operator Certificate at an Industry Canada office is $5 per qualification
- An accredited examiner may recover the cost of administering an examination
- An accredited volunteer examiner must hold an Amateur Radio Operator Certificate with Basic, Advanced, and Morse code qualifications
- The fee for taking an examination for an Amateur Radio Operator Certificate at an Industry Canada office is $20 per qualification

< The fee for taking an examination for an Amateur Radio Operator Certificate at an Industry Canada office is $5 per qualification >

B-001-022-002
****
RIC-3 – Sec. 4.2
Which of the following statements is NOT correct?

- A disabled candidate, taking a Morse code sending test, may be allowed to recite the examination text in Morse code sounds
- Examinations for disabled candidates may be given orally, or tailored to the candidate's ability to complete the examination
- An accredited examiner may recover the cost of administering an examination
- A disabled candidate must pass a normal amateur radio certificate examination before being granted any qualification

< A disabled candidate must pass a normal amateur radio certificate examination before being granted any qualification >

B-001-022-003
****
RIC-3 – Sec. 3.1
The fee for taking examinations for amateur radio operator certificates by an accredited volunteer examiner is:

- always $20 per visit regardless of the number of examinations
- to be negotiated between examiner and candidate
- always $20 per qualification
- always free of charge

< to be negotiated between examiner and candidate >

B-001-022-004
****
17.1, RIC-3 – Sec. 3.2
The fee for taking amateur radio certificate examinations at an Industry Canada office is:

- $5 per qualification examination
- $20 per qualification
- $20 per visit, regardless of the number of qualification examinations
- no charge for qualification examinations

< $20 per qualification >

B-001-022-005
****

RIC-3, Sec. 4.2, 4.3
Which of the following statements is FALSE?

- A candidate who fails a written examination for lack of reading skills may be given an oral examination
- A candidate who fails a written examination due to not usually speaking English or French may be given an oral examination
- An examiner may request medical evidence from a practicing medical physician before accommodating testing
- A candidate with insufficient knowledge of English or French may be accompanied by an interpreter

< A candidate with insufficient knowledge of English or French may be accompanied by an interpreter >

1-23 Antenna structure approval, neighbour and land-use authority consultation

Note: For questions B-001-023-001 to B-001-023-010, you are going to require the Industry Canada policy on towers, CPC-2-0-03, which can be downloaded from the Coax Publications web site when you log into the Student Success Pages or from the Industry Canada website.

B-001-023-001
****

CPC-2-0-03, S1.3
Which of these statements about installation or modification of an antenna structure is NOT correct?

- Prior to an installation, for which community concerns could be raised, radio amateurs may be required to consult with their land-use authority
- A radio amateur may erect any size antenna structure without consulting neighbours or the local land-use authority
- A radio amateur must follow Industry Canada's antenna siting procedures
- Industry Canada expects radio amateurs to address community concerns in a responsible manner

< A radio amateur may erect any size antenna structure without consulting neighbours or the local land-use authority >

B-001-023-002
****

CPC-2-0-03 S1.1
Who has authority over antenna installations including antenna masts and towers?

- The local municipal government
- The majority of neighbours residing within a distance of three times the proposed antenna structure height
- The Minister of Industry
- The person planning to use the tower or their spouse

< The Minister of Industry >

B-001-023-003
****

CPC-2-0-03 S6
If you are planning to install or modify an antenna system, under what conditions may you not be required to contact land use authorities to determine public consultation requirements?

- When transmitting will only be done at low power
- When an exclusion criterion defined by Industry Canada applies
- In a rural area
- When the structure is part of an amateur radio antenna

< When an exclusion criterion defined by Industry Canada applies >

B-001-023-004
****

CPC-2-0-03 S4.2
The land use authority has not established a process for public consultation for antenna systems. The radio amateur planning to install or modify an antenna system:

- must wait for the land use authority to develop a public consultation process
- must fulfill the public consultation requirements set out in Canada's Default Public Consultation Process unless the land use authority excludes their type of proposal from consultation or it is excluded by Industry Canada's process
- can proceed with their project without public consultation
- must implement a consultation process of their own design

<must fulfill the public consultation requirements set out in Canada's Default Public Consultation Process unless the land use authority excludes their type of proposal from consultation or it is excluded by Industry Canada's process >

B-001-023-005
****
CPC-2-0-03 S4.2
Which is not an element of the Industry Canada Public Consultation Process for antenna systems?

- Providing an opportunity for the public to respond regarding measures to address reasonable and relevant concerns
- Participating in public meetings on the project
- Providing written notice
- Addressing relevant questions, comments and concerns

< Participating in public meetings on the project >

B-001-023-006
****
CPC-2-0-03 S4.2
The Default Public Consultation Process for antenna systems requires proponents to address:

- reasonable and relevant concerns provided in writing within the 30-day public comment period
- all questions, comments and concerns raised
- comments reported in media reporting on the proposal
- opposition to the project

< reasonable and relevant concerns provided in writing within the 30-day public comment period >

B-001-023-007
****
CPC-2-0-03 S6
Where a municipality has developed a public consultation process, which of the following options best describes all circumstances when public consultation may not be required?

- Exclusions listed in both CPC-2-0-03 and the Local land use authority process
- Exclusions listed in either CPC-2-0-03 or the Local land use authority process
- Exclusions listed in the Industry Canada Client Procedures Circular on Radiocommunications and Broadcasting Antenna Systems CPC-2-0-03
- Exclusions defined in the Local land use authority process

< Exclusions listed in either CPC-2-0-03 or the Local land use authority process >

B-001-023-008
****

CPC-2-0-03 S6

Where the proponent and a stakeholder other than the general public reach an impasse over a proposed antenna system the final decision will:

- be made by the municipality in which the antenna is built
- be made by a majority vote of those residing with a radius of three times the antenna structure height
- be made by Industry Canada
- be postponed until those in dispute reach an agreement

< be made by Industry Canada >

B-001-023-009
****

CPC-2-0-03 S6

In general, what is the tallest amateur radio antenna system excluded from the requirements to consult with the land use authority and the public where there is a land use authority defined public consultation process?

- 15 m
- 21 m
- The taller of the height exclusion of the land use authority public consultation process and Industry Canada's antenna siting procedures
- 10 m

< The taller of the height exclusion of the land use authority public consultation process and Industry Canada's antenna siting procedures >

IC says 15 m unless the LUA says you may go a bit higher.

B-001-023-010
****

CPC-2-0-03 S6

Where a land use authority or municipality has established a public consultation process for antenna systems, who determines how public consultation should take place?

- The municipality or land use authority
- Industry Canada
- The person planning to erect the antenna structure
- The provincial government

< The municipality or land use authority >

1-24 Radio frequency electromagnetic field limits

B-001-024-001
****
16.9
What organization has published safety guidelines for the maximum limits of RF energy near the human body?

- Canadian Standards Association
- Environment Canada
- Transport Canada
- Health Canada

< Health Canada >

B-001-024-002
****
16.9
What is the purpose of the Safety Code 6?

- It gives RF exposure limits for the human body
- It lists all RF frequency allocations for interference protection
- It sets transmitter power limits for interference protection
- It sets antenna height limits for aircraft protection

< It gives RF exposure limits for the human body >

B-001-024-003
****
16.9
According to Safety Code 6, what frequencies cause us the greatest risk from RF energy?

- 3 to 30 MHz
- 30 to 300 MHz
- 300 to 3000 MHz
- Above 1500 MHz

< 30 to 300 MHz >

B-001-024-004
****
16.9
Why is the limit of exposure to RF the lowest in the frequency range of 30 MHz to 300 MHz, according to Safety Code 6?

- Most transmissions in this range are for a longer time
- The human body absorbs RF energy the most in this range
- There are more transmitters operating in this range
- There are fewer transmitters operating in this range

< The human body absorbs RF energy the most in this range >

B-001-024-005
****
16.9
According to Safety Code 6, what is the maximum safe power output to the antenna of a hand-held VHF or UHF radio?

- 25 watts
- 125 milliwatts
- not specified
- 10 watts

< not specified >

The exemption for portable equipment was withdrawn in 1999.

B-001-024-006
****
16.9
Which of the following statements is NOT correct?

- Maximum exposure levels of RF fields to the general population, in the frequency range 10 to 300 MHz, is 28 V/m RMS (E-field)
- Permissible exposure levels of RF fields increases as frequency is increased from 300 MHz to 1.5 GHz
- Permissible exposure levels of RF fields increases as frequency is decreased from 10 MHz to 1 MHz
- Permissible exposure levels of RF fields decreases as frequency is decreased below 10 MHz

< Permissible exposure levels of RF fields decreases as frequency is decreased below 10 MHz >

B-001-024-007
****
16.9
The permissible exposure levels of RF fields:

- decreases, as frequency is decreased below 10 MHz
- increases, as frequency is increased from 10 MHz to 300 MHz
- decreases, as frequency is increased above 300 MHz
- increases, as frequency is increased from 300 MHz to 1.5 GHz

< increases, as frequency is increased from 300 MHz to 1.5 Ghz >

B-001-024-008
****
16.9
Which statement is NOT correct?

- Hand held transmitters are excluded from Safety Code 6 requirements
- Antenna gain, distance, transmitter power and frequency are all factors that influence the electric field strength and a person's exposure to radio energy
- Safety Code 6 uses different units for the magnetic field strength and the electric field strength when stating limits
- Safety Code 6 specifies lower exposure limits for the general public in uncontrolled areas than it does for people in controlled areas

< Hand held transmitters are excluded from Safety Code 6 requirements >

B-001-024-009
****
16.9
Which statement is correct?

- Portable transmitters, operating below 1 GHz, with an output power equal to, or less than 7 watts, are exempt from the requirements of Safety Code 6
- Safety Code 6 sets limits for RF exposure for all radio transmitters regardless of power output
- Safety Code 6 regulates the operation of receivers only
- The operation of portable transmitting equipment is of no concern in Safety Code 6

< Safety Code 6 sets limits for RF exposure for all radio transmitters regardless of power output >

B-001-024-010
****
16.9
Which of these statements about Safety Code 6 is FALSE?

- Safety Code 6 sets limits for induced currents, electrical field strength and magnetic field strength from electromagnetic radiation
- Safety Code 6 set limits for allowable rates at which RF energy is absorbed in the body (Specific Absorption Rate)
- Safety Code 6 sets limits in terms of power levels fed into antennas
- Safety Code 6 sets limits for contact currents that could be drawn from ungrounded or poorly grounded objects

< Safety Code 6 sets limits in terms of power levels fed into antennas >

1-25 Criteria for resolution of radio frequency interference complaints

For questions B-001-025-001 through B-001-025-004, download IC document EMCAB-2 from the Coax Publications site via the Student Success Pages or from the Industry Canada website. In it, IC outlines the criteria to decide who is "right and wrong" when your signal interferes with a neighbour's TV et al. It is a balancing act, the "electromagnetic field" that you are generating versus the ability of your neighbour's electronic device to reject your signal.

B-001-025-001
****
15
In the event of the malfunctioning of a neighbour's broadcast FM receiver and stereo system, it will be deemed that the affected equipment's lack of immunity is the cause if the field strength:

- at the transmitting location is below the radio amateur's maximum allowable transmitter power
- at the transmitting location is above 100 watts
- near the affected equipment is above Industry Canada's specified immunity criteria
- on the premises of the affected equipment is below Industry Canada's specified immunity criteria

< on the premises of the affected equipment is below Industry Canada's specified immunity criteria >

B-001-025-002
****
15
In the event of interference to a neighbour's television receiver, according to EMCAB-2, it will be deemed that a radio amateur's transmission is the cause of the problem if the field strength:

- at the transmitting location is above the radio amateur's maximum allowable transmitter power
- on the neighbour's premises is above Industry Canada's specified immunity criteria
- near the TV is below Industry Canada's specified immunity criteria
- at the transmitting location is below the radio amateur's maximum allowable transmitter power

< on the neighbour's premises is above Industry Canada's specified immunity criteria >

B-001-025-003
****
15, 15.1
Which of the following is defined in EMCAB-2 as "any device, machinery or equipment, other than radio apparatus, the use or functioning of which is, or can be, adversely affected by radiocommunication emissions"?

- Broadcast receivers
- Radio-sensitive equipment
- Cable television converters
- Audio and video recorders

< Radio-sensitive equipment >

B-001-025-004
****
15, 15.1
According to EMCAB-2 which of the following types of equipment is NOT included in the list of field strength criteria for resolution of immunity complaints?

- Broadcast transmitters
- Broadcast receivers
- Associated equipment
- Radio-sensitive equipment

< Broadcast transmitters >

Operating and Procedures - 002

2-1 Voice operating procedures - channelized VHF/UHF repeater

B-002-001-001
****
12.4BSG8; 12.5.4BSG9
What is a good way to make contact on a repeater?

- Say the other operator's name, then your call sign three times
- Say, "Breaker, breaker"
- Say the call sign of the station you want to contact three times
- Say the call sign of the station you want to contact, then your call sign

< Say the call sign of the station you want to contact, then your call sign >

B-002-001-002
****
12.4BSG8; 12.5.1BSG9
What is the main purpose of a repeater?

- To retransmit weather information during severe storm warnings
- To make local information available 24 hours a day
- To increase the range of portable and mobile stations
- To link amateur stations with the telephone system

< To increase the range of portable and mobile stations >

B-002-001-003
****
5.7
What is frequency coordination on VHF and UHF bands?

- The selection of simplex frequencies by individual operators
- A part of the planning before a contest
- A process that seeks to carefully assign frequencies so as to minimize interference with neighbouring repeaters
- A band plan detailing modes and frequency segments within a band

< A process that seeks to carefully assign frequencies so as to minimize interference with neighbouring repeaters >

B-002-001-004
****
12.4BSG8; 12.5.1BSG9
What is the purpose of a repeater time-out timer?

- It tells how long someone has been using a repeater
- It interrupts lengthy transmissions without pauses
- It lets a repeater have a rest period after heavy use
- It logs repeater transmit time to predict when a repeater will fail

< It interrupts lengthy transmissions without pauses >

B-002-001-005
****
12.4BSG8; 12.5.4BSG9
What is a CTCSS tone?

- A sub-audible tone that activates a receiver audio output when present
- A tone used by repeaters to mark the end of a transmission
- A special signal used for telemetry between amateur space stations and Earth stations
- A special signal used for radio control of model craft

< A sub-audible tone that activates a receiver audio output when present >

B-002-001-006
****
12.4BSG8; 12.5.4BSG9
How do you call another station on a repeater if you know the station's call sign?

- Say "CQ" three times, then say the station's call sign
- Wait for the station to call "CQ", then answer it
- Say the station's call sign, then identify your own station
- Say "break, break 79," then say the station's call sign

< Say the station's call sign, then identify your own station >

B-002-001-007
****
12.4BSG8; 12.5.1BSG9
Why should you pause briefly between transmissions when using a repeater?

- To check the SWR of the repeater
- To reach for pencil and paper for third-party communications
- To dial up the repeater's autopatch
- To listen for anyone else wanting to use the repeater

< To listen for anyone else wanting to use the repeater >

B-002-001-008
****
12.4BSG8; 12.5.1BSG9
Why should you keep transmissions short when using a repeater?

- To give any listening non-hams a chance to respond
- To see if the receiving station operator is still awake
- A long transmission may prevent someone with an emergency from using the repeater
- To keep long-distance charges down

< A long transmission may prevent someone with an emergency from using the repeater >

B-002-001-009
****
12.4BSG8; 12.5.1BSG9
What is the proper way to break into a conversation on a repeater?

- Say your call sign during a break between transmissions
- Wait for the end of a transmission and start calling the desired party
- Shout, "break, break!" to show that you're eager to join the conversation
- Turn on an amplifier and override whoever is talking

< Say your call sign during a break between transmissions >

B-002-001-010
****
12.4BSG8; 12.5.1BSG9
What is the accepted way to ask someone their location when using a repeater?

- What is your 12?
- Where are you?
- What is your 20?
- Locations are not normally told by radio

< Where are you? >

B-002-001-011
****
12.4BSG8; 12.5.1BSG9
FM repeater operation on the 2 metre band uses one frequency for transmission and one for reception. The difference in frequency between the transmit and receive frequency is normally:

- 400 kHz
- 600 kHz
- 800 kHz
- 1000 kHz

< 600 kHz >

2-2 Phonetic alphabet

B-002-002-001
****
12.3
To make your call sign better understood when using voice transmissions, what should you do?

- Talk louder
- Turn up your microphone gain
- Use Standard International Phonetics for each letter of your call sign
- Use any words which start with the same letters as your call sign for each letter of your call sign

< Use Standard International Phonetics for each letter of your call sign >

B-002-002-002
****
12.3
What can you use as an aid for correct station identification when using phone?

- A speech compressor
- The Standard International Phonetic Alphabet
- Q signals
- Unique words of your choice

< The Standard International Phonetic Alphabet >

B-002-002-003
****
12.3
What is the Standard International Phonetic for the letter A?

- Adam
- America
- Alfa
- Able

< Alfa >

B-002-002-004
****
12.3
What is the Standard International Phonetic for the letter B?

- Bravo
- Brazil
- Borneo
- Baker

< Bravo >

B-002-002-005
****
12.3
What is the Standard International Phonetic for the letter D?

- Denmark
- David
- Delta
- Dog

< Delta >

B-002-002-006
****
12.3
What is the Standard International Phonetic for the letter E?

- Echo
- Easy
- Edward
- England

< Echo >

B-002-002-007
****
12.3
What is the Standard International Phonetic for the letter G?

- Germany
- Gibraltar
- Golf
- George

< Golf >

B-002-002-008
****
12.3
What is the Standard International Phonetic for the letter I?

- Iran
- Italy
- Item
- India

< India >

B-002-002-009
****
12.3
What is the Standard International Phonetic for the letter L?

- Lima
- Love
- London
- Luxembourg

< Lima >

B-002-002-010
****
12.3
What is the Standard International Phonetic for the letter P?

- Paris
- Peter
- Papa
- Portugal

< Papa >

B-002-002-011
****
12.3
What is the Standard International Phonetic for the letter R?

- Roger
- Radio
- Romania
- Romeo

< Romeo >

2-3 Voice operating procedures - simplex VHF/UHF and HF

B-002-003-001
****
12.7BSG8; 12.6.2BSG9
What is the correct way to call “CQ” when using voice?

- Say “CQ” at least five times, followed by “this is,” followed by your call sign spoken once
- Say “CQ” at least ten times, followed by “this is,” followed by your call sign spoken once
- Say “CQ” three times, followed by “this is,” followed by your call sign spoken three times
- Say ”CQ” once, followed by “this is,” followed by your call sign spoken three times

< Say “CQ” three times, followed by “this is,” followed by your call sign spoken three times >

B-002-003-002
****
12.7BSG8; 12.6.2BSG9
How should you answer a voice CQ call?

- Say the other station’s call sign at least three times, followed by “this is,” and your call sign at least five times phonetically
- Say the other station’s call sign at least ten times, followed by “this is,” then your call sign at least twice
- Say the other station’s call sign once, followed by “this is,” then your call sign given phonetically
- Say the other station’s call sign at least five times phonetically, followed by “this is,” then your call sign twice

< Say the other station’s call sign once, followed by “this is,” then your call sign given phonetically >

B-002-003-003
****
12.4BSG8; 12.5.2BSG9
What is simplex operation?

- Transmitting one-way communications
- Transmitting and receiving on the same frequency
- Transmitting and receiving over a wide area
- Transmitting on one frequency and receiving on another

< Transmitting and receiving on the same frequency >

B-002-003-004
****
12.4BSG8; 12.5.2BSG9
When should you use simplex operation instead of a repeater?

- When an emergency telephone call is needed
- When you are traveling and need some local information
- When signals are reliable between communicating parties without using a repeater
- When the most reliable communications are needed

< When signals are reliable between communicating parties without using a repeater >

B-002-003-005
****
12.4BSG8; 12.5BSG9
Why should local amateur communications use VHF and UHF frequencies instead of HF frequencies?

- Because signals are stronger on VHF and UHF frequencies
- To minimize interference on HF bands capable of long-distance communication
- Because greater output power is permitted on VHF and UHF
- Because HF transmissions are not propagated locally

< To minimize interference on HF bands capable of long-distance communication >

B-002-003-006
****
12.4BSG8; 12.5.2BSG9
Why should we be careful in choosing a simplex frequency when operating VHF and UHF FM?

- Implanted medical devices share the same spectrum
- Some frequencies are designated for narrow band FM and others for wideband FM
- You may inadvertently choose a channel that is an input to a local repeater
- Interference may be caused to unlicensed devices operating in the same band

< You may inadvertently choose a channel that is an input to a local repeater >

B-002-003-007
****
12.4BSG8; 12.5.2BSG9
If you are talking to a station using a repeater, how would you find out if you could communicate using simplex instead?

- See if you can clearly receive a more distant repeater
- See if you can clearly receive the station on a lower frequency band
- See if you can clearly receive the station on the repeater's input frequency
- See if a third station can clearly receive both of you

< See if you can clearly receive the station on the repeater's input frequency >

B-002-003-008
****
12.4BSG8; 12.5.2BSG9
If you are operating simplex on a repeater frequency, why would it be good amateur practice to change to another frequency?

- There are more repeater operators than simplex operators
- Changing the repeater's frequency requires the authorization of Industry Canada
- Changing the repeater's frequency is not practical
- The repeater's output power may ruin your station's receiver

< Changing the repeater's frequency is not practical >

B-002-003-009
****
12.7BSG8; 12.6.2BSG9
Which sideband is commonly used for 20-metre phone operation?

- Lower
- FM
- Double
- Upper

< Upper >

The convention is to use lower sideband on the 160 m, 80 m and 40 m bands and upper sideband for the 20 m, 15 m and 10 m bands. You can use the other sideband, but there may not be anybody there listening.

B-002-003-010
****
12.7BSG8; 12.6.2BSG9
Which sideband is commonly used on 3755 kHz for phone operation?

- FM
- Double
- Upper
- Lower

< Lower >

The convention is to use lower sideband on the 160 m, 80 m and 40 m bands and upper sideband for the 20 m, 15 m and 10 m bands. You can use the other sideband, but there may not be anybody there listening.

B-002-003-011
****
6.12
What is the best method to tell if a band is “open” for communication with a particular distant location?

- Ask others on your local 2 metre FM repeater
- Telephone an experienced local amateur
- Look at the propagation forecasts in an amateur radio magazine
- Listen for signals from that area from an amateur beacon station or a foreign broadcast or television station on a nearby frequency

< Listen for signals from that area from an amateur beacon station or a foreign broadcast or television station on a nearby frequency >

2-4 Tuneups and testing, use of dummy load, courteous operation

B-002-004-001
****
12.4BSG8; 12.5.3BSG9
What should you do before you transmit on any frequency?

- Listen to make sure that someone will be able to hear you
- Listen to make sure others are not using the frequency
- Check your antenna for resonance at the selected frequency
- Make sure the SWR on your antenna transmission line is high enough

< Listen to make sure others are not using the frequency >

B-002-004-002
****
13.15
If you contact another station and your signal is extremely strong and perfectly readable, what adjustment might you make to your transmitter?

- Turn on your speech processor
- Reduce your SWR
- Continue with your contact, making no changes
- Turn down your power output to the minimum necessary

< Turn down your power output to the minimum necessary >

B-002-004-003
****
11.6BSG8; 11.6.5BSG9
What is one way to shorten transmitter tune-up time on the air to cut down on interference?

- Tune the transmitter into a dummy load
- Use a long wire antenna
- Tune up on 40 metres first, then switch to the desired band
- Use twin lead instead of coaxial cable transmission lines

< Tune the transmitter into a dummy load >

B-002-004-004
****
11.6BSG8; 11.6.5BSG9
How can on-the-air interference be minimized during a lengthy transmitter testing or tuning procedure?

- Use a resonant antenna that requires no loading-up procedure
- Use a dummy load
- Choose an unoccupied frequency
- Use a non-resonant antenna

< Use a dummy load >

B-002-004-005
****
11.6BSG8; 11.6.5BSG9
Why would you use a dummy load?

- To reduce output power
- To test or adjust your transceiver without causing interference
- To give comparative signal reports
- It is faster to tune

< To test or adjust your transceiver without causing interference >

B-002-004-006
****
12.15BSG8; 12.11BSG9
If you are the net control station of a daily HF net, what should you do if the frequency on which you normally meet is in use just before the net begins?

- Increase your power output so that net participants will be able to hear you over the existing activity
- Cancel the net for that day
- Call and ask the occupants to relinquish the frequency for the scheduled net operations, but if they are not agreeable conduct the net on a frequency 3 to 5 kHz away from the regular net frequency
- Reduce your output power and start the net as usual

< Call and ask the occupants to relinquish the frequency for the scheduled net operations, but if they are not agreeable conduct the net on a frequency 3 to 5 kHz away from the regular net frequency >

B-002-004-007
****
12.15BSG8; 12.11BSG9
If a net is about to begin on a frequency which you and another station are using, what should you do?

- Transmit as long as possible on the frequency so that no other stations may use it
- Turn off your radio
- As a courtesy to the net, move to a different frequency
- Increase your power output to ensure that all net participants can hear you

< As a courtesy to the net, move to a different frequency >

B-002-004-008
****
12.15BSG8; 12.11BSG9
If propagation changes during your contact and you notice increasing interference from other activity on the same frequency, what should you do?

- Report the interference to your local Amateur Auxiliary Coordinator
- Increase the output power of your transmitter to overcome the interference
- Move your contact to another frequency
- Tell the interfering stations to change frequency, since you were there first

< Move your contact to another frequency >

B-002-004-009
****
12.15BSG8; 12.13BSG9
When selecting a single-sideband phone transmitting frequency, what minimum frequency separation from a contact in progress should you allow (between suppressed carriers) to minimize interference?

- Approximately 10 kHz
- Approximately 3 kHz
- 150 to 500 Hz
- Approximately 6 kHz

< Approximately 3 kHz >

B-002-004-010
****
5.7
What is a band plan?

- A guideline for deviating from amateur frequency band allocations
- A guideline for using different operating modes within an amateur band
- A plan of operating schedules within an amateur band published by Industry Canada
- A plan devised by a club to best use a frequency band during a contest

< A guideline for using different operating modes within an amateur band >

B-002-004-011
****
12.4BSG8; 12.5.3BSG9
Before transmitting, the first thing you should do is:

- make an announcement on the frequency indicating that you intend to make a call
- decrease your receiver's volume
- listen carefully so as not to interrupt communications already in progress
- ask if the frequency is occupied

< listen carefully so as not to interrupt communications already in progress >

2-5 Morse code (CW) operating procedures, procedural signs

B-002-005-001
****
12.6BSG8; 12.6.1BSG9
What is the correct way to call "CQ" when using Morse code?

- Send the letters "CQ" over and over
- Send the letters "CQ" three times, followed by "DE", followed by your call sign sent three times
- Send the letters "CQ" three times, followed by "DE", followed by your call sign sent once
- Send the letters "CQ" ten times, followed by "DE", followed by your call sign sent once

< Send the letters "CQ" three times, followed by "DE", followed by your call sign sent three times >

B-002-005-002
****
12.6BSG8; 12.6.1BSG9
How should you answer a routine Morse code "CQ" call?

- Send your call sign four times
- Send the other station's call sign once, followed by "DE", followed by your call sign four times
- Send your call sign followed by your name, station location and a signal report
- Send the other station's call sign twice, followed by "DE", followed by your call sign twice

< Send the other station's call sign twice, followed by "DE", followed by your call sign twice >

B-002-005-003
****
12.6BSG8; 12.6.1BSG9
At what speed should a Morse code CQ call be transmitted?

- At any speed below 5 w.p.m.
- At the highest speed your keyer will operate
- At the highest speed at which you can control the keyer
- At any speed which you can reliably receive

< At any speed which you can reliably receive >

B-002-005-004
****
12.6BSG8; 12.6.1BSG9
What is the meaning of the procedural signal “CQ”?

- Calling any station
- Call on the quarter hour
- An antenna is being tested
- Only the station “CQ” should answer

< Calling any station >

B-002-005-005
****
12.6BSG8; 12.6.1BSG9
What is the meaning of the procedural signal “DE”?

- From
- Received all correctly
- Calling any station
- Directional Emissions

< From >

B-002-005-006
****
12.6BSG8; 12.6.1BSG9
What is the meaning of the procedural signal “K”?

- Any station please reply
- End of message
- Called station only transmit
- All received correctly

< Any station please reply >

B-002-005-007
****
12.6BSG8; 12.6.1BSG9
What is meant by the term “DX”?

- Distant station
- Calling any station
- Go ahead
- Best regards

< Distant station >

B-002-005-008
****
12.6BSG8; 12.6.1BSG9
What is the meaning of the term “73”?

- Long distance
- Love and kisses
- Go ahead
- Best regards

< Best regards >

B-002-005-009
****
11.13
Which of the following describes full break-in telegraphy (QSK)?

- An operator must activate a manual send/receive switch before and after every transmission
- Breaking stations send the Morse code prosign “BK”
- Incoming signals are received between transmitted Morse code dots and dashes
- Automatic keyers are used to send Morse code instead of hand keys

< Incoming signals are received between transmitted Morse code dots and dashes >

B-002-005-010
****
12.6BSG8; 12.6.1BSG9
When selecting a CW transmitting frequency, what minimum frequency separation from a contact in progress should you allow to minimize interference?

- 5 to 50 Hz
- 1 to 3 kHz
- 3 to 6 kHz
- 150 to 500 Hz

< 150 to 500 Hz >

B-002-005-011
****
12.6BSG8; 12.6.1BSG9
Good Morse telegraphy operators:

- listen to the frequency to make sure that it is not in use before transmitting
- always give stations a good readability report
- save time by leaving out spaces between words
- tune the transmitter using the operating antenna

< listen to the frequency to make sure that it is not in use before transmitting >

2-6 RST system of signal reporting, use of S meter

B-002-006-001
****
12.6BSG8; 12.6.1BSG9
What are “RST” signal reports?

- A short way to describe transmitter power
- A short way to describe sunspot activity
- A short way to describe ionospheric conditions
- A short way to describe signal reception

< A short way to describe signal reception >

B-002-006-002
****
12.6BSG8; 12.6.1BSG9
What does “RST” mean in a signal report?

- Recovery, signal speed, tone
- Readability, signal speed, tempo
- Readability, signal strength, tone
- Recovery, signal strength, tempo

< Readability, signal strength, tone >

B-002-006-003
****
12.6, 12.7BSG8; 12.6.1, 12.6.2BSG9
What is the meaning of: “Your signal report is 5 7”?

- Your signal is readable with considerable difficulty
- Your signal is perfectly readable with near pure tone
- Your signal is perfectly readable, but weak
- Your signal is perfectly readable and moderately strong

< Your signal is perfectly readable and moderately strong >

B-002-006-004
****
12.6, 12.7BSG8; 12.6.1, 12.6.2BSG9
What is the meaning of: “Your signal report is 3 3”?

- The station is located at latitude 33 degrees
- The contact is serial number 33
- Your signal is readable with considerable difficulty and weak in strength
- Your signal is unreadable, very weak in strength

< Your signal is readable with considerable difficulty and weak in strength >

B-002-006-005
****
12.6, 12.7BSG8; 12.6.1, 12.6.2BSG9
What is the meaning of: “You are 5 9 plus 20 dB”?

- You are perfectly readable with a signal strength 20 decibels greater than S 9
- The bandwidth of your signal is 20 decibels above linearity
- Repeat your transmission on a frequency 20 kHz higher
- Your signal strength has increased by a factor of 100

< You are perfectly readable with a signal strength 20 decibels greater than S 9>

B-002-006-006
****
12.5.4BSG9
A distant station asks for a signal report on a local repeater you monitor. What fact affects your assessment?

- The repeater gain affects your S-meter reading
- You need to listen to the repeater input frequency for an accurate signal report
- Signal reports are only useful on simplex communications
- The other operator needs to know how well he is received on the repeater, not how well you receive the repeater

< The other operator needs to know how well he is received on the repeater, not how well you receive the repeater >

Signal reports on a repeater tend to be anecdotal. Such phrases as “full quieting into the repeater”, “solid copy”, or “noisy” are used instead.

B-002-006-007
****
A1.7
If the power output of a transmitter is increased by four times, how might a nearby receiver's S-meter reading change?

- Increase by approximately one S unit
- Increase by approximately four S units
- Decrease by approximately four S units
- Decrease by approximately one S unit

< Increase by approximately one S unit >

B-002-006-008
****
A1.7
By how many times must the power output of a transmitter be increased to raise the S-meter reading on a nearby receiver from S8 to S9?

- Approximately 5 times
- Approximately 3 times
- Approximately 2 times
- Approximately 4 times

< Approximately 4 times >

B-002-006-009
****
12.6BSG8; 12.6.1BSG9
What does "RST 579" mean in a Morse code contact?

- Your signal is perfectly readable, moderately strong, and with perfect tone
- Your signal is perfectly readable, weak strength, and with perfect tone
- Your signal is fairly readable, fair strength, and with perfect tone
- Your signal is barely readable, moderately strong, and with faint ripple

< Your signal is perfectly readable, moderately strong, and with perfect tone >

B-002-006-010
****
12.6, 12.7BSG8; 12.6.1, 12.6.2BSG9
What does "RST 459" mean in a Morse code contact?

- Your signal is very readable, very strong, and with perfect tone
- Your signal is barely readable, very weak, and with perfect tone
- Your signal is moderately readable, very weak, and with hum on the tone
- Your signal is quite readable, fair strength, and with perfect tone

< Your signal is quite readable, fair strength, and with perfect tone >

B-002-006-011
****
12.6, 12.7BSG8; 12.6.1, 12.6.2BSG9
What is the meaning of “Your signal report is 1 1”?

- Your signal is first class in readability and first class in strength
- Your signal is very readable and very strong
- Your signal is unreadable, and barely perceptible
- Your signal is 11 dB over S9

< Your signal is unreadable, and barely perceptible >

2-7 Q signals

B-002-007-001
****
12.2
What is the meaning of the Q signal “QRS”?

- Send “RST” report
- Radio station location is:
- Send more slowly
- Interference from static

< Send more slowly >

B-002-007-002
****
12.2
What is one meaning of the Q signal “QTH”?

- My location is
- Stop sending
- My name is
- Time here is

< My location is >

B-002-007-003
****
12.2
What is the proper Q signal to use to see if a frequency is in use before transmitting on CW?

- QRZ?
- QRL?
- QRV?
- QRU?

< QRL? >

B-002-007-004
****
12.2
What is one meaning of the Q signal “QSY”?

- Use more power
- Send faster
- Send more slowly
- Change frequency

< Change frequency >

B-002-007-005
****
12.2
What is the meaning of the Q signal “QSB”?

- I have no message
- A contact is confirmed
- Your signal is fading
- I am busy

< Your signal is fading >

B-002-007-006
****
12.2
What is the proper Q signal to use to ask if someone is calling you on CW?

- QRL?
- QRT?
- QRZ?
- QSL?

< QRZ? >

B-002-007-007
****
12.2
The signal “QRM” signifies:

- I am troubled by static
- your signals are fading
- is my transmission being interfered with
- I am being interfered with

< I am being interfered with >

B-002-007-008
****
12.2
The signal “QRN” means:

- I am being interfered with
- I am troubled by static
- I am busy
- are you troubled by static

< I am troubled by static >

B-002-007-009
****
12.2
The “Q signal” indicating that you want the other station to send slower is:

- QRN
- QRS
- QRM
- QRL

< QRS >

B-002-007-010
****
12.2
Who is calling me is denoted by the “Q signal”:

- QRM?
- QRZ?
- QRK?
- QRP?

< QRZ? >

B-002-007-011
****
12.2
The “Q signal” which signifies “I will call you again” is:

- QRT
- QRX
- QRZ
- QRS

< QRX >

2-8 Emergency operating procedures

B-002-008-001
****
12.16
When may you use your amateur station to transmit an “SOS” or “MAYDAY”?

- In a life-threatening distress situation
- Never
- Only at specific times (at 15 and 30 minutes after the hour)
- Only in case of a severe weather watch

< In a life-threatening distress situation >

B-002-008-002
****
12.16BSG8; 12.14BSG9
If you are in contact with another station and you hear an emergency call for help on your frequency, what should you do?

- Immediately stop your contact and acknowledge the emergency call
- Tell the calling station that the frequency is in use
- Direct the calling station to the nearest emergency net frequency
- Call your local police station and inform them of the emergency call

< Immediately stop your contact and acknowledge the emergency call >

B-002-008-003
****
12.16BSG8; 12.14BSG9
What is the proper distress call to use when operating phone?

- Say “MAYDAY” several times
- Say “SOS” several times
- Say “EMERGENCY” several times
- Say “HELP” several times

< Say “MAYDAY” several times >

B-002-008-004
****
12.16BSG8; 12.14BSG9
What is the proper distress call to use when operating CW?

- QRRR
- MAYDAY
- SOS
- CQD

< SOS >

B-002-008-005
****
12.16BSG8; 12.14BSG9
What is the proper way to interrupt a repeater conversation to signal a distress call?

- Break-in immediately following the transmission of the active party and state your situation and call sign
- Say “EMERGENCY” three times
- Say “SOS” then your call sign
- Say “HELP” as many times as it takes to get someone to answer

< Break-in immediately following the transmission of the active party and state your situation and call sign >

B-002-008-006
****
11.4BSG8; 11.4BSG9
Why is it a good idea to have a way to operate your amateur station without using commercial AC power lines?

- So you may provide communications in an emergency
- So you will comply with rules
- So you may operate in contests where AC power is not allowed
- So you may use your station while mobile

< So you may provide communications in an emergency >

B-002-008-007
****
11.4
What is the most important accessory to have for a hand-held radio in an emergency?

- An extra antenna
- A portable amplifier
- A microphone headset for hands-free operation
- Several sets of charged batteries

< Several sets of charged batteries >

B-002-008-008
****
8.8
Which type of antenna would be a good choice as part of a portable HF amateur station that could be set up in case of an emergency?

- A dipole
- A parabolic dish
- A three-element Yagi
- A three-element quad

< A dipole >

B-002-008-009
****
12.16BSG8; 12.14BSG9
If you are communicating with another amateur station and hear a station in distress break in, what should you do?

- Change to a different frequency so the station in distress may have a clear channel to call for assistance
- Immediately cease all transmissions because stations in distress have emergency rights to the frequency
- Acknowledge the station in distress and determine its location and what assistance may be needed
- Continue your communication because you were on frequency first

< Acknowledge the station in distress and determine its location and what assistance may be needed >

B-002-008-010
****
12.16BSG8; 12.14BSG9
In order of priority, a distress message comes before:

- a safety message
- an emergency message
- no other messages
- a government priority message

< an emergency message >

The current accepted level of emergency and response are: Distress, Urgency, and Security.

B-002-008-011
****
12.16BSG8; 12.14BSG9
If you hear distress traffic and are unable to render assistance you should:

- take no action
- tell all other stations to cease transmitting
- contact authorities and then maintain watch until you are certain that assistance will be forthcoming
- enter the details in the log book and take no further action

< contact authorities and then maintain watch until you are certain that assistance will be forthcoming >

2-9 Record keeping, confirmation practices, maps/charts, antenna orientation

B-002-009-001
****

12.11BSG8; 12.9BSG9
What is a "QSL card"?

- A postcard reminding you when your station licence will expire
- A letter or postcard from an amateur pen pal
- A written proof of communication between two amateurs
- A Notice of Violation from Industry Canada

< A written proof of communication between two amateurs >

B-002-009-002
****

12.14BSG8; 12.12BSG9
What is an azimuthal map?

- A map that shows the angle at which an amateur satellite crosses the equator
- A map that shows the number of degrees longitude that an amateur satellite appears to move westward at the equator
- A map projection centered on a particular location, used to determine the shortest path between points on the Earth's surface
- A map projection centered on the North Pole

< A map projection centered on a particular location, used to determine the shortest path between points on the Earth's surface >

B-002-009-003
****

12.14BSG8; 12.12BSG9
What is the most useful type of map to use when orienting a directional HF antenna toward a distant station?

- Topographical
- Azimuthal
- Mercator
- Polar projection

< Azimuthal >

B-002-009-004
****

12.14BSG8; 12.12BSG9
A directional antenna pointed in the long-path direction to another station is generally oriented how many degrees from its short-path heading?

- 270 degrees
- 180 degrees
- 45 degrees
- 90 degrees

<180 degrees >

B-002-009-005
****
12.11BSG8; 12.9BSG9
What method is used by radio amateurs to provide written proof of communication between two amateur stations?

- A packet message
- A signed postcard listing contact date, time, frequency, mode and power, called a “QSL card”
- A two-page letter containing a photograph of the operator
- A radiogram sent over the CW traffic net

< A signed postcard listing contact date, time, frequency, mode and power, called a “QSL card” >

B-002-009-006
****
12.14BSG8; 12.12BSG9
You hear other local stations talking to radio amateurs in New Zealand but you don’t hear those stations with your beam aimed on the normal compass bearing to New Zealand. What should you try?

- Point your antenna toward Newington, Connecticut
- Point your antenna to the north
- Point your antenna to the south
- Point your beam 180 degrees away from that bearing and listen for the stations arriving on the “long-path”

< Point your beam 180 degrees away from that bearing and listen for the stations arriving on the “long-path” >

B-002-009-007
****
12.12BSG8; 12.10BSG9
Which statement about recording all contacts and unanswered “CQ calls” in a station logbook or computer log is NOT correct?

- A log is important for handling neighbour interference complaints
- A logbook is required by Industry Canada
- A log is important for recording contacts for operating awards
- A well-kept log preserves your fondest amateur radio memories for years

< A logbook is required by Industry Canada >

B-002-009-008
****
12.14BSG8; 12.12BSG9
Why would it be useful to have an azimuthal world map centred on the location of your station?

- Because it looks impressive
- Because it shows the angle at which an amateur satellite crosses the equator
- Because it shows the number of degrees longitude that an amateur satellite moves west
- Because it shows the compass bearing from your station to any place on Earth, for antenna planning and pointing

< Because it shows the compass bearing from your station to any place on Earth, for antenna planning and pointing >

B-002-009-009
****
12.13 BSG8; 12.11BSG9
Station logs and confirmation (QSL) cards are always kept in UTC (Universal Time Coordinated). Where is that time based?

- Greenwich, England
- Geneva, Switzerland
- Ottawa, Canada
- Newington, Connecticut

< Greenwich, England >

B-002-009-010
****
12.13BSG8; 12.11BSG9
When referring to contacts in the station log, what do the letters UTC mean?

- Unlimited Time Capsule
- Universal Time Coordinated (formerly Greenwich Mean Time - GMT)
- Universal Time Constant
- Unlisted Telephone Call

< Universal Time Coordinated (formerly Greenwich Mean Time - GMT) >

B- 002-009-011
****
12.13BSG8; 12.11BSG9
To set your station clock accurately to UTC, you could receive the most accurate time off the air from _____?

- your local radio station
- CHU, WWV or WWVH
- a non-directional beacon station
- your local television station

< CHU, WWV or WWVH >

Station Assembly, Practice and Safety – 003

A suggested approach to answering the questions on the block diagrams is to draw them out, of course without peeking at the text book.

3-1 Functional layout of HF stations

B-003-001-001
****
11.6
A low pass filter in an HF station is most effective when connected:

- as close as possible to the antenna
- midway between the transceiver and antenna
- as close as possible to the transceiver output
- as close as possible to the antenna tuner output

< as close as possible to the transceiver output >

B-003-001-002
****
11.6BSG8; 11.6.1BSG9
A low pass filter in an HF station is most effective when connected:

- as close as possible to the antenna tuner output
- as close as possible to the linear amplifier input
- as close as possible to the linear amplifier output
- as close as possible to the antenna

< as close as possible to the linear amplifier output >

B-003-001-003
****
11.6BSG8; 11.6.1BSG9
In designing an HF station, which component would you use to reduce the effects of harmonic radiation?

- Antenna switch
- SWR bridge
- Low pass filter
- Dummy load

< Low pass filter >

B-003-001-004
****
11.6BSG9; 11.6.2BSG9
Which component in an HF station is the most useful for determining the effectiveness of the antenna system?

- Linear amplifier
- Dummy load
- SWR bridge
- Antenna switch

< SWR bridge >

B-003-001-005
****
11.6, Fig. 11-3BSG8; 11.6.3, Fig. 11-3BSG9
Of the components in an HF station, which component would normally be connected closest to the antenna, antenna tuner and dummy load?

- Transceiver
- Low pass filter
- SWR bridge
- Antenna switch

< Antenna switch >

B-003-001-006
****
11.6BSG8; 11.6.4BSG9
Of the components in an HF station, which component would be used to match impedances between the transceiver and antenna?

- SWR bridge
- Antenna tuner
- Antenna switch
- Dummy load

< Antenna tuner >

B-003-001-007
****
11.6BSG8; 11.6.5BSG
In an HF station, which component is temporarily connected in the tuning process or for adjustments to the transmitter?

- Low pass filter
- Antenna tuner
- Dummy load
- SWR bridge

< Dummy load >

B-003-001-008
****
11.6BSG8; 11.6.4BSG9
In an HF station, the antenna tuner is usually used for matching the transceiver with:

- most antennas when operating below 14 MHz
- most antennas when operating above 14 MHz
- mono-band Yagi type antennas
- tri-band Yagi antennas

< most antennas when operating below 14 MHz >

B-003-001-009
****
11.6BSG8; 11.6.4BSG9
In an HF Station, the antenna tuner is commonly used:

- to tune low pass filters
- with most antennas when operating below 14 MHz
- with most antennas when operating above 14 MHz
- to tune into dummy loads

< with most antennas when operating below 14 MHz >

3-2 Functional layout of FM transmitters

B-003-002-001
****
13.11
In a frequency modulation transmitter, the input to the speech amplifier is connected to the:

- modulator
- power amplifier
- frequency multiplier
- microphone

< microphone >

B-003-002-002
****
13.11
In a frequency modulation transmitter, the microphone is connected to the:

- power amplifier
- oscillator
- speech amplifier
- modulator

< speech amplifier >

B-003-002-003
****
13.11
In a frequency modulation transmitter, the _____ is in between the speech amplifier and the oscillator.

- modulator
- power amplifier
- microphone
- frequency multiplier

< modulator >

B-003-002-004
****
13.11
In a frequency modulation transmitter, the _____ is located between the modulator and the frequency multiplier.

- power amplifier
- microphone
- oscillator
- speech amplifier

< oscillator >

B-003-002-005
****
13.11
In a frequency modulation transmitter, the _____is located between the oscillator and the power amplifier.

- modulator
- frequency multiplier
- microphone
- speech amplifier

< frequency multiplier >

B-003-002-006
****
13.11
In a frequency modulation transmitter, the _____ is located between the frequency multiplier and the antenna.

- modulator
- speech amplifier
- oscillator
- power amplifier

< power amplifier >

B-003-002-007
****
13.11
In a frequency modulation transmitter, the power amplifier output is connected to the:

- frequency multiplier
- microphone
- modulator
- antenna

< antenna >

3-3 Functional layout of FM receivers

B-003-003-001
****
14.8
In a frequency modulation receiver, the _____ is connected to the input of the radio frequency amplifier.

- mixer
- frequency discriminator
- limiter
- antenna

< antenna >

B-003-003-002
****
14.8
In a frequency modulation receiver, the _____ is in between the antenna and the mixer.

- audio frequency amplifier
- local oscillator
- intermediate frequency amplifier
- radio frequency amplifier

< radio frequency amplifier > Note: In the 8th Ed./First Printing 9th Ed. the LO is called the HFO

B-003-003-003
****
14.8
In a frequency modulation receiver, the output of the local oscillator is fed to the:

- limiter
- antenna
- mixer
- radio frequency amplifier

< mixer > Note: In the 8th Ed./First Printing 9th Ed. the LO is called the HFO

B-003-003-004
****
14.8
In a frequency modulation receiver, the output of the _____ is connected to the mixer.

- local oscillator
- frequency discriminator
- intermediate frequency amplifier
- speaker or headphones

< local oscillator > Note: In the 8th Ed./First Printing 9th Ed. the LO is called the HFO

B-003-003-005
****
14.8
In a frequency modulation receiver, the _____ is in between the mixer and the intermediate frequency amplifier.

- limiter
- frequency discriminator
- radio frequency amplifier
- filter

< filter > Note: In the 8th Ed./First Printing 9th Ed. the LO is called the HFO

B-003-003-006
****
14.8
In a frequency modulation receiver, the _____ is located between the filter and the limiter.

- mixer
- radio frequency amplifier
- intermediate frequency amplifier
- local oscillator

< intermediate frequency amplifier > Note: In the 8th Ed./First Printing 9th Ed. the LO is called the HFO

B-003-003-007
****
14.8
In a frequency modulation receiver, the _____ is in between the intermediate frequency amplifier and the frequency discriminator.

- radio frequency amplifier
- limiter
- filter
- local oscillator

< limiter > Note: Note: In the 8th Ed./First Printing 9th Ed. the LO is called the HFO

B-003-003-008
****
14.8
In a frequency modulation receiver, the. _____ is located between the limiter and the audio frequency amplifier.

- speaker or headphones
- local oscillator
- frequency discriminator
- intermediate frequency amplifier

< frequency discriminator > Note: In the 8th Ed./First Printing 9th Ed. the LO is called the HFO

B-003-003-009
****
14.8
In a frequency modulation receiver, the _____ is located between the speaker or headphones and the frequency discriminator.

- intermediate frequency amplifier
- radio frequency amplifier
- audio frequency amplifier
- limiter

< audio frequency amplifier > Note: In the 8th Ed./First Printing 9th Ed. the LO is called the HFO

B-003-003-010
****
14.8
In a frequency modulation receiver, the _____ connects to the audio frequency amplifier output.

- intermediate frequency amplifier
- frequency discriminator
- limiter
- speaker or headphones

< speaker or headphones > Note: In the 8th Ed./First Printing 9th Ed. the LO is called the HFO

3-4 Functional layout of CW transmitters

B-003-004-001
****
13.9
In a CW transmitter, the output from the _____ is connected to the driver/buffer.

- telegraph key
- power supply
- master oscillator
- power amplifier

< master oscillator >

B-003-004-002
****
13.9
In a typical CW transmitter, the _____ is the primary source of direct current.

- master oscillator
- power supply
- driver/buffer
- power amplifier

< power supply >

B-003-004-003
****
13.9
In a CW transmitter, the _____is between the master oscillator and the power amplifier.

- driver/buffer
- audio amplifier
- power supply
- telegraph key

< driver/buffer >

B-003-004-004
****
13.9
In a CW transmitter, the _____ controls when RF energy is applied to the antenna.

- driver/buffer
- power amplifier
- telegraph key
- master oscillator

< telegraph key >

B-003-004-005
****
13.9
In a CW transmitter, the _____ is in between the driver/buffer stage and the antenna.

- power amplifier
- power supply
- telegraph key
- master oscillator

< power amplifier >

B-003-004-006
****
13.9
In a CW transmitter, the output of the _____ is transferred to the antenna.

- driver/buffer
- power supply
- master oscillator
- power amplifier

< power amplifier >

3-5 Functional layout of SSB/CW receivers

B-003-005-001
****
14.9
In a single sideband and CW receiver, the antenna is connected to the _____.

- local oscillator
- intermediate frequency amplifier
- radio frequency amplifier
- product detector

< radio frequency amplifier >

B-003-005-002
****
14.9
In a single sideband and CW receiver, the output of the _____ is connected to the mixer.

- radio frequency amplifier
- filter
- intermediate frequency amplifier
- audio frequency amplifier

< radio frequency amplifier >

B-003-005-003
****
14.9
In a single sideband and CW receiver, the _____ is connected to the radio frequency amplifier and the local oscillator.

- mixer
- beat frequency oscillator
- product detector
- filter

< mixer >

B-003-005-004
****
14.9
In a single sideband and CW receiver, the output of the _____ is connected to the mixer.

- local oscillator
- intermediate frequency amplifier
- beat frequency oscillator
- product detector

< local oscillator >

B-003-005-005
****
14.9
In a single sideband and CW receiver, the _____ is in between the mixer and intermediate frequency amplifier.

- product detector
- filter
- radio frequency amplifier
- beat frequency oscillator

< filter >

B-003-005-006
****
14.9
In a single sideband and CW receiver, the _____ is in between the filter and product detector.

- radio frequency amplifier
- intermediate frequency amplifier
- audio frequency amplifier
- beat frequency oscillator

< intermediate frequency amplifier >

B-003-005-007
****
14.9
In a single sideband and CW receiver, the _____ output is connected to the audio frequency amplifier.

- local oscillator
- beat frequency oscillator
- intermediate frequency amplifier
- product detector

< product detector >

B-003-005-008
****
14.9
In a single sideband and CW receiver, the output of the _____ is connected to the product detector.

- beat frequency oscillator
- mixer
- radio frequency amplifier
- audio frequency amplifier

< beat frequency oscillator >

B-003-005-009
****
14.9
In a single sideband and CW receiver, the _____ is connected to the output of the product detector.

- local oscillator
- radio frequency amplifier
- audio frequency amplifier
- intermediate frequency amplifier

< audio frequency amplifier >

B-003-005-010
****
14.9
In a single sideband and CW receiver, the _____ is connected to the output of the audio frequency amplifier.

- beat frequency oscillator
- speaker or headphones
- mixer
- radio frequency amplifier

< speaker or headphones >

3-6 Functional layout of SSB transmitters

B-003-006-001
****
13.12
In a single sideband transmitter, the output of the _____ is connected to the balanced modulator.

- mixer
- radio frequency oscillator
- variable frequency oscillator
- linear amplifier

< radio frequency oscillator >

B-003-006-002
****
13.12
In a single sideband transmitter, the output of the _____ is connected to the filter.

- mixer
- radio frequency oscillator
- balanced modulator
- microphone

< balanced modulator >

B-003-006-003
****
13.12
In a single sideband transmitter, the _____ is in between the balanced modulator and the mixer.

- speech amplifier
- microphone
- filter
- radio frequency oscillator

< filter >

B-003-006-004
****
13.12
In a single sideband transmitter, the _____ is connected to the speech amplifier.

- radio frequency oscillator
- filter
- mixer
- microphone

< microphone >

B-003-006-005
****
13.12
In a single sideband transmitter, the output of the _____ is connected to the balanced modulator.

- filter
- variable frequency oscillator
- linear amplifier
- speech amplifier

< speech amplifier >

B-003-006-006
****
13.12
In a single sideband transmitter, the output of the variable frequency oscillator is connected to the _____.

- balanced modulator
- linear amplifier
- mixer
- antenna

< mixer >

B-003-006-007
****
13.12
In a single sideband transmitter, the output of the _____ is connected to the mixer.

- linear amplifier
- antenna
- variable frequency oscillator
- radio frequency oscillator

< variable frequency oscillator >

B-003-006-008
****
13.12
In a single sideband transmitter, the _____ is in between the mixer and the antenna.

- variable frequency oscillator
- balanced modulator
- radio frequency oscillator
- linear amplifier

< linear amplifier >

B-003-006-009
****
13.12
In a single sideband transmitter, the output of the linear amplifier is connected to the:

- speech amplifier
- antenna
- filter
- variable frequency oscillator

< antenna >

3-7 Functional layout of digital systems

B-003-007-001
****
11.14 – Fig. 11-11BSG8; 11.14 – Fig. 11-12BSG9
In an amateur digital radio system, the _____ interfaces with the computer.

- transceiver
- input/output
- antenna
- power supply

< input/output >

B-003-007-002
****
11.14 – Fig. 11-11BSG8; 11.14 – Fig. 11-12BSG9
In an amateur digital radio system, the modem is connected to the _____ .

- amplifier
- antenna
- input/output
- computer

< computer >

B-003-007-003
****
11.14 – Fig. 11-11BSG8; 11.14 – Fig. 11-12BSG9
In an amateur digital radio system, the transceiver is connected to the _____ .

- input/output
- modem
- computer
- scanner

< modem >

B-003-007-004
****
11.14 – Fig. 11-11BSG8; 11.14 – Fig. 11-12BSG9
In an amateur digital radio system, the audio connections of the modem/sound card modem are connected to the _____ .

- transceiver
- input/output
- scanner
- antenna

< transceiver >

B-003-007-005
****
11.14
In an amateur digital radio system, the modem function is often performed by the computer ____ _____ .

- sound card
- keyboard
- scanner
- serial port

< sound card >

3-8 Functional layout of regulated power supplies

B-003-008-001
****
10.1 - Fig. 10-1
In a regulated power supply, the transformer connects to an external source, which is referred to as _____ .

- regulator
- filter
- rectifier
- input

< input >

B-003-008-002
****
10.1 – Fig. 10-1
In a regulated power supply, the _____ is between the input and the rectifier.

- output
- regulator
- filter
- transformer

< transformer >

B-003-008-003
****
10.1 – Fig. 10-1
In a regulated power supply, the _____ is between the transformer and the filter.

- output
- regulator
- rectifier
- input

< rectifier >

B-003-008-004
****
10.1 - Fig. 10-1
In a regulated power supply, the output of the rectifier is connected to the _____ .

- transformer
- regulator
- filter
- output

< filter >

B-003-008-005
****
10.1 – Fig. 10-1
In a regulated power supply, the output of the filter connects to the _____ .

- transformer
- rectifier
- output
- regulator

< regulator >

B-003-008-006
****
10.1 – Fig. 10-1
In a regulated power supply, the _____ is connected to the regulator.

- input
- transformer
- output
- rectifier

< output >

3-9 Functional layout of Yagi-Uda antennas

B-003-009-001
****
8.10
In a Yagi 3 element directional antenna, the _____ is primarily for mechanical purposes.

- driven element
- director
- boom
- reflector

< boom >

B-003-009-002
****
8.10
In a Yagi 3 element directional antenna, the _____ is the longest radiating element.

- reflector
- director
- driven element
- boom

< reflector >

B-003-009-003
****
8.10
In a Yagi 3 element directional antenna, the _____ is the shortest radiating element.

- reflector
- driven element
- director
- boom

< director >

B-003-009-004
****
8.10
In a Yagi 3 element directional antenna, the _____ is not the longest nor the shortest radiating connected element.

- director
- reflector
- driven element
- boom

< driven element >

3-10 Receiver fundamentals

B-003-010-001
****
12.9, 13.1, 13.5, 13.8
Which list of emission types is in order from the narrowest bandwidth to the widest bandwidth?

- CW, RTTY, SSB voice, FM voice
- CW, SSB voice, RTTY, FM voice
- CW, FM voice, RTTY, SSB voice
- RTTY, CW, SSB voice, FM voice

< CW, RTTY, SSB voice, FM voice >

B-003-010-002
****
14.4
The figure in a receiver's specifications which indicates its sensitivity is the:

- bandwidth of the IF in kilohertz
- number of RF amplifiers
- RF input signal needed to achieve a given signal plus noise to noise ratio
- audio output in watts

< RF input signal needed to achieve a given signal plus noise to noise ratio >

B-003-010-003
****
14.4
If two receivers of different sensitivity are compared, the less sensitive receiver will produce:

- less signal or more noise
- a steady oscillator drift
- more than one signal
- more signal or less noise

< less signal or more noise >

B-003-010-004
****
14.9
Which of the following modes of transmission is usually detected with a product detector?

- Double sideband full carrier
- Frequency modulation
- Pulse modulation
- Single sideband suppressed carrier

< Single sideband suppressed carrier >

B-003-010-005
****
14.9
A receiver designed for SSB reception must have a BFO (beat frequency oscillator) because:

- it beats with the received carrier to produce the other sideband
- it reduces the passband of the IF stages
- it phases out the unwanted sideband signal
- the suppressed carrier must be replaced for detection

< the suppressed carrier must be replaced for detection >

B-003-010-006
****
14.6
A receiver receives an incoming signal of 3.54 MHz, and the local oscillator produces a signal of 3.995 MHz. To which frequency should the IF be tuned?

- 3.995 MHz
- 3.54 MHz
- 455 kHz
- 7.435 MHz

<455 kHz >

B-003-010-007
****
14.10
What kind of filter would you use to attenuate an interfering carrier signal while receiving an SSB transmission?

- An all pass filter
- A pi-network filter
- A notch filter
- A band pass filter

< A notch filter >

B-003-010-008
****
14.2
The three main parameters against which the quality of a receiver is measured are:

- sensitivity, selectivity and stability
- selectivity, stability and frequency range
- sensitivity, stability and cross-modulation
- sensitivity, selectivity and image rejection

< sensitivity, selectivity and stability >

B-003-010-009
****
14.4
A communications receiver has four filters installed in it, respectively designated as 250 Hz, 500 Hz, 2.4 kHz, and 6 kHz. If you were listening to single sideband, which filter would you utilize?

- 500 Hz
- 2.4 kHz
- 250 Hz
- 6 kHz

<2.4 kHz >

B-003-010-010
****
14.4
A communications receiver has four filters installed in it, respectively designated as 250 Hz, 500 Hz, 2.4 kHz and 6 kHz. You are copying a CW transmission and there is a great deal of interference. Which one of the filters would you choose?

- 6 kHz
- 250 Hz
- 500 Hz
- 2.4 kHz

<250 Hz >

B-003-010-011
****
14.4 & 14.10
Selectivity can be placed in the audio stages of a receiver by the utilization of RC active or passive audio filters. If you were to copy CW, which of the following bandpasses would you choose?

- 750 - 850 Hz
- 2100 - 2300 Hz
- 300 - 2700 Hz
- 100 - 1100 Hz

<750 - 850 Hz >

3-11 Transmitter, carrier, keying, and amplitude modulation fundamentals

B-003-011-001
****
15.7BSG8; 15.8BSG9
What does chirp mean?

- A slow change in transmitter frequency as the circuit warms up
- An overload in a receiver's audio circuit whenever CW is received
- A small change in a transmitter's frequency each time it is keyed
- A high-pitched tone which is received along with a CW signal

< A small change in a transmitter's frequency each time it is keyed >

B-003-011-002
****
15.7BSG8; 15.8BSG9
What can be done to keep a CW transmitter from chirping?

- Add a low pass filter
- Keep the power supply voltages very steady under transmit load
- Add a key-click filter
- Keep the power supply current very steady under transmit load

< Keep the power supply voltages very steady under transmit load >

B-003-011-003
****
13.10
What circuit has a variable-frequency oscillator connected to a driver and a power amplifier?

- A crystal-controlled AM transmitter
- A single-sideband transmitter
- A digital radio transmitter
- A VFO-controlled CW transmitter

< A VFO-controlled CW transmitter >

B-003-011-004
****
13.4
What type of modulation system changes the amplitude of an RF wave for the purpose of conveying information?

- Frequency modulation
- Amplitude modulation
- Phase modulation
- Amplitude-rectification modulation

< Amplitude modulation >

B-003-011-005
****
13.4
In what emission type does the instantaneous amplitude (envelope) of the RF signal vary in accordance with the modulating audio?

- Frequency shift keying
- Amplitude modulation
- Frequency modulation
- Pulse modulation

< Amplitude modulation >

B-003-011-006
****
13.7
Morse code is usually transmitted by radio as:

- an interrupted carrier
- a series of key-clicks
- a continuous carrier
- a voice-modulated carrier

< an interrupted carrier >

B-003-011-007
****
7.8, 11.10, 11.11
A mismatched antenna or transmission line may present an incorrect load to the transmitter. The result may be:

- the driver stage will not deliver power to the final
- the output tank circuit breaks down
- full power will not be transferred to the antenna
- loss of modulation in the transmitted signal

< full power will not be transferred to the antenna >

B-003-011-008
****
11.11
One result of a slight mismatch between the power amplifier of a transmitter and the antenna would be:

- lower modulation percentage
- radiated key-clicks
- reduced antenna radiation
- smaller DC current drain

< reduced antenna radiation >

B-003-011-009
****
13.9
An RF oscillator should be electrically and mechanically stable. This is to ensure that the oscillator does not:

- cause undue distortion
- drift in frequency
- become over modulated
- generate key-clicks

< drift in frequency >

B-003-011-010
****
11.11
The input power to the final stage of your transmitter is 200 watts and the output is 125 watts. What has happened to the remaining power?

- It has been used to provide positive feedback
- It has been dissipated as heat loss
- It has been used to provide greater efficiency
- It has been used to provide negative feedback

< It has been dissipated as heat loss >

B-003-011-011
****
11.11
The difference between DC input power and RF output power of a transmitter RF amplifier:

- appears as heat dissipation
- is lost in the transmission line
- is due to oscillating
- radiates from the antenna

< appears as heat dissipation >

3-12 Carrier suppression, SSB fundamentals

B-003-012-001
****
11.8
What may happen if an SSB transmitter is operated with the microphone gain set too high?

- It may cause atmospheric interference in the air around the antenna
- It may cause digital interference to computer equipment
- It may cause splatter interference to other stations operating near its frequency
- It may cause interference to other stations operating on a higher frequency band

< It may cause splatter interference to other stations operating near its frequency >

B-003-012-002
****
11.8
What may happen if an SSB transmitter is operated with too much speech processing?

- It may cause digital interference to computer equipment
- It may cause atmospheric interference in the air around the antenna
- It may cause interference to other stations operating on a higher frequency band
- It may cause audio distortion or splatter interference to other stations operating near its frequency

< It may cause audio distortion or splatter interference to other stations operating near its frequency >

B-003-012-003
****
13.4
What is the term for the average power supplied to an antenna transmission line during one RF cycle, at the crest of the modulation envelope?

- Average radio-frequency power
- Peak transmitter power
- Peak envelope power
- Peak output power

< Peak envelope power >

B-003-012-004
****
13.7
What is the usual bandwidth of a single sideband amateur signal?

- Between 2 and 3 kHz
- 1 kHz
- 2 kHz
- Between 3 and 6 kHz

< Between 2 and 3 kHz >

B-003-012-005
****
13.12
In a typical single-sideband phone transmitter, what circuit processes signals from the balanced modulator and sends signals to the mixer?

- RF amplifier
- Carrier oscillator
- Filter
- IF amplifier

< Filter >

B-003-012-006
****
13.5, 13.10
What is one advantage of carrier suppression in a double-sideband phone transmission?

- More power can be put into the sidebands for a given power amplifier capacity
- Only half the bandwidth is required for the same information content
- Greater modulation percentage is obtainable with lower distortion
- Simpler equipment can be used to receive a double-sideband suppressed-carrier signal

< More power can be put into the sidebands for a given power amplifier capacity >

B-003-012-007
****
13.4, 13.12
What happens to the signal of an over modulated single-sideband or double-sideband phone transmitter?

- It has higher fidelity and improved signal-to-noise ratio
- It becomes distorted and occupies more bandwidth
- It becomes stronger with no other effects
- It occupies less bandwidth with poor high-frequency response

< It becomes distorted and occupies more bandwidth >

B-003-012-008
****
11.8BSG9
How should the microphone gain control be adjusted on a single-sideband phone transmitter?

- For slight movement of the ALC meter on modulation peaks
- For full deflection of the ALC meter on modulation peaks
- For 100% frequency deviation on modulation peaks
- For a dip in plate current

< For slight movement of the ALC meter on modulation peaks >

B-003-012-009
****
13.12
The purpose of a balanced modulator in an SSB transmitter is to:

- suppress the carrier and pass on the two sidebands
- make sure that the carrier and both sidebands are 180 degrees out of phase
- ensure that the percentage of modulation is kept constant
- make sure that the carrier and both sidebands are in phase

< suppress the carrier and pass on the two sidebands >

B-003-012-010
****
14.9
In a SSB transmission, the carrier is:

- transmitted with one sideband
- inserted at the transmitter
- of no use at the receiver
- reinserted at the receiver

< reinserted at the receiver >

B-003-012-011
****
11.8
The automatic level control (ALC) in a SSB transmitter:

- reduces the system noise
- controls the peak audio input so that the final amplifier is not overdriven
- reduces transmitter auto feedback
- increases the occupied bandwidth

< controls the peak audio input so that the final amplifier is not overdriven >

3-13 Frequency and phase modulation fundamentals

B-003-013-001
****
13.6
What may happen if an FM transmitter is operated with the microphone gain or deviation control set too high?

- It may cause digital interference to computer equipment
- It may cause atmospheric interference in the air around the antenna
- It may cause interference to other stations operating on a higher frequency band
- It may cause interference to other stations operating near its frequency

< It may cause interference to other stations operating near its frequency >

B-003-013-002
****
11.4
What may your FM hand-held or mobile transceiver do if you shout into its microphone and the deviation adjustment is set too high?

- It may cause atmospheric interference in the air around the antenna
- It may cause interference to other stations operating on a higher frequency band
- It may cause interference to other stations operating near its frequency
- It may cause digital interference to computer equipment

< It may cause interference to other stations operating near its frequency >

B-003-013-003
****
11.4
What can you do if you are told your FM hand-held or mobile transceiver is overdeviating?

- Let the transceiver cool off
- Change to a higher power level
- Talk farther away from the microphone
- Talk louder into the microphone

< Talk farther away from the microphone >

B-003-013-004
****
13.6
What kind of emission would your FM transmitter produce if its microphone failed to work?

- A phase-modulated carrier
- An unmodulated carrier
- A frequency-modulated carrier
- An amplitude-modulated carrier

< An unmodulated carrier >

B-003-013-005
****
13.6
Why is FM voice best for local VHF/UHF radio communications?

- It is more resistant to distortion caused by reflected signals
- Its RF carrier stays on frequency better than the AM modes
- It provides good signal plus noise to noise ratio at low RF signal levels
- The carrier is not detectable

< It provides good signal plus noise to noise ratio at low RF signal levels >

B-003-013-006
****
13.7
What is the usual bandwidth of a frequency-modulated amateur signal for +/- 5 kHz deviation?

- Between 5 and 10 kHz
- Greater than 20 kHz
- Between 10 and 20 kHz
- Less than 5 kHz

< Between 10 and 20 kHz >

B-003-013-007
****
11.4
What is the result of overdeviation in an FM transmitter?

- Increased transmitter range
- Poor carrier suppression
- Out-of-channel emissions
- Increased transmitter power

< Out-of-channel emissions >

B-003-013-008
****
13.6, 13.11
What emission is produced by a reactance modulator connected to an RF power amplifier?

- Phase modulation
- Multiplex modulation
- Amplitude modulation
- Pulse modulation

< Phase modulation >

B-003-013-009
****
13.7
Why isn't frequency modulated (FM) phone used below 28.0 MHz?

- The bandwidth would exceed limits in the Regulations
- The transmitter efficiency for this mode is low
- Harmonics could not be attenuated to practical levels
- The frequency stability would not be adequate

< The bandwidth would exceed limits in the Regulations >

B-003-013-010
****
11.4
You are transmitting FM on the 2 metre band. Several stations advise you that your transmission is loud and distorted. A quick check with a frequency counter tells you that the transmitter is on the proper frequency. Which of the following is the most probable cause of the distortion?

- The repeater is reversing your sidebands
- The frequency counter is giving an incorrect reading and you are indeed off frequency
- The frequency deviation of your transmitter is set too high
- The power supply output voltage is low

< The frequency deviation of your transmitter is set too high >

B-003-013-011
****
12.4BSG8: 12.5BSG9
FM receivers perform in an unusual manner when two or more stations are present. The loudest signal, even though it is only two or three times as stronger than the other signals, will be the only transmission demodulated. This is called:

- attach effect
- interference effect
- surrender effect
- capture effect

< capture effect >

3-14 Station accessories for telegraphy, radiotelephony, digital modes

B-003-014-001
****
11.13
What do many amateurs use to help form good Morse code characters?

- A key-operated on/off switch
- A notch filter
- A DTMF keypad
- An electronic keyer

< An electronic keyer >

B-003-014-002
****
11.15
Where would you connect a microphone for voice operation?

- To a transceiver
- To a power supply
- To an antenna switch
- To an antenna

< To a transceiver >

B-003-014-003
****
11.15
What would you connect to a transceiver for voice operation?

- A microphone
- A receiver audio filter
- A terminal-voice controller
- A splatter filter

< A microphone >

B-003-014-004
****
11.6BSG8; 11.6.5BSG9
Why might a dummy antenna get warm when in use?

- Because it stores electric current
- Because it changes RF energy into heat
- Because it absorbs static electricity
- Because it stores radio waves

< Because it changes RF energy into heat >

B-003-014-005
****
11.4BSG8; 11.4, 11.7.1BSG9
What is the circuit called which causes a transmitter to automatically transmit when an operator speaks into its microphone?

- VFO
- VOX
- VXO
- VCO

< VOX >

B-003-014-006
****
11.8
What is the reason for using a properly adjusted speech processor with a single-sideband phone transmitter?

- It reduces average transmitter power requirements
- It reduces unwanted noise pickup from the microphone
- It improves voice frequency fidelity
- It improves signal intelligibility at the receiver

< It improves signal intelligibility at the receiver >

B-003-014-007
****
11.8
If a single-sideband phone transmitter is 100% modulated, what will a speech processor do to the transmitter's power?

- It will increase the output PEP
- It will decrease the peak power output
- It will decrease the average power output
- It will add nothing to the output Peak Envelop Power (PEP)

< It will add nothing to the output Peak Envelop Power (PEP)>

B-003-014-008
****
13.14
When switching from receive to transmit:

- the receiver should be muted
- the transmit oscillator should be turned off
- the receiving antenna should be connected
- the power supply should be off

< the receiver should be muted >

B-003-014-009
****
13.14
A switching system to enable the use of one antenna for a transmitter and receiver should also:

- disconnect the antenna tuner
- disable the unit not being used
- ground the antenna on receive
- switch between meters

< disable the unit not being used >

B-003-014-010
****
13.14
An antenna changeover switch in a transmitter-receiver combination is necessary:

- to prevent RF currents entering the receiver circuits
- to allow more than one transmitter to be used
- so that one antenna can be used for transmitter and receiver
- to change antennas for operation on other frequencies

< so that one antenna can be used for transmitter and receiver >

B-003-014-011
****
11.15
Which of the following components could be used as a dynamic microphone?

- Capacitor
- Loudspeaker
- Crystal earpiece
- Resistor

< Loudspeaker >

3-15 Digital mode fundamentals (RTTY, ASCII, AMTOR, packet)

B-003-015-001
****
12.9BSG8; 12.7.3BSG9
What does “connected” mean in an AX.25 packet-radio link?

- A telephone link is working between two stations
- A message has reached an amateur station for local delivery
- A transmitting and receiving station are using a digipeater, so no other contacts can take place until they are finished
- A transmitting station is sending data to only one receiving station; it replies that the data is being received correctly

< A transmitting station is sending data to only one receiving station; it replies that the data is being received correctly >

B-003-015-002
****
12.9BSG8; 12.7.3BSG9
What does “monitoring” mean on a packet-radio frequency?

- Industry Canada is monitoring all messages
- A receiving station is displaying messages that may not be sent to it, and is not replying to any message
- A member of the Amateur Auxiliary is copying all messages
- A receiving station is displaying all messages sent to it, and replying that the messages are being received correctly

< A receiving station is displaying messages that may not be sent to it, and is not replying to any message >

B-003-015-003
****
12.9BSG8; 12.7.3BSG9
What is a digipeater?

- A repeater built using only digital electronics parts
- A repeater that changes audio signals to digital data
- A station that retransmits any data that it receives
- A station that retransmits only data that is marked to be retransmitted

< A station that retransmits only data that is marked to be retransmitted >

B-003-015-004
****
12.9BSG8; 12.7.3BSG9
What does “network” mean in packet radio?

- The connections on terminal-node controllers
- The programming in a terminal-node controller that rejects other callers if a station is already connected
- A way of connecting packet-radio stations so data can be sent over long distances
- A way of connecting terminal-node controllers by telephone so data can be sent over long distances

< A way of connecting packet-radio stations so data can be sent over long distances >

B-003-015-005
****
11.14, 12.9BSG8; 11.14, 12.7.3, 12.7.4BSG9
In an AX.25 packet-radio operation, what equipment connects to a terminal-node controller?

- A DTMF keypad, a monitor and a transceiver
- A DTMF microphone, a monitor and a transceiver
- A transceiver, a computer and possibly a GPS system
- A transceiver and a modem

< A transceiver, a computer and possibly a GPS system >

B-003-015-006
****
12.9BSG8; 12.7.3BSG9
How would you modulate a 2 meter FM transceiver to produce packet-radio emissions?

- Connect a terminal-node controller to the transceiver's microphone input
- Connect a terminal-node controller to interrupt the transceiver's carrier wave
- Connect a keyboard to the transceiver's microphone input
- Connect a DTMF keypad to the transceiver's microphone input

< Connect a terminal-node controller to the transceiver's microphone input >

B-003-015-007
****
12.9BSG8; 12.7.2BSG9
When selecting a RTTY transmitting frequency, what minimum frequency separation from a contact in progress should you allow (center to center) to minimize interference?

- Approximately 6 kHz
- Approximately 3 kHz
- 60 Hz
- 250 to 500 Hz

< 250 to 500 Hz >

B-003-015-008
****
12.9BSG8; 12.7.1BSG9
Digital transmissions use signals called _____to transmit the states 1 and 0

- dot and dash
- mark and space
- packet and AMTOR
- Baudot and ASCII

< mark and space >

B-003-015-009
****
12.9BSG8; 12.7.2BSG9
Which of the following terms does not apply to packet?

- Baudot
- ASCII
- Automatic Packet Reporting System (APRS)
- AX.25

< Baudot >

B-003-015-010
****
12.9BSG8; 12.7.5BSG9
When using AMTOR transmissions, there are two modes that may be utilized. Mode A uses Automatic Repeat Request (ARQ) protocol and is normally used

- for communications after contact has been established
- at all times. Mode B is for test purposes only
- only when communications have been completed
- when making a general call

< for communications after contact has been established >

B-003-015-011
****
13.4
With a digital communication mode based on a computer sound card, what is the result of feeding too much audio in the transceiver?

- Power amplifier overheating
- Splatter or out of channel emissions
- Higher signal-to-noise ratio
- Lower error rate

< Splatter or out of channel emissions >

You are causing overmodulation. The source of the audio is a "red herring".

3-16 Cells and batteries, types, ratings, charging

B-003-016-001
****
2.13BSG8; 2.14BSG9
How much voltage does a standard automobile battery usually supply?

- About 9 volts
- About 12 volts
- About 240 volts
- About 120 volts

< About 12 volts >

B-003-016-002
****
2.13 BSG8; 2.14BSG9
Which component has a positive and a negative side?

- A fuse
- A resistor
- A battery
- A potentiometer

< A battery >

B-003-016-003
****
2.13BSG8; 2.14BSG9
A cell, that can be repeatedly recharged by supplying it with electrical energy, is known as a:

- primary cell
- storage cell
- low leakage cell
- memory cell

< storage cell >

B-003-016-004
****
2.13 BSG8; 2.14BSG9
Which of the following is a source of electromotive force (EMF)?

- germanium diode
- P channel FET
- carbon resistor
- lithium-ion battery

< lithium-ion battery >

B-003-016-005
****
2.13BSG8; 2.14BSG9
An important difference between a conventional flashlight battery and a lead acid battery is that only the lead acid battery:

- has two terminals
- can be completely discharged
- contains an electrolyte
- can be repeatedly recharged

< can be repeatedly recharged >

B-003-016-006
****
2.13BSG8; 2.14BSG9
An alkaline cell has a nominal voltage of 1.5 volts. When supplying a great deal of current, the voltage may drop to 1.2 volts. This is due to the cell's:

- voltage capacity
- internal resistance
- electrolyte becoming dry
- current capacity

< internal resistance >

B-003-016-007
****
2.13BSG8; 2.14BSG9
An inexpensive primary cell in use today is the carbon-zinc or flashlight cell. This cell can be recharged:

- never
- twice
- many times
- once

< never >

B-003-016-008
****
2.13BSG8; 2.14BSG9
Battery capacity is commonly stated as a value of current delivered over a specified period of time. What is the effect of exceeding that specified current?

- The battery will accept the subsequent charge in a shorter time
- The voltage delivered will be higher
- A battery charge will not last as long
- The internal resistance of the cell is short-circuited

< A battery charge will not last as long >

The easiest way to exceed the specified period of time is to connect the two terminals, + and -, with a conductor such as a wire. You can accomplish the same thing by putting a charged battery pack from a portable VHF transceiver in your pocket with a handful of change – not! With no external load attached, the current flow is excessive and the internal resistance becomes the load, quickly converting the energy into heat. Higher currents cause more heating according to the power formula $P = I^2R$.

B-003-016-009
****
2.13BSG8; 2.14BSG9
To increase the current capacity of a cell, several cells should be connected in:

- parallel
- series
- parallel resonant
- series resonant

< parallel >

B-003-016-010
****
2.13BSG8; 2.14BSG9
To increase the voltage output, several cells are connected in:

- parallel
- series-parallel
- resonance
- series

< series >

B-003-016-011
****
2.13BSG8; 2.14BSG9
A lithium-ion battery should never be:

- short-circuited
- recharged
- left disconnected
- left overnight at room temperature

< short-circuited >

The comment made about Ni-Cad cells in S2.13 applies also to lithium-ion cells.

The easiest way to exceed the specified period of time is to connect the two terminals, + and -, with a conductor such as a wire. You can accomplish the same thing by putting a charged battery pack from a portable VHF transceiver in your pocket with a handful of change – not! With no external load attached, the current flow is excessive and the internal resistance becomes the load, quickly converting the energy into heat. Higher currents cause more heating according to the power formula $P = I^2R$.

3-17 Power supply fundamentals

B-003-017-001
****
If your mobile transceiver works in your car but not in your home, what should you check first?

- The power supply
- The speaker
- The microphone
- The SWR meter

< The power supply >

B-003-017-002
****
10.1
What device converts household current to 12 volts DC?

- A low pass filter
- An RS-0232 interface
- A catalytic converter
- A power supply

< A power supply >

B-003-017-003
****
10.2
Which of these usually needs a high current capacity power supply?

- A receiver
- An SWR meter
- A transceiver
- An antenna switch

< A transceiver >

B-003-017-004
****
10.4
What may cause a buzzing or hum in the signal of an AC-powered transmitter?

- Energy from another transmitter
- Bad design of the transmitter's RF power output circuit
- A bad filter capacitor in the transmitter's power supply
- Using an antenna which is the wrong length

< A bad filter capacitor in the transmitter's power supply >

B-003-017-005
****
10.2
A power supply is to supply DC at 12 volts at 5 amperes. The power transformer should be rated higher than:

- 6 watts
- 60 watts
- 17 watts
- 2.4 watts

< 60 watts >

> *$P = EI$, so this power supply has a rating of 12 x 5 = 60 watts output. So your transformer would have to be rated higher than 60 watts. Note the units used here.*

B-003-017-006
****
9.2

The diode is an important part of a simple power supply. It converts AC to DC, since it:

- has a high resistance to DC but not to AC
- allows electrons to flow in only one direction from anode to cathode
- allows electrons to flow in only one direction from cathode to anode
- has a high resistance to AC but not to DC

< allows electrons to flow in only one direction from cathode to anode >

B-003-017-007
****
10.1
To convert AC to pulsating DC, you could use a:

- diode
- transformer
- capacitor
- resistor

< diode >

B-003-017-008
****
16.1
Power-line voltages have been made standard over the years and the voltages generally supplied to homes are approximately:

- 120 and 240 volts
- 110 and 220 volts
- 100 and 200 volts
- 130 and 260 volts

< 120 and 240 volts >

AC Voltages supplied to homes can be as low as 100/200 V and as high as 130/260V. This is further complicated by frequent references to 115 V and 220 V. So simply remember the answer that IC wants, "120 and 240 volts".

B-003-017-009
****
2.7; 3.5
Your mobile HF transceiver draws 22 amperes on transmit. The manufacturer suggests limiting the voltage drop to 0.5 volt and the vehicle battery is 3 metres (10 feet) away. Given the losses below at that current, which minimum wire gauge must you use?

- Number 8, 0.05 V per metre (0.01 V per foot)
- Number 12, 0.11 V per metre (0.03 V per foot)
- Number 14, 0.19 V per metre (0.06 V per foot)
- Number 10, 0.07 V per metre (0.02 V per foot)

< Number 10, 0.07 V per metre (0.02 V per foot)>

*Assume that the transceiver is being fed by twin lead, a B+ line and a ground line. So we **double** all the lengths. The voltage drop calculation is (**length**) x (**V/unit length**). Using metres, 12 gauge has a voltage drop of (0.11) x (6) = 0.0.66 V. Similarly, for 8 gauge, the voltage drop would be 0.30 V; for 10 gauge, 0.42 V; for 14 gauge, 1.04 V. We can scrap 12 and 14 gauge as each exceeds the limit of 0.5 V. The larger the gauge number, the smaller the diameter and the lower the cost so 10 gauge wins. The key word is "minimum".*

B-003-017-010
****
16.3
Why are fuses needed as close as possible to the vehicle battery when wiring a transceiver directly to the battery?

- To protect the radio from transient voltages
- To prevent an overcurrent from starting a fire
- To prevent interference to the vehicle's electronic systems
- To reduce the voltage drop in the radio's DC supply

< To prevent an overcurrent from starting a fire >

Fuses are installed as a safety precaution!!!

B-003-017-011
****
10.4
You have a very loud low-frequency hum appearing on your transmission. In what part of the transmitter would you first look for the trouble?

- The driver circuit
- The power amplifier circuit
- The power supply
- The variable-frequency oscillator

< The power supply >

3-18 Electrical hazards, electrical safety, security

B-003-018-001
****
11.5
How could you best keep unauthorized persons from using your amateur station at home?

- Put a “Danger - High Voltage” sign in the station
- Put fuses in the main power line
- Use a key-operated on/off switch in the main power line
- Use a carrier-operated relay in the main power line

< Use a key-operated on/off switch in the main power line >

B-003-018-002
****
11.5
How could you best keep unauthorized persons from using a mobile amateur station in your car?

- Turn the radio off when you are not using it
- Put a “Do not touch” sign on the radio
- Disconnect the microphone when you are not using it
- Tune the radio to an unused frequency when you are done using it

< Disconnect the microphone when you are not using it >

B-003-018-003
****
11.5
Why would you use a key-operated on/off switch in the main power line of your station?

- For safety, to turn off the station in the event of an emergency
- To keep unauthorized persons from using your station
- For safety, in case the main fuses fail
- To keep the power company from turning of your electricity during an emergency

< To keep unauthorized persons from using your station >

B-003-018-004
****
16.4
Why would there be a switch in a high-voltage power supply to turn off the power if its cabinet is opened?

- To keep dangerous RF radiation from leaking out through an open cabinet
- To keep dangerous RF radiation from coming in through an open cabinet
- To turn the power supply off when it is not being used
- To keep anyone opening the cabinet from getting shocked by dangerous high voltages

< To keep anyone opening the cabinet from getting shocked by dangerous high voltages >

B-003-018-005
****
16.5
How little electrical current flowing through the human body can be fatal?

- More than 20 amperes
- Current flow through the human body is never fatal
- As little as 20 milliamperes
- Approximately 10 amperes

< As little as 20 milliamperes >

B-003-018-006
****
16.5
Which body organ can be fatally affected by a very small amount of electrical current?

- The liver
- The lungs
- The heart
- The brain

< The heart >

B-003-018-007
****
16.5
What is the minimum voltage which is usually dangerous to humans?

- 2000 volts
- 30 volts
- 100 volts
- 1000 volts

< 30 volts >

B-003-018-008
****
16.5
What should you do if you discover someone who is being burned by high voltage?

- Immediately drag the person away from the high voltage
- Run from the area so you won't be burned too
- Turn off the power, call for emergency help and provide first-aid if needed
- Wait for a few minutes to see if the person can get away from the high voltage on their own, then try to help

< Turn off the power, call for emergency help and provide first-aid if needed >

B-003-018-009
****
16.5
What is the safest method to remove an unconscious person from contact with a high voltage source?

- Call an electrician
- Remove the person by pulling an arm or a leg
- Turn off the high voltage switch before removing the person from contact with the source
- Wrap the person in a blanket and pull him to a safe area

< Turn off the high voltage switch before removing the person from contact with the source >

B-003-018-010
****
16.4
Before checking a fault in a mains operated power supply unit, it would be safest to FIRST:

- check action of capacitor bleeder resistance
- remove and check fuse from power supply
- turn off the power and remove power plug
- short out leads of filter capacitor

< turn off the power and remove power plug >

B-003-018-011
****
16.4
Fault finding in a power supply of an amateur transmitter while the supply is operating is not a recommended technique because of the risk of:

- overmodulation
- blowing the fuse
- electric shock
- damaging the transmitter

< electric shock >

3-19 Electrical safety ground, capacitor discharge, fuse replacement

B-003-019-001
****
16.2
For best protection from electrical shock, what should be grounded in an amateur station?

- All station equipment
- The antenna transmission line
- The AC power line
- The power supply primary

< All station equipment >

B-003-019-002
****
16.2
If a separate ground system is not possible for your amateur station, an alternative indoor grounding point could be:

- a metallic cold water pipe
- a plastic cold water pipe
- a window screen
- a metallic natural gas pipe

< a metallic cold water pipe >

B-003-019-003
****
16.2
To protect you against electrical shock, the chassis of each piece of your station equipment should be connected to:

- a dummy load
- insulated shock mounts
- the antenna
- a good ground connection

< a good ground connection >

B-003-019-004
****
16.2
Which of these materials is best for a ground rod driven into the earth?

- Iron or steel
- Fiberglass
- Copper-clad steel
- Hard plastic

< Copper-clad steel >

B-003-019-005
****
16.2
If you ground your station equipment to a ground rod driven into the earth, what is the shortest length the rod should be?

- 1.2 metre (4 ft.)
- 2.5 metres (8 ft.)
- 3 metres (10 ft.)
- The station ground system must conform to applicable electrical code requirements

< The station ground system must conform to applicable electrical code requirements >

> *Answer "3 metres (10 ft.)" used to be the correct answer. As codes change from province to province, IC has elected to move to "The station ground system must conform to applicable electrical code requirements" as the correct answer.*

B-003-019-006
****
16.2
Where should the green wire in a three-wire AC line cord be connected in a power supply?

- To the fuse
- To the chassis
- To the white wire
- To the "hot" side of the power switch

< To the chassis >

B-003-019-007
****
16.2
If your third-floor amateur station has a ground wire running 10 metres (33 feet) down to a ground rod, why might you get an RF burn if you touch the front panel of your HF transceiver?

- Because the transceiver's heat-sensing circuit is not working to start the cooling fan
- Because the ground rod is not making good contact with moist earth
- Because the ground wire has significant reactance and acts more like an antenna than an RF ground connection
- Because of a bad antenna connection, allowing the RF energy to take an easier path out of the transceiver through you

< Because the ground wire has significant reactance and acts more like an antenna than an RF ground connection >

B-003-019-008
****
16.2
What is one good way to avoid stray RF energy in your amateur station?

- Use a beryllium ground wire for best conductivity
- Keep the station's ground wire as short as possible
- Make a couple of loops in the ground wire where it connects to your station
- Drive the ground rod at least 4m (14 feet) into the ground

< Keep the station's ground wire as short as possible >

B-003-019-009
****
16.2
Which statement about station grounding is TRUE?

- If the chassis of all station equipment is connected with a good conductor, there is no need to tie them to an earth ground
- The chassis of each piece of station equipment should be tied together with high-impedance conductors
- RF hotspots can occur in a station located above the ground floor if the equipment is grounded by a long ground wire
- A ground loop is an effective way to ground station equipment

< RF hotspots can occur in a station located above the ground floor if the equipment is grounded by a long ground wire >

B-003-019-010
****
16.2
On mains operated power supplies, the ground wire should be connected to the metal chassis of the power supply. This ensures, in case there is a fault in the power supply, that the chassis:

- develops a high voltage compared to the ground
- does not develop a high voltage with respect to the ground
- does not become conductive to prevent electric shock
- becomes conductive to prevent electric shock

< does not develop a high voltage with respect to the ground >

B-003-019-011
****
16.2
The purpose of using a three-wire power cord and plug on amateur radio equipment is to:

- prevent the plug from being reversed in the wall outlet
- prevent internal short circuits
- make it inconvenient to use
- prevent the chassis from becoming live

< prevent the chassis from becoming live >

3-20 Antenna and tower safety, lightning protection

B-003-020-001
****
16.8
Why should you ground all antenna and rotator cables when your amateur station is not in use?

- To lock the antenna system in one position
- To avoid radio frequency interference
- To make sure everything will stay in place
- To protect the station equipment and building from lightning damage

< To protect the station equipment and building from lightning damage >

B-003-020-002
****
16.8
You want to install a lightning arrestor on your antenna transmission line, where should it be inserted?

- Anywhere on the line
- Outside, as close to the to the earth grounding as possible
- Close to the antenna
- Behind the transmitter

< Outside, as close to the to the earth grounding as possible >

B-003-020-003
****
16.8
How can amateur station equipment best be protected from lightning damage?

- Never turn off the equipment
- Disconnect the ground system from all radios
- Disconnect all equipment from the power lines and antenna cables
- Use heavy insulation on the wiring

< Disconnect all equipment from the power lines and antenna cables >

B-003-020-004
****
16.7
What equipment should be worn for working on an antenna tower?

- A grounding chain
- Approved equipment in accordance with applicable standards concerning fall protection
- A reflective vest of approved color
- A flashing red, yellow or white light

< Approved equipment in accordance with applicable standards concerning fall protection >

B-003-020-005
****
16.7
Why should you wear approved fall arrest equipment if you are working on an antenna tower?

- To keep the tower from becoming unbalanced while you are working
- To safely hold your tools so they don't fall and injure someone on the ground
- To prevent you from accidentally falling
- To safely bring any tools you might use up and down the tower

< To prevent you from accidentally falling >

B-003-020-006
****
16.6
For safety, how high should you place a horizontal wire antenna?

- As close to the ground as possible
- High enough so that no one can touch any part of it from the ground
- Above high-voltage electrical lines
- Just high enough so you can easily reach it for adjustments or repairs

< High enough so that no one can touch any part of it from the ground >

B-003-020-007
****
16.7
Why should you wear a hard hat if you are on the ground helping someone work on an antenna tower?

- So someone passing by will know that work is being done on the tower and will stay away
- To protect your head from something dropped from the tower
- So you won't be hurt if the tower should accidentally fall
- To keep RF energy away from your head during antenna testing

< To protect your head from something dropped from the tower >

B-003-020-008
****
16.6
Why should your outside antennas be high enough so that no one can touch them while you are transmitting?

- Touching the antenna might radiate harmonics
- Touching the antenna might cause television interference
- Touching the antenna might cause RF burns
- Touching the antenna might reflect the signal back to the transmitter and cause damage

< Touching the antenna might cause RF burns >

B-003-020-009
****
16.6
Why should you make sure that no one can touch an open wire transmission line while you are transmitting with it?

- Because contact might cause a short circuit and damage the transmitter
- Because high-voltage radio energy might burn the person
- Because contact might break the transmission line
- Because contact might cause spurious emissions

< Because high-voltage radio energy might burn the person >

B-003-020-010
****
16.9
What safety precautions should you take before beginning repairs on an antenna?

- Turn off the main power switch in your house
- Be sure to turn off the transmitter and disconnect the transmission line
- Be sure you and the antenna structure are grounded
- Inform your neighbors so they are aware of your intentions

< Be sure to turn off the transmitter and disconnect the transmission line >

B-003-020-011
****
16.6
What precaution should you take when installing a ground-mounted antenna?

- It should not be installed in a wet area
- It should not be installed higher than you can reach
- It should be installed so no one can come in contact with it
- It should be painted so people or animals do not accidentally run into it

< It should be installed so no one can come in contact with it >

3-21 Exposure of human body to RF, safety precautions

B-003-021-001
****
16.9
What should you do for safety when operating at UHF and microwave frequencies?

- Keep antenna away from your eyes when RF is applied
- Make sure that an RF leakage filter is installed at the antenna feed point
- Make sure the standing wave ratio is low before you conduct a test
- Never use a horizontally polarized antenna

< Keep antenna away from your eyes when RF is applied >

B-003-021-002
****
16.9
What should you do for safety if you put up a UHF transmitting antenna?

- Make sure the antenna is near the ground to keep its RF energy pointing in the correct direction
- Make sure you connect an RF leakage filter at the antenna feed point
- Make sure that RF field screens are in place
- Make sure the antenna will be in a place where no one can get near it when you are transmitting

< Make sure the antenna will be in a place where no one can get near it when you are transmitting >

B-003-021-003
****
16.9
What should you do for safety, before removing the shielding on a UHF power amplifier?

- Make sure the amplifier cannot accidentally be turned on
- Make sure that RF leakage filters are connected
- Make sure the antenna transmission line is properly grounded
- Make sure all RF screens are in place at the antenna transmission line

< Make sure the amplifier cannot accidentally be turned on >

B-003-021-004
****
16.9
Why should you make sure the antenna of a hand-held transceiver is not close to your head when transmitting?

- To keep static charges from building up
- To help the antenna radiate energy equally in all directions
- To reduce your exposure to the radio-frequency energy
- To use your body to reflect the signal in one direction

< To reduce your exposure to the radio-frequency energy >

B-003-021-005
****
16.9
How should you position the antenna of a hand-held transceiver while you are transmitting?

- Away from your head and away from others
- Pointed towards the station you are contacting
- Pointed away from the station you are contacting
- Pointed down to bounce the signal off the ground

< Away from your head and away from others >

B-003-021-006
****
16.9
How can exposure to a large amount of RF energy affect body tissue?

- It paralyzes the tissue
- It causes hair to fall out
- It heats the tissue
- It lowers blood pressure

< It heats the tissue >

B-003-021-007
****
16.9
Which body organ is the most likely to be damaged from the heating effects of RF radiation?

- Eyes
- Heart
- Liver
- Hands

< Eyes >

B-003-021-008
****
16.9
Depending on the wavelength of the signal, the energy density of the RF field, and other factors, in what way can RF energy affect body tissue?

- It has no effect on the body
- It heats the tissue
- It causes ionizing radiation poisoning
- It causes blood flow to stop

< It heats the tissue >

B-003-021-009
****
16.9
If you operate your amateur station with indoor antennas, what precautions should you take when you install them?

- Locate the antennas close to your operating position to minimize transmission line length
- Locate the antennas as far away as possible from living spaces that will be occupied while you are operating
- Position the antennas parallel to electrical power wires to take advantage of parasitic effects
- Position the antennas along the edge of a wall where it meets the floor or ceiling to reduce parasitic radiation

< Locate the antennas as far away as possible from living spaces that will be occupied while you are operating >

B-003-021-010
****
16.6
Why should directional high-gain antennas be mounted higher than nearby structures?

- So they will be dried by the wind after a heavy rain storm
- So they will not damage nearby structures with RF energy
- So they will receive more sky waves and fewer ground waves
- So they will not direct RF energy toward people in nearby structures

< So they will not direct RF energy toward people in nearby structures >

B-003-021-011
****
16.6
For best RF safety, where should the ends and center of a dipole antenna be located?

- Close to the ground so simple adjustments can be easily made without climbing a ladder
- As high as possible to prevent people from coming in contact with the antenna
- Near or over moist ground so RF energy will be radiated away from the ground
- As close to the transmitter as possible so RF energy will be concentrated near the transmitter

< As high as possible to prevent people from coming in contact with the antenna >

Circuit Components - 004

4-1 Amplifier fundamentals

B-004-001-001
****
13.9
A circuit designed to increase the level of its input signal is called:

- a modulator
- an oscillator
- a receiver
- an amplifier

< an amplifier >

B-004-001-002
****
13.12
If an amplifier becomes non-linear, the output signal would:

- cause oscillations
- overload the power supply
- become distorted
- be saturated

< become distorted >

B-004-001-003
****
14.7
To increase the level of very weak radio signals from an antenna, you would use:

- an audio amplifier
- an RF amplifier
- an RF oscillator
- an audio oscillator

< an RF amplifier >

B-004-001-004
****
13.10
To increase the level of very weak signals from a microphone you would use:

- an RF oscillator
- an RF amplifier
- an audio oscillator
- an audio amplifier

< an audio amplifier >

B-004-001-005
****
13.10
The range of frequencies to be amplified by a speech amplifier is typically:

- 3 to 300 Hz
- 300 to 1000 Hz
- 40 to 40 000 Hz
- 300 to 3000 Hz

<300 to 3000 Hz >

B-004-001-006
****
9.5
Which of the following is NOT amplified by an amplifier?

- Voltage
- Resistance
- Current
- Power

< Resistance >

B-004-001-007
****
9.5
The increase in signal level by an amplifier is called:

- modulation
- gain
- attenuation
- amplitude

< gain >

B-004-001-008
****
9.5
A device with gain has the property of:

- modulation
- amplification
- attenuation
- oscillation

< amplification >

B-004-001-009
****
9.5
A device labeled “Gain = 10 dB” is likely to be an:

- audio fader
- amplifier
- attenuator
- oscillator

< amplifier >

B-004-001-010
****
9.5
Amplifiers can amplify:

- voltage, current, or inductance
- voltage, current, or power
- current, power, or inductance
- voltage, power, or inductance

< voltage, current, or power >

B-004-001-011
****
9.5/9.6
Which of the following is not a property of an amplifier?

- Loss
- Gain
- Linearity
- Distortion

< Loss >

4-2 Diode fundamentals

B-004-002-001
****
9.2
Zener diodes are used as:

- current regulators
- RF detectors
- AF detectors
- voltage regulators

< voltage regulators >

B-004-002-002
****
14.6
One important application for diodes is recovering information from transmitted signals. This is referred to as:

- regeneration
- ionization
- biasing
- demodulation

< demodulation >

B-004-002-003
****
9.2
The primary purpose of a Zener diode is to:

- regulate or maintain a constant voltage
- provide a voltage phase shift
- to boost the power supply voltage
- provide a path through which current can flow

< regulate or maintain a constant voltage >

B-004-002-004
****
10.1
The action of changing alternating current to direct current is called:

- rectification
- amplification
- transformation
- modulation

< rectification >

B-004-002-005
****
9.2
The electrodes of a semi-conductor diode are known as:

- anode and cathode
- gate and source
- collector and base
- cathode and drain

< anode and cathode >

B-004-002-006
****
10.1
If alternating current is applied to the anode of a diode, what would you expect to see at the cathode?

- Pulsating alternating current
- Pulsating direct current
- No signal
- Steady direct current

< Pulsating direct current >

B-004-002-007
****
9.2
In a semi-conductor diode, electrons flow from:

- cathode to grid
- grid to anode
- cathode to anode
- anode to cathode

< cathode to anode >

B-004-002-008
****
9.2
What semi-conductor device glows different colours depending upon its chemical composition?

- A neon bulb
- A vacuum diode
- A light-emitting diode
- A fluorescent bulb

< A light-emitting diode >

B-004-002-009
****
9.2
Voltage regulation is the principal application of the:

- light-emitting diode
- vacuum diode
- Zener diode
- junction diode

< Zener diode >

B-004-002-010
****
9.2
In order for a diode to conduct, it must be:

- reverse-biased
- forward-biased
- close coupled
- enhanced

< forward-biased >

4-3 Bipolar transistor fundamentals

B-004-003-001
****
9.5
Which component can amplify a small signal using low voltages?

- A multiple-cell battery
- A PNP transistor
- A variable resistor
- An electrolytic capacitor

< A PNP transistor >

B-004-003-002
****
9.5
The basic semiconductor amplifying device is the:

- tube
- P-N junction
- diode
- transistor

< transistor >

B-004-003-003
****
9.3
The three leads from a PNP transistor are named:

- collector, source and drain
- gate, source and drain
- collector, emitter and base
- drain, base and source

< collector, emitter and base >

B-004-003-004
****
9.5
If a low level signal is placed at the input to a transistor, a higher level of signal is produced at the output lead. This effect is known as:

- rectification
- amplification
- detection
- modulation

< amplification >

B-004-003-005
****
9.3
Bipolar transistors usually have:

- 2 leads
- 4 leads
- 3 leads
- 1 lead

< 3 leads >

B-004-003-006
****
9.3
A semi-conductor is described as a “general purpose audio NPN device”. This would be:

- a bipolar transistor
- a silicon diode
- a triode
- an audio detector

< a bipolar transistor >

B-004-003-007
****
9.3
The two basic types of bipolar transistors are:

- varicap and Zener types
- P and N channel types
- NPN and PNP types
- diode and triode types

< NPN and PNP types >

B-004-003-008
****
9.6
A transistor can be destroyed in a circuit by:

- saturation
- cut-off
- excessive heat
- excessive light

< excessive heat >

B-004-003-009
****
9.9
In a bipolar transistor, the _____ compares closest to the control grid of a triode vacuum tube.

- collector
- base
- emitter
- source

< base >

B-004-003-010
****
9.9
In a bipolar transistor, the _____ compares closest to the plate of a triode vacuum tube.

- gate
- emitter
- base
- collector

< collector >

B-004-003-011
****
9.9
In a bipolar transistor, the _____ compares closest to the cathode of a triode vacuum tube.

- emitter
- collector
- base
- drain

< emitter >

4-4 Field-effect transistor fundamentals

B-004-004-001
****
9.4
The two basic types of field effect transistors (FET) are:

- inductive and capacitive
- N and P channel
- NPN and PNP
- germanium and silicon

< N and P channel >

B-004-004-002
****
9.4
A semi-conductor having its leads labeled gate, drain, and source is best described as a:

- silicon diode
- field-effect transistor
- gated transistor
- bipolar transistor

< field-effect transistor >

B-004-004-003
****
9.4
In a field effect transistor, the_____ is the terminal that controls the conductance of the channel.

- drain
- source
- collector
- gate

< gate >

B-004-004-004
****
9.4
In a field effect transistor, the _____ is the terminal where the charge carriers enter the channel.

- emitter
- source
- gate
- drain

< source >

B-004-004-005
****
9.4
In a field effect transistor, the _____ is the terminal where the charge carriers leave the channel.

- collector
- source
- gate
- drain

< drain >

B-004-004-006
****
9.9
Which semiconductor device has characteristics most similar to a triode vacuum tube?

- Bipolar transistor
- Field effect transistor
- Junction diode
- Zener diode

< Field effect transistor >

B-004-004-007
****
9.4
The control element in the field effect transistor is the:

- gate
- source
- drain
- base

< gate >

B-004-004-008
****
9.4
If you wish to reduce the current flowing in a field effect transistor, you could:

- decrease the reverse bias voltage
- increase the forward bias voltage
- increase the forward bias gain
- increase the reverse bias voltage

< increase the reverse bias voltage >

B-004-004-009
****
9.9
The source of a field effect transistor corresponds to the _____ of a bipolar transistor.

- base
- drain
- collector
- emitter

< emitter >

B-004-004-010
****
9.9
The drain of a field effect transistor corresponds to the _____ of a bipolar transistor.

- base
- source
- emitter
- collector

< collector >

B-004-004-011
****
9.5
Which two elements in a field effect transistor exhibit fairly similar characteristics?

- Source and base
- Source and drain
- Source and gate
- Gate and drain

< Source and drain >

4-5 Triode vacuum tube fundamentals

B-004-005-001
****
9.9
What is one reason a triode vacuum tube might be used instead of a transistor in a circuit?

- It is much smaller
- It uses lower voltages
- It may be able to handle higher power
- It uses less current

< It may be able to handle higher power >

B-004-005-002
****
9.9
Which component can amplify a small signal but must use high voltages?

- A multiple-cell battery
- A vacuum tube
- A transistor
- An electrolytic capacitor

< A vacuum tube >

B-004-005-003
****
9.9
A feature common to triode tubes and transistors is that both:

- convert electrical energy to radio waves
- use heat to cause electron movement
- can amplify signals
- have electrons drifting through a vacuum

< can amplify signals >

B-004-005-004
****
9.9
In a vacuum tube, the electrode that is operated with the highest positive potential is the _____ .

- plate
- filament (heater)
- cathode
- grid

< plate >

B-004-005-005
****
9.9
In a vacuum tube, the electrode that is usually a cylinder of wire mesh is the _____ .

- filament (heater)
- cathode
- plate
- grid

< grid >

B-004-005-006
****
9.9
In a vacuum tube, the element that is furthest away from the plate is the _____ .

- cathode
- filament (heater)
- grid
- emitter

< filament (heater)>

B-004-005-007
****
9.9
In a vacuum tube, the electrode that emits electrons is the _____ .

- grid
- collector
- plate
- cathode

< cathode >

B-004-005-008
****
9.9
What is inside the envelope of a triode tube?

- A vacuum
- Argon
- Air
- Neon

< A vacuum >

This is why it is called a vacuum tube.

B-004-005-009
****
9.9
How many grids are there in a triode vacuum tube?

- Three
- Three plus a filament
- One
- Two

< One >

4-6 Resistor colour codes, tolerances, temperature coefficient

B-004-006-001
****
2.7.4BSG8; 2.6BSG9
How do you find a resistor's tolerance rating?

- By reading its Baudot code
- By using a voltmeter
- By reading the resistor's colour code
- By using Thevenin's theorem for resistors

< By reading the resistor's colour code >

B-004-006-002
****
2.7.4BSG8; 2.8.4BSG9
What do the first three-color bands on a resistor indicate?

- The power rating in watts
- The resistance tolerance in percent
- The value of the resistor in ohms
- The resistance material

< The value of the resistor in ohms >

B-004-006-003
****
2.7.4BSG8; 2.8.4BSG9
What would the fourth color band on a 47 ohm resistor indicate?

- The resistance material
- The resistance tolerance in percent
- The value of the resistor in ohms
- The power rating in watts

< The resistance tolerance in percent >

B-004-006-004
****
2.7.4BSG8; 2.6BSG9
What are the possible values of a 100 ohm resistor with a 10% tolerance?

- 10 to 100 ohms
- 80 to 120 ohms
- 90 to 110 ohms
- 90 to 100 ohms

< 90 to 110 ohms >

B-004-006-005
****
2.7.4BSG8; 2.8.4BSG9
How do you find a resistor's value?

- By using Thevenin's theorem for resistors
- By using the Baudot code
- By using the resistor's colour code
- By using a voltmeter

< By using the resistor's colour code >

B-004-006-006
****
2.7.4BSG8; 2.6BSG9
A club project requires that a resistive voltage divider provide a very accurate and predictable ratio. Out of the list below, which resistor tolerance would you select?

- 0.1%
- 5%
- 10%
- 20%

< 0.1% >

B-004-006-007
****
2.7.4BSG8; 2.6BSG9
You need a current limiting resistor for a light-emitting diode (LED). The actual resistance is not critical at all. Out of the list below, which tolerance would you select?

- 0.1%
- 5%
- 10%
- 20%

< 20% >

B-004-006-008
****
2.6BSG8; 2.7BSG9
If a carbon resistor's temperature is increased, what will happen to the resistance?

- It will become time dependent
- It will increase by 20% for every 10 degrees centigrade
- It will change depending on the resistor's temperature coefficient rating
- It will stay the same

< It will change depending on the resistor's temperature coefficient rating >

B-004-006-009
****
2.7.4BSG8; 2.8.4BSG9
A gold tolerance band on a resistor indicates the tolerance is:

- 10%
- 1%
- 5%
- 20%

< 5% >

B-004-006-010
****
2.7.4BSG8; 2.8.4BSG9
Which colour band would differentiate a 120-ohm from a 1200-ohm resistor?

- Third band
- First band
- Second band
- Fourth band

< Third band >

B-004-006-011
****

2.7.4BSG8; 2.8.4BSG9
Given that red = 2, violet = 7 and yellow = 4, what is the nominal value of a resistor whose colour code reads “red”, “violet” and “yellow”?

- 27 megohms
- 270 kilohms
- 274 ohms
- 72 kilohms

< 270 kilohms >

Basic Electronics and Theory - 005

5-1 Metric prefixes - pico, micro, milli, centi, kilo, mega, giga

B-005-001-001
****

A1.5
If a dial marked in megahertz shows a reading of 3.525 MHz, what would it show if it were marked in kilohertz?

- 35.25 kHz
- 3 525 000 kHz
- 0.003525 kHz
- 3525 kHz

< 3525 kHz >

B-005-001-002
****

A1.5
If an ammeter marked in amperes is used to measure a 3000 milliampere current, what reading would it show?

- 3 000 000 amperes
- 3 amperes
- 0.003 amperes
- 0.3 amperes

< 3 amperes >

3000 mA = 3 A

B-005-001-003
****
A1.5
If a voltmeter marked in volts is used to measure a 3500 millivolt potential, what reading would it show?

- 0.35 volt
- 35 volts
- 350 volts
- 3.5 volts

< 3.5 volts >

B-005-001-004
****
A1.5
How many microfarads is 1 000 000 picofarads?

- 1 microfarad
- 1 000 000 000 microfarads
- 1000 microfarads
- 0.001 microfarad

< 1 microfarad >

B-005-001-005
****
A1.5
If you have a hand-held transceiver which puts out 500 milliwatts, how many watts would this be?

- 0.5
- 5
- 50
- 0.02

< 0.5 >

B-005-001-006
****
A1.5
A kilohm is:

- 0.1 ohm
- 0.001 ohm
- 10 ohms
- 1000 ohms

< 1000 ohms >

B-005-001-007
****
A1.5
6.6 kilovolts is equal to:

- 66 000 volts
- 6600 volts
- 660 volts
- 66 volts

< 6600 volts >

B-005-001-008
****
A1.5
A current of one quarter ampere may be written as:

- 0.25 milliampere
- 250 microamperes
- 250 milliamperes
- 0.5 amperes

< 250 milliamperes >

B-005-001-009
****
A1.5
How many millivolts are equivalent to two volts?

- 0.000002
- 2 000 000
- 0.002
- 2000

< 2000 >

B-005-001-010
****
A1.5
One megahertz is equal to:

- 0.001 Hz
- 10 Hz
- 1 000 kHz
- 100 kHz

< 1 000 kHz >

B-005-001-011
****
A1.5
An inductance of 10 000 microhenrys may be stated correctly as:

- 100 millihenrys
- 10 henrys
- 1 000 henrys
- 10 millihenrys

< 10 millihenrys >

5-2 Concepts of current, voltage, conductor, insulator, resistance

B-005-002-001
****
2.5
Name three good electrical conductors.

- Gold, silver, wood
- Copper, aluminum, paper
- Copper, gold, mica
- Gold, silver, aluminum

< Gold, silver, aluminum >

B-005-002-002
****
2.5
Name four good electrical insulators.

- Glass, air, plastic, porcelain
- Plastic, rubber, wood, carbon
- Paper, glass, air, aluminum
- Glass, wood, copper, porcelain

< Glass, air, plastic, porcelain >

B-005-002-003
****
2.5
Why do resistors sometimes get hot when in use?

- Their reactance makes them heat up
- Hotter circuit components nearby heat them up
- They absorb magnetic energy which makes them hot
- Some electrical energy passing through them is lost as heat

< Some electrical energy passing through them is lost as heat >

B-005-002-004
****
2.5
What is the best conductor among the following materials?

- aluminum
- copper
- carbon
- silicon

< copper >

B-005-002-005
****
2.5
Which type of material listed will most readily allow an electric current to flow?

- a conductor
- an insulator
- a semiconductor
- a dielectric

< a conductor >

B-005-002-006
****
2.5
A length of metal is connected in a circuit and is found to conduct electricity very well. It would be best described as having a:

- high wattage
- low wattage
- low resistance
- high resistance

< low resistance >

B-005-002-007
****
2.6
The letter “R” is the symbol for:

- reactance
- resistance
- impedance
- reluctance

< resistance >

B-005-002-008
****
2.8
The reciprocal of resistance is:

- conductance
- reactance
- reluctance
- permeability

< conductance >

B-005-002-009
****
3.5
Voltage drop means:

- the difference in voltage at output terminals of a transformer
- the voltage which is dissipated before useful work is accomplished
- the voltage developed across the terminals of a component
- any point in a radio circuit which has zero voltage

< the voltage developed across the terminals of a component >

B-005-002-010
****
2.6BSG8; 2.7BSG9
The resistance of a conductor changes with:

- temperature
- voltage
- current
- humidity

< temperature >

B-005-002-011
****
2.7.1BSG8; 2.8.1BSG9
The most common material used to make a resistor is:

- lead
- carbon
- gold
- mica

< carbon >

5-3 Concepts of energy and power, open and short circuits

B-005-003-001
****
2.3
What is the word used to describe the rate at which electrical energy is used?

- Voltage
- Resistance
- Power
- Current

< Power >

B-005-003-002
****
2.3
If you have light bulbs marked 40 watts, 60 watts and 100 watts, which one will use electrical energy the fastest?

- The 40 watt bulb
- The 60 watt bulb
- The 100 watt bulb
- They will all be the same

< The 100 watt bulb >

B-005-003-003
****
3.7
What is the basic unit of electrical power?

- The watt
- The ampere
- The volt
- The ohm

< The watt >

B-005-003-004
****
2.14BSG8; 2.15BSG9
Which electrical circuit will have no current?

- A short circuit
- A complete circuit
- A closed circuit
- An open circuit

< An open circuit >

B-005-003-005
****
2.14BSG8; 2.15BSG9
Which electrical circuit draws too much current?

- A short circuit
- A dead circuit
- A closed circuit
- An open circuit

< A short circuit >

B-005-003-006
****
3.7
Power is expressed in:

- amperes
- ohms
- watts
- volts

< watts >

B-005-003-007
****
3.7
Which of the following two quantities should be multiplied together to find power?

- Voltage and inductance
- Resistance and capacitance
- Voltage and current
- Inductance and capacitance

< Voltage and current >

B-005-003-008
****
3.7
Which two electrical units multiplied together give the unit “watts”?

- Amperes and henrys
- Volts and amperes
- Volts and farads
- Farads and henrys

< Volts and amperes >

B-005-003-009
****
2.6BSG8; 2.7BSG9
A resistor in a circuit becomes very hot and starts to burn. This is because the resistor is dissipating too much:

- voltage
- resistance
- current
- power

< power >

B-005-003-010
****
3.8
High power resistors are usually large with heavy leads. The size aids the operation of the resistor by:

- allowing higher voltage to be handled
- increasing the effective resistance of the resistor
- making it shock proof
- allowing heat to dissipate more readily

< allowing heat to dissipate more readily >

B-005-003-011
****
3.8
The resistor that could dissipate the most heat would be marked:

- 2 ohms
- 0.5 watt
- 20 watts
- 100 ohms

< 20 watts >

5-4 Ohm's Law - single resistors

B-005-004-001
****
3.2
If a current of 2 amperes flows through a 50-ohm resistor, what is the voltage across the resistor?

- 100 volts
- 48 volts
- 52 volts
- 25 volts

< 100 volts >

B-005-004-002
****
3.2
How is the current in a DC circuit calculated when the voltage and resistance are known?

- Current equals resistance divided by voltage
- Current equals power divided by voltage
- Current equals voltage divided by resistance
- Current equals resistance multiplied by voltage

< Current equals voltage divided by resistance >

B-005-004-003
****
3.2
How is the resistance in a DC circuit calculated when the voltage and current are known?

- Resistance equals current multiplied by voltage
- Resistance equals voltage divided by current
- Resistance equals power divided by voltage
- Resistance equals current divided by voltage

< Resistance equals voltage divided by current >

B-005-004-004
****
3.2
How is the voltage in a DC circuit calculated when the current and resistance are known?

- Voltage equals current divided by resistance
- Voltage equals resistance divided by current
- Voltage equals power divided by current
- Voltage equals current multiplied by resistance

< Voltage equals current multiplied by resistance >

B-005-004-005
****
3.2
If a 12-volt battery supplies 0.25 ampere to a circuit, what is the circuit's resistance?

- 3 ohms
- 48 ohms
- 12 ohms
- 0.25 ohm

< 48 ohms >

B-005-004-006
****
3.2
Calculate the value of resistance necessary to drop 100 volts with current flow of 0.8 milliamperes:

- 125 kilohms
- 125 ohms
- 1250 ohms
- 1.25 kilohms

< 125 kilohms >

Don't forget to change all values to standard units.

B-005-004-007
****
3.2
The voltage required to force a current of 4.4 amperes through a resistance of 50 ohms is:

- 220 volts
- 2220 volts
- 22.0 volts
- 0.220 volt

< 220 volts >

B-005-004-008
****
3.2
A lamp has a resistance of 30 ohms and a 6 volt battery is connected. The current flow will be:

- 2 amperes
- 0.5 ampere
- 0.005 ampere
- 0.2 ampere

< 0.2 ampere >

B-005-004-009
****
3.2
What voltage would be needed to supply a current of 200 milliamperes, to operate an electric lamp which has a resistance of 25 ohms?

- 5 volts
- 8 volts
- 175 volts
- 225 volts

< 5 volts >

Don't forget to change all values to standard units

B-005-004-010
****
3.2
The resistance of a circuit can be found by using one of the following:

- R = E/I
- R = I/E
- R = E/R
- R = E x I

< R = E/I >

B-005-004-011
****
3.2
If a 3 volt battery supplies 300 milliamperes to a circuit, the circuit resistance is:

- 10 ohms
- 9 ohms
- 5 ohms
- 3 ohms

< 10 ohms >

Don't forget to change all values to standard units

5-5 Series and parallel resistors

B-005-005-001
****
3.4
In a parallel circuit with a voltage source and several branch resistors, how is the total current related to the current in the branch resistors?

- It equals the sum of the branch current through each resistor
- It equals the average of the branch current through each resistor
- It decreases as more parallel resistors are added to the circuit
- It is the sum of each resistor's voltage drop multiplied by the total number of resistors

< It equals the sum of the branch current through each resistor >

B-005-005-002
****
3.4
Three resistors, respectively rated at 10, 15, and 20 ohms respectively are connected in parallel across a 6 volt battery. Which statement is true

- The current flowing through the 10 ohm resistance is less than that flowing through the 20 ohm resistance
- The current flowing through the 10 ohm, 15 ohm, and 20 ohm separate resistances when added together equals the total current drawn from the battery
- The voltage drop across each resistance added together equals 6 volts
- The voltage drop across the 20 ohm resistance is greater than the voltage across the 10 ohm resistance

< The current flowing through the 10 ohm, 15 ohm, and 20 ohm separate resistances when added together equals the total current drawn from the battery >

B-005-005-003
****
3.4
Total resistance in a parallel circuit:

- is always less than the smallest resistance
- depends upon the voltage drop across each branch
- could be equal to the resistance of one branch
- depends upon the applied voltage

< is always less than the smallest resistance >

B-005-005-004
****
3.2/3.4
Two resistors are connected in parallel and are connected across a 40 volt battery. If each resistor is 1000 ohms, the total current is:

- 80 milliamperes
- 40 milliamperes
- 80 amperes
- 40 amperes

< 80 milliamperes >

Don't forget to change all values to standard units

B-005-005-005
****
3.4
The total resistance of resistors connected in series is:

- greater than the resistance of any one resistor
- less than the resistance of any one resistor
- equal to the highest resistance present
- equal to the lowest resistance present

< greater than the resistance of any one resistor >

B-005-005-006
****
3.4
Five 10 ohm resistors connected in series equals:

- 50 ohms
- 5 ohms
- 10 ohms
- 1 ohm

< 50 ohms >

B-005-005-007
****
3.4
Which series combination of resistors would replace a single 120 ohm resistor?

- Six 22 ohm
- Two 62 ohm
- Five 100 ohm
- Five 24 ohm

< Five 24 ohm >

B-005-005-008
****
3.4
If ten resistors of equal value were wired in parallel, the total resistance would be:

- 10 / R
- R / 10
- 10 x R
- 10 + R

< R / 10 >

Let's work it out. The ten resistors are equal in value. Let's give them a value of 100 ohms to make the calculations simple. We hook up **two** of them in parallel. Using the process outlined page 3-6 the **resulting resistance** will be:

(100)(100)/(10 +10) = 50 ohms

Now let's connect another 100 ohm resistor in parallel with the resulting resistance of 50 ohms. The new resulting resistance with be:

(50)(100)/(50 + 100) = 33.3 Ohms

Now let's connect another 100 ohm resistor in parallel with the resulting resistance of 33.3 ohms. The new resulting resistance will be:

(33.3)(100)/(33.3 + 100) = 24.98 ohms which we can round up to 25 ohms.

We keep doing this until we have used up all the resistors. The final resulting resistance will be 10 ohms, which is one-tenth of 100. R/10 is the answer.

The formula for calculating the resulting resistance when N, the number resistors of equal value, are hooked up in parallel is:

$R_{resulting} = R_{given}/N$

B-005-005-009
****
3.4
The total resistance of four 68 ohm resistors wired in parallel is:

- 12 ohms
- 34 ohms
- 272 ohms
- 17 ohms

< 17 ohms > See above.

B-005-005-010
****
3.4
Two resistors are in parallel. Resistor A carries twice the current of resistor B, which means that:

- the voltage across B is twice that across A
- the voltage across A is twice that across B
- A has half the resistance of B
- B has half the resistance of A

< A has half the resistance of B >

B-005-005-011
****
3.4
The total current in a parallel circuit is equal to the:

- source voltage divided by the value of one of the resistive elements
- sum of the currents through all the parallel branches
- source voltage divided by the sum of the resistive elements
- current in any one of the parallel branches

< sum of the currents through all the parallel branches >

5-6 Power law, resistor power dissipation

B-005-006-001
****
3.8
Why would a large size resistor be used instead of a smaller one of the same resistance?

- For better response time
- For a higher current gain
- For less impedance in the circuit
- For greater power dissipation

< For greater power dissipation >

B-005-006-002
****
3.7
How many watts of electrical power are used by a 12 volt DC light bulb that draws
0.2 ampere?

- 6 watts
- 2.4 watts
- 60 watts
- 24 watts

< 2.4 watts >

B-005-006-003
****
3.7
The DC input power of a transmitter operating at 12 volts and drawing 500 milliamps would be:

- 500 watts
- 12 watts
- 6 watts
- 20 watts

< 6 watts >

Don't forget to change all values to standard units

B-005-006-004
****
3.8
When two 500 ohm 1 watt resistors are connected in series, the maximum total power that can be dissipated by the resistors is:

- 1 watt
- 1/2 watt
- 4 watts
- 2 watts

< 2 watts >

B-005-006-005
****
3.8
When two 500 ohm 1 watt resistors are connected in parallel, they can dissipate a maximum total power of:

- 1 watt
- 4 watts
- 2 watts
- 1/2 watt

< 2 watts >

B-005-006-006
****
3.7
If the voltage applied to two resistors in series is doubled, how much will the total power change?

- Double
- No change
- Increase four times
- Decrease to half

< Increase four times >

Consider two 5 ohm resistors and with 10 volts applied to them. Since the resistors are in series the total resistance is 10 ohms. Since we know resistance and voltage, P = E^2/R = (10)(10)/10 = 10 watts. When we double the voltage to 20 volts and crunch the numbers P = (20)(20)/10 = 40 watts. The power has increased four times.

To do this algebraically, recall that $P = EI$ and $E = IR$. So, $I = E/R$ then $P = E^2/R$. This means that P is directly proportional to the square of the voltage. Doubling the voltage increases the power by four times.

B-005-006-007
****
3.4, 3.8
Which combination of resistors could make up a 50 ohms dummy load capable of dissipating safely 5 watts

- Two 2-watt 25 ohm resistors in series
- Ten quarter-watt 500 ohm resistors in parallel
- Four 2-watt 200 ohm resistors in parallel
- Two 5-watt 100 ohm resistors in series

< Four 2-watt 200 ohm resistors in parallel >

For "Two 5-watt 100 ohms resistors in series", the resistors are in series and the total resistance is 200 ohm, more than required. For "Two 2-watt 25 ohm resistors in series ", the resistors are in series, giving 50 ohm, but the total wattage is 4 watts, less than the 5 watts required. For "Ten quarter-watt 500 ohm resistors in parallel", the total resistance is 50 ohm, but wattage is the sum of all the wattage, 2.5 watts. For "Four 2-watt 200 ohm resistors in parallel", the total resistance is 50 ohm and the total wattage is 8 watts, more than required.

B-005-006-008
****
3.7
A 12 volt light bulb is rated at a power of 30 watts. The current drawn would be:

- 12/30 amps
- 30/12 amps
- 18 amps
- 360 amps

< 30/12 amps >

Since we know voltage and power the formula to use to calculate current is P/E, the answer is "30/12 amps".

B-005-006-009
****
3.7
If two 10 ohm resistors are connected in series with a 10 volt battery, the power consumption would be:

- 10 watts
- 20 watts
- 100 watts
- 5 watts

< 5 watts >

Total resistance 20 ohms and voltage is 10 V. The formula we use to calculate power is $P = {E^2}/{R}$, *so Power = (10)(10)/20 = 5 watts.*

B-005-006-010
****
3.4/3.8
One advantage of replacing a 50 ohm resistor with a parallel combination of two similarly rated 100 ohm resistors is that the parallel combination will have:

- lesser resistance and similar power rating
- the same resistance but greater power rating
- the same resistance but lesser power rating
- greater resistance and similar power rating

< the same resistance but greater power rating >

B-005-006-011
****
3.8
Resistor wattage ratings are:

- expressed in joules
- variable in steps of one hundred
- determined by heat dissipation qualities
- calculated according to physical size and tolerance rating

< determined by heat dissipation qualities >

5-7 AC, sinewave, frequency, frequency units

B-005-007-001
****
5.2
What term means the number of times per second that an alternating current flows back and forth?

- Frequency
- Speed
- Pulse rate
- Inductance

< Frequency >

B-005-007-002
****
11.15
Approximately what frequency range can most humans hear?

- 20 - 20 000 Hz
- 20 000 - 30 000 Hz
- 200 - 200 000 Hz
- 0 - 20 Hz

<20 - 20 000 Hz >

B-005-007-003
****
11.15
Why do we call signals in the range 20 Hz to 20 000 Hz audio frequencies?

- Because the human ear can sense radio waves in this range
- Because the human ear can sense sounds in this range
- Because the human ear cannot sense anything in this range
- Because this range is too low for radio energy

< Because the human ear can sense sounds in this range >

B-005-007-004
****
5.4
Electrical energy at a frequency of 7125 kHz is in what frequency range?

- Audio
- Hyper
- Super-high
- Radio

< Radio >

B-005-007-005
****
5.3
What is the name for the distance an AC signal travels during one complete cycle?

- Wave spread
- Wavelength
- Wave speed
- Waveform

< Wavelength >

B-005-007-006
****
5.3
What happens to a signal's wavelength as its frequency increases?

- It stays the same
- It disappears
- It gets shorter
- It gets longer

< It gets shorter >

B-005-007-007
****
5.3
What happens to a signal's frequency as its wavelength gets longer?

- It goes up
- It goes down
- It disappears
- It stays the same

< It goes down >

B-005-007-008
****
5.2
What does 60 hertz (Hz) mean?

- 60 metres per second
- 6000 cycles per second
- 60 cycles per second
- 6000 metres per second

< 60 cycles per second >

B-005-007-009
****
5.2
If the frequency of the waveform is 100 Hz, the time for one cycle is:

- 0.01 second
- 10 seconds
- 0.0001 second
- 1 second

< 0.01 second >

> *Aid: 100 Hz = 100 cycles in 1 second. Dividing by 100, we get 1 cycle in 0.01s.*

B-005-007-010
****
5.2
Current in an AC circuit goes through a complete cycle in 0.1 second. This means the AC has a frequency of:

- 1 Hz
- 100 Hz
- 1000 Hz
- 10 Hz

< 10 Hz >

B-005-007-011
****
5.4
A signal is composed of a fundamental frequency of 2 kHz and another of 4 kHz. This 4 kHz signal is referred to as:

- the DC component of the main signal
- a dielectric signal of the main signal
- a harmonic of the 2 kHz signal
- a fundamental of the 2 kHz signal

< a harmonic of the 2 kHz signal >

5-8 Ratios, logarithms, decibels

Look at the examples in Appendix A1.7 for the equation to calculate this. Remember the equation and not the answer.

B-005-008-001
****
A1.7
A two-times increase in power results in a change of how many dB?

- 6 dB higher
- 12 dB higher
- 1 dB higher
- 3 dB higher

< 3 dB higher >

B-005-008-002
****
A1.7
How can you decrease your transmitter's power by 3 dB?

- Divide the original power by 3
- Divide the original power by 4
- Divide the original power by 2
- Divide the original power by 1.5

< Divide the original power by 2 >

B-005-008-003
****
A1.7
How can you increase your transmitter's power by 6 dB?

- Multiply the original power by 4
- Multiply the original power by 3
- Multiply the original power by 2
- Multiply the original power by 1.5

< Multiply the original power by 4 >

B-005-008-004
****
A1.7
If a signal-strength report is “10 dB over S9”, what should the report be if the transmitter power is reduced from 1500 watts to 150 watts?

- S9 minus 10 dB
- S9 plus 5 dB
- S9
- S9 plus 3 dB

< S9 >

B-005-008-005
****
A1.7
If a signal-strength report is “20 dB over S9”, what should the report be if the transmitter power is reduced from 1500 watts to 150 watts?

- S9 plus 5 dB
- S9 plus 3 dB
- S9
- S9 plus 10 dB

< S9 plus 10 dB >

B-005-008-006
****
A1.7
The unit “decibel” is used to indicate:

- certain radio waves
- a single side band signal
- a mathematical ratio
- an oscilloscope wave form

< a mathematical ratio >

B-005-008-007
****
A1.7
The power output from a transmitter increases from 1 watt to 2 watts. This is a db increase of:

- 6
- 1
- 3
- 30

< 3 >

B-005-008-008
****
A1.7
The power of a transmitter is increased from 5 watts to 50 watts by a linear amplifier. The power gain, expressed in dB, is:

- 40 dB
- 20 dB
- 10 dB
- 30 dB

< 10 dB >

B-005-008-009
****
A1.7
You add a 9 dB gain amplifier to your 2 watt handheld. What is the power output of the combination?

- 11 watts
- 20 watts
- 18 watts
- 16 watts

< 16 watts >

B-005-008-010
****
A1.7
The power of a transmitter is increased from 2 watts to 8 watts. This is a power gain of _____ dB.

- 6 dB
- 3 dB
- 8 dB
- 9 dB

< 6 dB >

B-005-008-011
****
A1.7
A local amateur reports your 100W 2m simplex VHF transmission as 30 dB over S9. To reduce your signal to S9, you would reduce your power to _____ watts.

- 100 mW
- 1 W
- 10 W
- 33.3 W

< 100 mW >

5-9 Introduction to inductance, capacitance

B-005-009-001
****
4.5
If two equal-value inductors are connected in series, what is their total inductance?

- Twice the value of one inductor
- Half the value of one inductor
- The same as the value of either inductor
- The value of one inductor times the value of the other

< Twice the value of one inductor >

B-005-009-002
****
4.5
If two equal-value inductors are connected in parallel, what is their total inductance?

- Twice the value of one inductor
- The same as the value of either inductor
- The value of one inductor times the value of the other
- Half the value of one inductor

< Half the value of one inductor >

B-005-009-003
****
4.5
If two equal-valued capacitors are connected in series, what is their total capacitance?

- The value of one capacitor times the value of the other
- Half the value of either capacitor
- Twice the value of one capacitor
- The same as the value of either capacitor

< Half the value of either capacitor >

B-005-009-004
****
4.5
If two equal-valued capacitors are connected in parallel, what is their total capacitance?

- Half the value of one capacitor
- Twice the value of one capacitor
- The same as the value of either capacitor
- The value of one capacitor times the value of the other

< Twice the value of one capacitor >

B-005-009-005
****
4.2
What determines the inductance of a coil?

- The core material, the core diameter, the length of the coil and the number of turns of wire used to wind the coil
- The core material, the number of turns used to wind the core and the frequency of the current through the coil
- The core diameter, the number of turns of wire used to wind the coil and the type of metal used for the wire
- The core material, the core diameter, the length of the coil and whether the coil is mounted horizontally or vertically

< The core material, the core diameter, the length of the coil and the number of turns of wire used to wind the coil >

B-005-009-006
****
4.7/4.8
What determines the capacitance of a capacitor?

- The material between the plates, the area of one plate, the number of plates and the material used for the protective coating
- The material between the plates, the surface area of the plate, the number of plates and the spacing between the plates
- The material between the plates, the number of plates and the size of the wires connected to the plates
- The number of plates, the spacing between the plates and whether the dielectric material is N type or P type

< The material between the plates, the surface area of the plate, the number of plates and the spacing between the plates >

B-005-009-007
****
4.9
If two equal-valued capacitors are connected in parallel, what is their capacitance?

- Twice the value of either capacitor
- The same value of either capacitor
- The value of one capacitor times the value of the other
- Half the value of either capacitor

< Twice the value of either capacitor >

B-005-009-008
****
4.5
To replace a faulty 10 millihenry choke, you could use two:

- 30 millihenry chokes in parallel
- 5 millihenry chokes in parallel
- 5 millihenry chokes in series
- 20 millihenry chokes in series

< 5 millihenry chokes in series >

B-005-009-009
****
4.9
Three 15 microfarad capacitors are wired in series. The total capacitance of this arrangement is:

- 18 microfarads
- 5 microfarads
- 45 microfarads
- 12 microfarads

< 5 microfarads >

B-005-009-010
****
4.9
Which series combinations of capacitors would best replace a faulty 10 microfarad capacitor?

- Two 20 microfarad capacitors
- Two 10 microfarad capacitors
- Twenty 2 microfarad capacitors
- Ten 2 microfarad capacitors

< Two 20 microfarad capacitors >

B-005-009-011
****
4.9
The total capacitance of two or more capacitors in series is:

- found by adding each of the capacitors together and dividing by the total number of capacitors
- found by adding each of the capacitors together
- always greater than the largest capacitor
- always less than the smallest capacitor

< always less than the smallest capacitor >

5-10 Introduction to reactance, impedance

B-005-010-001
****
4.12
How does a coil react to AC?

- As the amplitude of the applied AC increases, the reactance decreases
- As the amplitude of the applied AC increases, the reactance increases
- As the frequency of the applied AC increases, the reactance decreases
- As the frequency of the applied AC increases, the reactance increases

< As the frequency of the applied AC increases, the reactance increases >

Remember the equation $X_L = 2\pi fL$. This will show you that the answer is not dependent on amplitude but directly proportional to the frequency.

B-005-010-002
****
4.13
How does a capacitor react to AC?

- As the amplitude of the applied AC increases, the reactance decreases
- As the frequency of the applied AC increases, the reactance decreases
- As the frequency of the applied AC increases, the reactance increases
- As the amplitude of the applied AC increases, the reactance increases

< As the frequency of the applied AC increases, the reactance decreases >

Remember the equation $X_C = {}^{1}/_{2\pi fC}$. This will show you that the answer is not dependent on amplitude but inversely proportional to the frequency.

B-005-010-003
****
4.13
The reactance of capacitors increases as:

- frequency increases
- frequency decreases
- applied voltage increases
- applied voltage decreases

< frequency decreases >

The reactance of a capacitor is inversely proportional to the frequency and not voltage.

B-005-010-004
****
4.14
In inductances, AC may be opposed by both resistance of winding wire and reactance due to inductive effect. The term which includes resistance and reactance is:

- capacitance
- impedance
- resonance
- inductance

< impedance >

B-005-010-005
****
4.13
Capacitive reactance:

- applies only to series RLC circuits
- increases as frequency increases
- increases with the time constant
- decreases as frequency increases

< decreases as frequency increases >

The reactance is inversely proportional to the frequency for a capacitor.

B-005-010-006
****
4.12
Inductive reactance may be increased by:

- an increase in the applied voltage
- an increase in the applied frequency
- a decrease in the applied frequency
- a decrease in the supplied current

< an increase in the applied frequency >

The reactance is directly proportional to the frequency for an inductor.

B-005-010-007
****
4.12
What property allows a coil wound on a ferrite core to mitigate the effects of an offending radio signal?

- Low reactance at audio frequencies
- High reactance at audio frequencies
- High reactance at radio frequencies
- Low reactance at radio frequencies

< High reactance at radio frequencies >

This device is called a "choke", well-named as the higher the frequency the larger the inductive reactance or opposition to the flow of AC. Radio waves are complex alternating currents. As this question is dealing with radio signals, we can ignore answers that involve audio frequencies.

B-005-010-008
****
4.13
What property allows an RF bypass capacitor on an audio circuit to divert an offending radio signal?

- High reactance at audio frequencies
- Low reactance at radio frequencies
- High reactance at radio frequencies
- Low reactance at audio frequencies

< Low reactance at radio frequencies >

It is all about frequency. Ignore answers that deal with audio frequencies, which have much lower frequencies than radio waves. This question is talking about allowing RF, radio frequencies, to be diverted or allowed to flow in a desired direction. This means that one does not want to provide any opposition to the flow of the RF. In a capacitor the higher the frequency the smaller the capacitive reactance or opposition to the flow of AC. Radio waves are complex alternating currents.

B-005-010-009
****
4.13
What property allows an RF bypass capacitor to have little effect on an audio circuit?

- Low reactance at low frequencies
- High reactance at low frequencies
- Low reactance at high frequencies
- High reactance at high frequencies

< High reactance at low frequencies >

It is all about frequency. Audio circuits means audio frequencies (AF), which have much lower frequencies than radio frequencies (RF). In a capacitor, the higher the frequency the smaller the capacitive reactance or opposition to the flow of AC. To allow audio frequencies to flow unimpeded one uses a large capacitance to provide a low capacitive reactance. An RF bypass capacitor is used to divert or force RF to flow unimpeded in a desired direction, in this case, away from or out of the audio circuit. This means the RF capacitor will have low value, as it will present a high reactance to the RF flow through the audio circuit.

B-005-010-010
****
4.12
What property allows an RF choke coil to have little effect on signals meant to pass through the coil.

- High reactance at low frequencies
- Low reactance at high frequencies
- High reactance at high frequencies
- Low reactance at low frequencies

< Low reactance at low frequencies >

> *It is all about frequency. The key phrase here is 'signals meant to pass through the coil'. An RF choke coil is an inductor. In an inductor, the higher the frequency the larger the inductive reactance or opposition to the flow of AC.*

B-005-010-011
****
4.12
In general, the reactance of inductors increases with:

- increasing applied voltage
- increasing AC frequency
- decreasing AC frequency
- decreasing applied voltage

< increasing AC frequency >

5-11 Introduction to magnetics, transformers

B-005-011-001
****
4.6
If no load is attached to the secondary winding of a transformer, what is current in the primary winding called?

- Magnetizing current
- Direct current
- Latent current
- Stabilizing current

< Magnetizing current >

B-005-011-002
****
3.7
A transformer operates a 6.3 volt 2 ampere light bulb from its secondary winding. The input power to the primary winding is approximately:

- 3 watts
- 13 watts
- 6 watts
- 8 watts

< 13 watts >

Power = E x I = 12.6 W consumed in the secondary. In a perfect system 12.6 W would be transferred from the primary to the secondary, about 13 W.

B-005-011-003
****
3.7
A transformer has a 240 volt primary that draws a current of 250 milliamperes from the mains supply. Assuming no losses and only one secondary, what current would be available from the 12 volt secondary?

- 50 amperes
- 5 amperes
- 215 amperes
- 25 amperes

< 5 amperes >

Same approach as the previous question, except you have to convert milliamperes to amperes.

B-005-011-004
****
4.6
In a mains power transformer, the primary winding has 250 turns, and the secondary has 500. If the input voltage is 120 volts, the likely secondary voltage is:

- 480 V
- 610 V
- 26 V
- 240 V

< 240 V >

B-005-011-005
****
4.1
The strength of the magnetic field around a conductor in air is:

- inversely proportional to the voltage on the conductor
- directly proportional to the current in the conductor
- inversely proportional to the diameter of the conductor
- directly proportional to the diameter of the conductor

< directly proportional to the current in the conductor >

B-005-011-006
****
4.1
Maximum induced voltage in a coil occurs when:

- current is going through its least rate of change
- the magnetic field around the coil is not changing
- current is going through its greatest rate of change
- the current through the coil is of a DC nature

< current is going through its greatest rate of change >

B-005-011-007
****
4.1
The voltage induced in a conductor moving in a magnetic field is at a maximum when the movement is:

- made in a counterclockwise direction
- parallel to the lines of force
- made in a clockwise direction
- perpendicular to the lines of force

< perpendicular to the lines of force >

B-005-011-008
****
4.6
A 100% efficient transformer has a turns ratio of 1/5. If the secondary current is 50 milliamperes, the primary current is:

- 0.25 A
- 2 500 mA
- 0.01 A
- 0.25 mA

< 0.25 A >

In BSG9 page and in the ARRL Handbook, the turns ratio is defined as Ns/Np. However in the Dictionary of Electronics, the turns ratio is defined as Np/Ns. There is confusion here. More precisely, the former Ns/Np is called the secondary-to-primary turns ratio and the latter is called the primary-to secondary turns ratio. In this case, you need to 'take care to use the primary-to-secondary turns ratio, since the secondary-to-primary turns ratio is more common'.

The calculation is based on the equation $\frac{N_s}{N_p} = \frac{E_s}{E_p} = \frac{I_p}{I_s}$*. Solving the equation for the primary current gives* $I_p = \frac{N_s}{N_p} I_s$*. Putting in the numbers, after converting to standard units, results in* $I_p = \frac{5}{1} 0.050 = 0.25$ *amperes, where the primary-to-secondary turns ratio is used. If the secondary-to-primary turns ratio had been used, then the result would have been 0.01 amperes. IC should probably clarify the question. You will just have to remember this.*

B-005-011-009
****
2.10BSG8; 2.11BSG9
A force of repulsion exists between two _____ magnetic poles.

- positive
- negative
- like
- unlike

< like >

B-005-011-010
****
2.10BSG8; 2.11BSG9
A permanent magnet would most likely be made from:

- aluminum
- brass
- steel
- copper

< steel >

B-005-011-011
****
4.6
The fact that energy transfer from primary to secondary windings in a power transformer is not perfect is indicated by:

- warm iron laminations
- electrostatic shielding large
- large secondary currents
- high primary voltages

< warm iron laminations >

5-12 Introduction to resonance, tuned circuits

B-005-012-001
****
4.15
Resonance is the condition that exists when:

- resistance is equal to the reactance
- inductive reactance and capacitive reactance are equal
- inductive reactance is the only opposition in the circuit
- the circuit contains no resistance

< inductive reactance and capacitive reactance are equal >

B-005-012-002
****
4.16
Parallel tuned circuits offer:

- high impedance at resonance
- low impedance at resonance
- zero impedance at resonance
- an impedance equal to resistance of the circuit

< high impedance at resonance >

B-005-012-003
****
4.15
Resonance is an electrical property used to describe:

- an inductor
- a set of parallel inductors
- the results of tuning a varicap (varactor)
- the frequency characteristic of a coil and capacitor circuit

< the frequency characteristic of a coil and capacitor circuit >

B-005-012-004
****
4.16
A tuned circuit is formed from two basic components. These are:

- resistors and transistors
- directors and reflectors
- diodes and transistors
- inductors and capacitors

< inductors and capacitors >

B-005-012-005
****
4.16
When a parallel coil-capacitor combination is supplied with AC of different frequencies, there will be one frequency where the impedance will be highest. This is the:

- reactive frequency
- resonant frequency
- impedance frequency
- inductive frequency

< resonant frequency >

B-005-012-006
****
4.16
In a parallel-resonant circuit at resonance, the circuit has a:

- high impedance
- low impedance
- low mutual inductance
- high mutual inductance

< high impedance >

B-005-012-007
****
4.16
In a series resonant circuit at resonance, the circuit has:

- low impedance
- high impedance
- low mutual inductance
- high mutual inductance

< low impedance >

B-005-012-008
****
4.16
A coil and an air-spaced capacitor are arranged to form a resonant circuit. The resonant frequency will remain the same if we:

- wind more turns on the coil
- add a resistor to the circuit
- increase the area of plates in the capacitor
- insert Mylar sheets between the plates of the capacitor

< add a resistor to the circuit >

B-005-012-009
****
4.16
Resonant circuits in a receiver are used to:

- select signal frequencies
- filter direct current
- increase power
- adjust voltage levels

< select signal frequencies >

B-005-012-010
****
4.15
Resonance is the condition that exists when:

- inductive reactance is the only opposition in the circuit
- the circuit contains no resistance
- resistance is equal to the reactance
- inductive reactance and capacitive reactance are equal and opposite in sign

< inductive reactance and capacitive reactance are equal and opposite in sign >

B-005-012-011
****
4.16
When a series LCR circuit is tuned to the frequency of the source, the:

- line current reaches maximum
- line current lags the applied voltage
- line current leads the applied voltage
- impedance is maximum

< line current reaches maximum >

5-13 Introduction to meters and measurements

B-005-013-001
****
10.6
How is a voltmeter usually connected to a circuit under test?

- In quadrature with the circuit
- In phase with the circuit
- In parallel with the circuit
- In series with the circuit

< In parallel with the circuit >

B-005-013-002
****
10.6
How is an ammeter usually connected to a circuit under test?

- In parallel with the circuit
- In series with the circuit
- In quadrature with the circuit
- In phase with the circuit

< In series with the circuit >

B-005-013-003
****
2.18BSG8; 2.19BSG9
What does a multimeter measure?

- Resistance, capacitance and inductance
- Resistance and reactance
- SWR and power
- Voltage, current and resistance

< Voltage, current and resistance >

B-005-013-004
****
2.3
The correct instrument to measure plate current or collector current of a transmitter is:

- an ammeter
- an ohmmeter
- a wattmeter
- a voltmeter

< an ammeter >

B-005-013-005
****
10.6
Which of the following meters would you use to measure the power supply current drawn by a small hand-held transistorized receiver?

- an RF power meter
- an electrostatic voltmeter
- a DC ammeter
- an RF ammeter

< a DC ammeter >

B-005-013-006
****
10.6
When measuring current drawn from a DC power supply, it is true to say that the meter will act in circuit as:

- an extra current drain
- an insulator
- a low value resistance
- a perfect conductor

< a low value resistance >

Any meter will provide a resistance, but it is negligible.

B-005-013-007
****
10.6
When measuring the current drawn by a receiver from a power supply, the current meter should be placed:

- in series with one of the receiver power leads
- in series with both receiver power leads
- in parallel with both receiver power supply leads
- in parallel with one of the receiver power leads

< in series with one of the receiver power leads >

B-005-013-008
****
2.4
Potential difference is measured by means of:

- a voltmeter
- a wattmeter
- an ohmmeter
- an ammeter

< a voltmeter >

B-005-013-009
****
2.3
The instrument used for measuring the flow of electrical current is the:

- faradmeter
- wattmeter
- voltmeter
- ammeter

< ammeter >

B-005-013-010
****
10.6
In measuring volts and amperes, the connections should be made with:

- the voltmeter in series and ammeter in parallel
- both voltmeter and ammeter in series
- both voltmeter and ammeter in parallel
- the voltmeter in parallel and ammeter in series

< the voltmeter in parallel and ammeter in series >

Feedlines and Antenna Systems - 006

6-1 Feed line characteristics, characteristic impedance

B-006-001-001
****
7.1
What connects your transceiver to your antenna?

- A dummy load
- A transmission line
- The power cord
- A ground wire

< A transmission line >

B-006-001-002
****
7.2
The characteristic impedance of a transmission line is determined by the:

- frequency at which the line is operated
- load placed on the line
- physical dimensions and relative positions of the conductors
- length of the line

< physical dimensions and relative positions of the conductors >

B-006-001-003
****
7.2
The characteristic impedance of a 20 metre piece of transmission line is 52 ohms. If 10 metres were cut off, the impedance would be:

- 13 ohms
- 52 ohms
- 26 ohms
- 39 ohms

< 52 ohms >

B-006-001-004
****
7.4
The characteristic impedance of a coaxial line:

- is greater for larger diameter line
- can be the same for different diameter line
- changes significantly with the frequency of the energy it carries
- is correct for only one size of line

< can be the same for different diameter line >

B-006-001-005
****
7.4
What commonly available antenna transmission line can be buried directly in the ground for some distance without adverse effects?

- 75 ohm twin-lead
- Coaxial cable
- 300 ohm twin-lead
- 600 ohm open-wire

< Coaxial cable >

B-006-001-006
****
7.2
The characteristic impedance of a transmission line is:

- equal to the pure resistance which, if connected to the end of the line, will absorb all the power arriving along it
- the impedance of a section of the line one wavelength long
- the dynamic impedance of the line at the operating frequency
- the ratio of the power supplied to the line to the power delivered to the load

< equal to the pure resistance which, if connected to the end of the line, will absorb all the power arriving along it >

B-006-001-007
****
7.4
A transmission line differs from an ordinary circuit or network in communications or signaling devices in one very important way. That important aspect is:

- capacitive reactance
- inductive reactance
- resistance
- propagation delay

< propagation delay >

B-006-001-008
****
7.3
The characteristic impedance of a parallel wire transmission line does not depend on the:

- centre to centre distance between conductors
- dielectric
- velocity of energy on the line
- radius of the conductors

< velocity of energy on the line >

B-006-001-009
****
7.2, 7.8
If the impedance terminating a transmission line differs significantly from the characteristic impedance of the line, what will be observed at the input of the line?

- An impedance nearly equal to the characteristic impedance
- Some value of impedance influenced by line length
- An infinite impedance
- A negative impedance

< Some value of impedance influenced by line length >

If the line impedance and load impedance don't match, the input will see an impedance value that is a function of the line length. The mathematics to calculate the value of the impedance in this situation is more than a little demanding and then some!

B-006-001-010
****
7.3
What factors determine the characteristic impedance of a parallel-conductor antenna transmission line?

- The radius of the conductors and the frequency of the signal
- The frequency of the signal and the length of the line
- The distance between the centres of the conductors and the radius of the conductors
- The distance between the centres of the conductors and the length of the line

< The distance between the centres of the conductors and the radius of the conductors >

B-006-001-011
****
7.4
What factors determine the characteristic impedance of a coaxial antenna transmission line?

- The ratio of the diameter of the inner conductor to the diameter of the shield
- The diameter of the shield and the length of the line
- The diameter of the shield and the frequency of the signal
- The frequency of the signal and the length of the line

< The ratio of the diameter of the inner conductor to the diameter of the shield >

6-2 Balanced and unbalanced feed lines, baluns

B-006-002-001
****
7.4
What is a coaxial cable?

- A centre wire inside an insulating material which is covered by a metal sleeve or shield
- Two wires side-by-side in a plastic ribbon
- Two wires side-by-side held apart by insulating rods
- Two wires twisted around each other in a spiral

< A centre wire inside an insulating material which is covered by a metal sleeve or shield >

B-006-002-002
****
7.3
What is parallel-conductor transmission line?

- Two wires side-by-side held apart by insulating material
- Two wires twisted around each other in a spiral
- A center wire inside an insulating material which is covered by a metal sleeve or shield
- A metal pipe which is as wide or slightly wider than a wavelength of the signal it carries

< Two wires side-by-side held apart by insulating material >

B-006-002-003
****
7.3
What kind of antenna transmission line is made of two conductors held apart by insulated rods?

- Twin lead in a plastic ribbon
- Twisted pair
- Open wire line
- Coaxial cable

< Open wire line >

B-006-002-004
****
7.7
What does the term “balun” mean?

- Balanced to unbalanced
- Balanced unloader
- Balanced unmodulator
- Balanced antenna network

< Balanced to unbalanced >

B-006-002-005
****
7.7 – Fig 7.8/7.9
Where would you install a balun to feed a dipole antenna with 50-ohm coaxial cable?

- Between the antenna and the ground
- Between the coaxial cable and the ground
- Between the coaxial cable and the antenna
- Between the transmitter and the coaxial cable

< Between the coaxial cable and the antenna >

B-006-002-006
****
7.4
What is an unbalanced line?

- Transmission line with neither conductor connected to ground
- Transmission line with both conductors connected to ground
- Transmission line with both conductors connected to each other
- Transmission line with one conductor connected to ground

< Transmission line with one conductor connected to ground >

B-006-002-007
****
7.7
What device can be installed to feed a balanced antenna with an unbalanced transmission line?

- A triaxial transformer
- A wavetrap
- A loading coil
- A balun

< A balun >

B-006-002-008
****
7.4
A flexible coaxial line contains:

- two parallel conductors separated by spacers
- braided shield conductor and insulation around a central conductor
- four or more conductors running parallel
- only one conductor

< braided shield conductor and insulation around a central conductor >

B-006-002-009
****
7.3
A balanced transmission line:

- carries RF current on one wire only
- is made of one conductor only
- is made of two parallel wires
- has one conductor inside the other

< is made of two parallel wires >

Remember that there are three common varieties in use: open wire line, insulated twin lead, and ladder-line.

B-006-002-010
****
7.7
A 75 ohm transmission line could be matched to the 300 ohm feed point of an antenna:

- with an extra 250 ohm resistor
- by using a 4 to 1 trigatron
- by inserting a diode in one leg of the antenna
- by using a 4 to 1 impedance transformer

< by using a 4 to 1 impedance transformer >

B-006-002-011
****
7.3
What kind of antenna transmission line can be constructed using two conductors which are maintained a uniform distance apart using insulated spreaders?

- Coaxial cable
- 75 ohm twin-lead
- 300 ohm twin-lead
- 600 ohm open wire line

< 600 ohm open wire line >

6-3 Popular antenna feed line and coaxial connector types

B-006-003-001
****
7.4
Why does coaxial cable make a good antenna transmission line?

- It is weatherproof, and its impedance matches most amateur antennas
- It is weatherproof, and its impedance is higher than that of most amateur antennas
- It can be used near metal objects, and its impedance is higher than that of most amateur antennas
- You can make it at home, and its impedance matches most amateur antennas

< It is weatherproof, and its impedance matches most amateur antennas >

B-006-003-002
****
7.4
What is the best antenna transmission line to use, if it must be put near grounded metal objects?

- Coaxial cable
- Ladder-line
- Twisted pair
- Twin lead

< Coaxial cable >

B-006-003-003
****
7.3
What are some reasons not to use parallel-conductor transmission line?

- It is difficult to make at home, and it does not work very well with a high SWR
- It does not work well when tied down to metal objects, and you should use a balun and may have to use an impedance-matching device with your transceiver
- You must use an impedance-matching device with your transceiver, and it does not work very well with a high SWR
- It does not work well when tied down to metal objects, and it cannot operate under high power

< It does not work well when tied down to metal objects, and you should use a balun and may have to use an impedance-matching device with your transceiver >

B-006-003-004
****
7.5
What common connector usually joins RG-213 coaxial cable to an HF transceiver?

- A PL-259 connector
- An F-type cable connector
- A banana plug connector
- A binding post connector

< A PL-259 connector >

B-006-003-005
****
7.5
What common connector usually joins a hand-held transceiver to its antenna?

- A PL-259 connector
- An F-type cable connector
- A binding post connector
- A SMA connector

< A SMA connector >

B-006-003-006
****
7.5
Which of these common connectors has the lowest loss at UHF?

- An F-type cable connector
- A BNC connector
- A PL-259 connector
- A type-N connector

< A type-N connector >

B-006-003-007
****
7.4
If you install a 6-metre Yagi on a tower 60 metres (200 ft) from your transmitter, which of the following transmission lines provides the least loss?

- RG-58
- RG-213
- RG-174
- RG-59

< RG-213 >

B-006-003-008
****
7.5
Why should you regularly clean and tighten all antenna connectors?

- To keep them looking nice
- To keep them from getting stuck in place
- To increase their capacitance
- To help keep their contact resistance at a minimum

< To help keep their contact resistance at a minimum >

B-006-003-009
****
7.4
What commonly available antenna transmission line can be buried directly in the ground for some distance without adverse effects?

- 75 ohm twin-lead
- 600 ohm open wire line
- 300 ohm twin-lead
- Coaxial cable

< Coaxial cable >

B-006-003-010
****
7.4
When antenna transmission lines must be placed near grounded metal objects, which of the following transmission lines should be used?

- 600 ohm open wire line
- 75 ohm twin-lead
- Coaxial cable
- 300 ohm twin-lead

< Coaxial cable >

B-006-003-011
****
7.3
TV twin-lead transmission line can be used for a transmission line in an amateur station. The impedance of this line is approximately:

- 50 ohms
- 70 ohms
- 300 ohms
- 600 ohms

< 300 ohms >

6-4 Line losses by line type, length and frequency

B-006-004-001
****
7.4
Why should you use only good quality coaxial cable and connectors for an UHF antenna system?

- To keep the standing wave ratio of your antenna system high
- To keep RF loss low
- To keep television interference high
- To keep the power going to your antenna system from getting too high

< To keep RF loss low >

B-006-004-002
****
7.3
What are some reasons to use parallel-conductor transmission line?

- It has low impedance and works with a high SWR
- It will operate with a high SWR, and it works well when tied down to metal objects
- It has a low impedance, and has less loss than coaxial cable
- It will operate with a high SWR, and has less loss than coaxial cable

< It will operate with a high SWR, and has less loss than coaxial cable >

B-006-004-003
****
7.6
If your transmitter and antenna are 15 metres (50 ft) apart, but are connected by 60 metres (200 ft) of RG-58 coaxial cable, what should be done to reduce transmission line loss?

- Shorten the excess cable
- Shorten the excess cable so the transmission line is an odd number of wavelengths long
- Roll the excess cable into a coil which is as small as possible
- Shorten the excess cable so the transmission line is an even number of wavelengths long

< Shorten the excess cable >

B-006-004-004
****
7.6
As the length of a transmission line is changed, what happens to signal loss?

- Signal loss decreases as length increases
- Signal loss is the least when the length is the same as the signal's wavelength
- Signal loss is the same for any length of transmission line
- Signal loss increases as length increases

< Signal loss increases as length increases >

B-006-004-005
****
7.6
As the frequency of a signal is changed, what happens to signal loss in a transmission line?

- Signal loss is the least when the signal's wavelength is the same as the transmission line's length
- Signal loss is the same for any frequency
- Signal loss increases with increasing frequency
- Signal loss increases with decreasing frequency

< Signal loss increases with increasing frequency >

B-006-004-006
****
7.6
Losses occurring on a transmission line between transmitter and antenna results in:

- reflections occurring in the line
- the wire radiating RF energy
- less RF power being radiated
- an SWR reading of 1:1

< less RF power being radiated >

B-006-004-007
****
7.3
The lowest loss transmission line on HF is:

- 75 ohm twin-lead
- coaxial cable
- 300 ohm twin-lead
- open wire line

< open wire line >

B-006-004-008
****
7.6
In what values are RF transmission line losses expressed?

- dB per unit length
- Ohms per MHz
- dB per MHz
- Ohms per metre

< dB per unit length >

B-006-004-009
****
7.6
If the length of coaxial transmission line is increased from 20 metres (66 ft) to 40 metres (132 ft), how would this affect the line loss?

- It would be reduced by 10%
- It would be increased by 10%
- It would be reduced to 50%
- It would be increased by 100%

< It would be increased by 100% >

B-006-004-010
****
7.6
If the frequency is increased, how would this affect the loss on a transmission line?

- It would decrease
- It would increase
- It is independent of frequency
- It depends on the line length

< It would increase >

6-5 Standing waves, standing wave ratio, SWR meter

B-006-005-001
****
7.8
What does an SWR reading of 1:1 mean?

- The best impedance match has been attained
- An antenna for another frequency band is probably connected
- No power is going to the antenna
- The SWR meter is broken

< The best impedance match has been attained >

B-006-005-002
****
7.8
What does an SWR reading of less than 1.5:1 mean?

- An impedance match which is too low
- A serious impedance mismatch, something may be wrong with the antenna system
- An antenna gain of 1.5
- A fairly good impedance match

< A fairly good impedance match >

B-006-005-003
****
11.6BSG8; 11.6.2BSG9
What kind of SWR reading may mean poor electrical contact between parts of an antenna system?

- A negative reading
- No reading at all
- A very low reading
- A jumpy reading

< A jumpy reading >

B-006-005-004
****
7.8, 11.6BSG8; 7.8, 11.6.2BSG9
What does a very high SWR reading mean?

- The transmitter is putting out more power than normal, showing that it is about to go bad
- There is a large amount of solar radiation, which means very poor radio conditions
- The signals coming from the antenna are unusually strong, which means very good radio conditions
- The antenna is the wrong length for the operating frequency, or the transmission line may be an open or short circuited

< The antenna is the wrong length for the operating frequency, or the transmission line may be an open or short circuited >

B-006-005-005
****
7.8
What does standing-wave ratio mean?

- The ratio of maximum to minimum voltages on a transmission line
- The ratio of maximum to minimum inductances on a transmission line
- The ratio of maximum to minimum resistances on a transmission line
- The ratio of maximum to minimum impedances on a transmission line

< The ratio of maximum to minimum voltages on a transmission line >

B-006-005-006
****
7.8
If your antenna transmission line gets hot when you are transmitting, what might this mean?

- You should transmit using less power
- The conductors in the transmission line are not insulated very well
- The transmission line is too long
- The SWR may be too high, or the transmission line loss may be high

< The SWR may be too high, or the transmission line loss may be high >

B-006-005-007
****
7.8
If the characteristic impedance of the transmission line does not match the antenna input impedance then:

- standing waves are produced in the transmission line
- heat is produced at the junction
- the SWR reading falls to 1:1
- the antenna will not radiate any signal

< standing waves are produced in the transmission line >

B-006-005-008
****
7.8
The result of the presence of standing waves on a transmission line is:

- perfect impedance match between transmitter and transmission line
- maximum transfer of energy to the antenna from the transmitter
- lack of radiation from the transmission line
- reduced transfer of RF energy to the antenna

< reduced transfer of RF energy to the antenna >

B-006-005-009
****
7.8
An SWR meter measures the degree of match between transmission line and antenna by:

- comparing forward and reflected voltage
- measuring radiated RF energy
- measuring the conductor temperature
- inserting a diode in the transmission line

< comparing forward and reflected voltage >

B-006-005-010
****
7.8
A resonant antenna having a feed point impedance of 200 ohms is connected to a transmission line which has an impedance of 50 ohms. What will the standing wave ratio of this system be?

- 4:1
- 6:1
- 3:1
- 5:1

< 4:1 >

B-006-005-011
****
7.3
The type of transmission line best suited to operating at a high standing wave ratio is:

- 600 ohm open wire line
- 75 ohm twin-lead
- coaxial line
- 300 ohm twin-lead

< 600 ohm open wire line >

6-6 Concept of impedance matching

B-006-006-001
****
7.8/11.10BSG8; 7.8/11.6.4BSG9
What device might allow use of an antenna on a band it was not designed for?

- An antenna tuner
- An SWR meter
- A low pass filter
- A high pass filter

< An antenna tuner >

B-006-006-002
****
11.6BSG8; 11.6.4BSG9
What does an antenna tuner do?

- It matches a transceiver to a mismatched antenna system
- It helps a receiver automatically tune in stations that are far away
- It switches an antenna system to a transmitter when sending, and to a receiver when listening
- It switches a transceiver between different kinds of antennas connected to one transmission line

< It matches a transceiver to a mismatched antenna system >

B-006-006-003
****
11.6BSG8; 11.6.4BSG9
What would you use to connect a coaxial cable of 50 ohms impedance to an antenna of 17 ohms impedance?

- A low pass filter
- A terminating resistor
- An impedance-matching device
- An SWR meter

< An impedance-matching device >

B-006-006-004
****
4.14
When will a power source deliver maximum output to the load?

- When the impedance of the load is equal to the impedance of the source
- When air wound transformers are used instead of iron-core transformers
- When the power-supply fuse rating equals the primary winding current
- When the load resistance is infinite

< When the impedance of the load is equal to the impedance of the source >

B-006-006-005
****
4.14
What happens when the impedance of an electrical load is equal to the internal impedance of the power source?

- The electrical load is shorted
- No current can flow through the circuit
- The source delivers minimum power to the load
- The source delivers maximum power to the load

< The source delivers maximum power to the load >

B-006-006-006
****
4.14
Why is impedance matching important?

- So the load will draw minimum power from the source
- To ensure that there is less resistance than reactance in the circuit
- To ensure that the resistance and reactance in the circuit are equal
- So the source can deliver maximum power to the load

< So the source can deliver maximum power to the load >

B-006-006-007
****
4.14
To obtain efficient power transmission from a transmitter to an antenna requires:

- inductive impedance
- matching of impedances
- high load impedance
- low load resistance

< matching of impedances >

B-006-006-008
****
4.14
To obtain efficient transfer of power from a transmitter to an antenna, it is important that there is a:

- low load resistance
- matching of impedance
- high load impedance
- proper method of balance

< matching of impedance >

B-006-006-009
****
7.8
If an antenna is correctly matched to a transmitter, the length of transmission line:

- must be an odd number of quarter-wave
- must be an even number of half-waves
- will have no effect on the matching
- must be a full wavelength long

< will have no effect on the matching >

B-006-006-010
****
4.14
The reason that an RF transmission line should be matched at the transmitter end is to:

- overcome fading of the transmitted signal
- transfer the maximum amount of power to the antenna
- ensure that the radiated signal has the intended polarization
- prevent frequency drift

< transfer the maximum amount of power to the antenna >

B-006-006-011
****
7.6/7.7/7.8
If the centre impedance of a folded dipole is approximately 300 ohms, and you are using RG8U (50 ohms) coaxial lines, what is the ratio required to have the line and the antenna matched?

- 4:1
- 10:1
- 6:1
- 2:1

< 6:1 >

6-7 Isotropic source, polarization via element orientation

B-006-007-001
****
8.2
What does horizontal wave polarization mean?

- The electric and magnetic lines of force of a radio wave are perpendicular to the Earth's surface
- The electric lines of force of a radio wave are perpendicular to the Earth's surface
- The magnetic lines of force of a radio wave are parallel to the Earth's surface
- The electric lines of force of a radio wave are parallel to the Earth's surface

< The electric lines of force of a radio wave are parallel to the Earth's surface >

B-006-007-002
****
8.2
What does vertical wave polarization mean?

- The electric and magnetic lines of force of a radio wave are parallel to the Earth's surface
- The electric lines of force of a radio wave are parallel to the Earth's surface
- The electric lines of force of a radio wave are perpendicular to the Earth's surface
- The magnetic lines of force of a radio wave are perpendicular to the Earth's surface

< The electric lines of force of a radio wave are perpendicular to the Earth's surface >

B-006-007-003
****
8.2
What electromagnetic wave polarization does a Yagi antenna have when its elements are parallel to the Earth's surface?

- Helical
- Vertical
- Circular
- Horizontal

< Horizontal >

B-006-007-004
****
8.2
What electromagnetic wave polarization does a half-wavelength antenna have when it is perpendicular to the Earth's surface?

- Vertical
- Circular
- Horizontal
- Parabolical

< Vertical >

B-006-007-005
****
8.2
Polarization of an antenna is determined by:

- the magnetic field
- the type of antenna
- the orientation of the electric field relative to the Earth's surface
- the height of the antenna

< the orientation of the electric field relative to the Earth's surface >

B-006-007-006
****
8.3
An isotropic antenna is:

- an infinitely long piece of wire
- a dummy load
- a half-wave reference dipole
- a hypothetical point source

< a hypothetical point source >

B-006-007-007
****
8.6
What is the antenna radiation pattern for an isotropic radiator?

- A cardioid
- A unidirectional cardioid
- A sphere
- A parabola

< A sphere >

B-006-007-008
****
8.9
VHF signals from a mobile station using a vertical whip antenna will normally be best received using a:

- random length of wire
- horizontal ground-plane antenna
- horizontal dipole antenna
- vertical ground-plane antenna

< vertical ground-plane antenna >

B-006-007-009
****
8.6
A dipole antenna will emit a vertically polarized wave if it is:

- mounted vertically
- fed with the correct type of RF
- too near to the ground
- parallel with the ground

< mounted vertically >

B-006-007-010
****
8.6
If an electromagnetic wave leaves an antenna vertically polarized, it will arrive at the receiving antenna, by ground wave:

- horizontally polarized
- polarized in any plane
- vertically polarized
- polarized at right angles to original

< vertically polarized >

B-006-007-011
****
8.6
Compared with a horizontal antenna, a vertical antenna will receive a vertically polarized radio wave:

- without any comparative difference
- if the antenna changes the polarization
- at greater strength
- at weaker strength

< at greater strength >

6-8 Wavelength versus physical length

B-006-008-001
****
8.8BSG8; 8.8.1BSG9
If an antenna is made longer, what happens to its resonant frequency?

- It stays the same
- It disappears
- It decreases
- It increases

< It decreases >

Frequency and wavelength are inversely proportional. As one increases, the other deceases. As you lengthen an antenna, you lengthen the wavelength with which is resonant. The frequency with which is resonant decreases.

B-006-008-002
****
8.8BSG8 ,8.8.1BSG9
If an antenna is made shorter, what happens to its resonant frequency?

- It stays the same
- It disappears
- It decreases
- It increases

< It increases >

Frequency and wavelength are inversely proportional. As one increases, the other deceases. As you shorten an antenna you shorten the wavelength with which is resonant. The frequency with which is resonant increases.

B-006-008-003
****
5.4
The wavelength for a frequency of 25 MHz is:

- 12 metres (39.4 ft)
- 15 metres (49.2 ft)
- 4 metres (13.1 ft)
- 32 metres (105 ft)

< 12 metres (39.4 ft)>

B-006-008-004
****
5.4
The velocity of propagation of radio frequency energy in free space is:

- 186 000 kilometres per second
- 300 000 kilometres per second
- 3000 kilometres per second
- 150 kilometres per second

< 300 000 kilometres per second >

B-006-008-005
****
8.8
Adding a series inductance to an antenna would:

- decrease the resonant frequency
- increase the resonant frequency
- have little effect
- have no change on the resonant frequency

< decrease the resonant frequency >

An inductance is a coil of wire, so adding an inductance in series with the antenna means that you are lengthening the antenna. The longer the antenna, the lower the resonant frequency.

B-006-008-006
****
8.5, 8.8BSG8; 8.5, 8.8.1BSG9
The resonant frequency of an antenna may be increased by:

- shortening the radiating element
- lowering the radiating element
- increasing the height the radiating element
- lengthening the radiating element

< shortening the radiating element >

Frequency and wavelength are inversely proportional. As one increases, the other deceases. As you shorten an antenna you shorten the wavelength with which is resonant, and thus increase its resonant frequency.

B-006-008-007
****
5.4
The speed of a radio wave:

- varies directly with frequency
- is the same as the speed of light
- is infinite in space
- is always less than half speed of light

< is the same as the speed of light >

B-006-008-008
****
8.5
At the end of suspended antenna wire, insulators are used. These act to:

- limit the electrical length of the antenna
- increase the effective antenna length
- allow the antenna to be more easily held vertically
- prevent any loss of radio waves by the antenna

< limit the electrical length of the antenna >

B-006-008-009
****
8.5
To lower the resonant frequency of an antenna, the operator should:

- ground one end
- centre feed it with TV ribbon transmission line
- lengthen it
- shorten it

< lengthen it >

Frequency and wavelength are inversely proportional. As one increases, the other deceases. As you lengthen an antenna you lengthen the wavelength with which is resonant, and thus decrease its resonant frequency.

B-006-008-010
****
8.8BSG8; 8.8.4BSG9
One solution to multiband operation with a shortened radiator is the “trap dipole” or trap vertical. These “traps” are actually:

- coils wrapped around a ferrite rod
- hollow metal cans
- a coil and capacitor in parallel
- large wire-wound resistors

< a coil and capacitor in parallel >

B-006-008-011
****
5.4
The wavelength corresponding to a frequency of 2 MHz is:

- 150 m (492 ft)
- 360 m (1181 ft)
- 1500 m (4921 ft)
- 30 m (98 ft)

<150 m (492 ft)>

6-9 Gain, directivity, radiation pattern, antenna bandwidth

B-006-009-001
****
8.10
What is a parasitic beam antenna?

- An antenna where some elements obtain their radio energy by induction or radiation from a driven element
- An antenna where the driven element obtains its radio energy by induction or radiation from director elements
- An antenna where all elements are driven by direct connection to the transmission line
- An antenna where wave traps are used to magnetically couple the elements

< An antenna where some elements obtain their radio energy by induction or radiation from a driven element >

B-006-009-002
****
8.10BSG8; 8.10.1BSG9
How can the bandwidth of a parasitic beam antenna be increased?

- Use traps on the elements
- Use tapered-diameter elements
- Use closer element spacing
- Use larger diameter elements

< Use larger diameter elements >

B-006-009-003
****
8.10
If a parasitic element slightly shorter than a horizontal dipole antenna is placed parallel to the dipole 0.1 wavelength away from it and at the same height, what effect will this have on the antenna's radiation pattern?

- A major lobe will develop in the horizontal plane, parallel to the two elements
- A major lobe will develop in the vertical plane, away from the ground
- The radiation pattern will not be affected
- A major lobe will develop in the horizontal plane, from the dipole toward the parasitic element

< A major lobe will develop in the horizontal plane, from the dipole toward the parasitic element >

B-006-009-004
****
8.10
If a parasitic element slightly longer than a horizontal dipole antenna is placed parallel to the dipole 0.1 wavelength away from it and at the same height, what effect will this have on the antenna's radiation pattern?

- The radiation pattern will not be affected
- A major lobe will develop in the horizontal plane, from the parasitic element, toward the dipole
- A major lobe will develop in the horizontal plane, parallel to the two elements
- A major lobe will develop in the vertical plane, away from the ground

< A major lobe will develop in the horizontal plane, from the parasitic element, toward the dipole >

B-006-009-005
****
8.14
The property of an antenna, which defines the range of frequencies to which it will respond, is called its:

- bandwidth
- front-to-back ratio
- impedance
- polarization

< bandwidth >

B-006-009-006
****
8.3
Approximately how much gain does a half-wave dipole have over an isotropic radiator?

- 2.1 dB
- 1.5 dB
- 3.0 dB
- 6.0 dB

< 2.1 dB >

B-006-009-007
****
8.3
What is meant by antenna gain?

- The power amplifier gain minus the transmission line losses
- The numerical ratio relating the radiated signal strength of an antenna to that of another antenna
- The numerical ratio of the signal in the forward direction to the signal in the back direction
- The numerical ratio of the amount of power radiated by an antenna compared to the transmitter output power

< The numerical ratio relating the radiated signal strength of an antenna to that of another antenna >

B-006-009-008
****
8.14
What is meant by antenna bandwidth?

- The angle formed between two imaginary lines drawn through the ends of the elements
- The frequency range over which the antenna may be expected to perform well
- Antenna length divided by the number of elements
- The angle between the half-power radiation points

< The frequency range over which the antenna may be expected to perform well >

B-006-009-009
****
8.6
In free space, what is the radiation characteristic of a half-wave dipole?

- Maximum radiation from the ends, minimum broadside
- Omnidirectional
- Maximum radiation at 45 degrees to the plane of the antenna
- Minimum radiation from the ends, maximum broadside

< Minimum radiation from the ends, maximum broadside >

B-006-009-010
****
8.3
The gain of an antenna, especially on VHF and above, is quoted in dBi. The "i" in this expression stands for:

- ideal
- ionosphere
- interpolated
- isotropic

< isotropic >

B-006-009-011
****
8.10
The front-to-back ratio of a beam antenna is:

- the ratio of the forward power at the 3 dB points to the power radiated in the backward direction
- the ratio of the maximum forward power in the major lobe to the maximum backward power radiation
- the forward power of the major lobe to the power in the backward direction both being measured at the 3 dB points
- undefined

< the ratio of the maximum forward power in the major lobe to the maximum backward power radiation >

The correct term for a beam antenna is multi-element parasitic directional driven array.

6-10 Vertical antennas - types, dimensions, characteristics

B-006-010-001
****
8.5
How do you calculate the length in metres (feet) of a quarter-wavelength antenna?

- Divide 150 (491) by the antenna's operating frequency in MHz
- Divide 71.5 (234) by the antenna's operating frequency in MHz
- Divide 468 (1532) by the antenna's operating frequency in MHz
- Divide 300 (982) by the antenna's operating frequency in MHz

< Divide 71.5 (234) by the antenna's operating frequency in MHz >

Remember that the equation depends on the operating frequency. For frequencies above 30 MHz, the equation is $\lambda = \frac{300}{f}$ for a one wavelength antenna and below 30 MHz, the equation is $\lambda = \frac{286}{f}$ for a one wavelength antenna. The answer to this question then is 71.5 metres, where the second equation has been used for a quarter-wavelength antenna.

B-006-010-002
****
8.5
If you made a quarter-wavelength vertical antenna for 21.125 MHz, how long would it be?

- 6.76 metres (22.2 ft)
- 3.36 metres (11.0 ft)
- 3.6 metres (11.8 ft)
- 7.2 metres (23.6 ft)

< 3.36 metres (11.0 ft)> See the note in the previous question.

B-006-010-003
****
8.5
If you made a half-wavelength vertical antenna for 223 MHz, how long would it be?

- 64 cm (25.2 in)
- 128 cm (50.4 in)
- 105 cm (41.3 in)
- 134.6cm(53in)

< 64 cm (25.2 in)>

We are dealing with a frequency above 30 MHz, so we use the following relationship: $\lambda = \frac{300}{f}$. Since we want a half-wavelength antenna we use : $\lambda = \frac{150}{f}$. Our trusty calculator tells us that 150/223 = 0.673 m to three decimal places. Since the answers above are expressed in centimetres, 0.673 m = 67.3 cm. The only answer that seems close is "64 cm (25.2 in)". It seems as if IC used the wrong formula in solving this, 143/f, which applies for frequencies below 30 MHz. If this question shows up on your exam remember this warning and the answer that IC want "64 cm (25.2 in)"!

B-006-010-004
****
8.9
Why is a 5/8-wavelength vertical antenna better than a 1/4-wavelength vertical antenna for VHF or UHF mobile operations?

- A 5/8-wavelength antenna is easier to install on a car
- A 5/8-wavelength antenna can handle more power
- A 5/8-wavelength antenna has more gain
- A 5/8-wavelength antenna has less corona loss

< A 5/8-wavelength antenna has more gain >

B-006-010-005
****
8.9
If a magnetic-base whip antenna is placed on the roof of a car, in what direction does it send out radio energy?

- Most of it goes equally in two opposite directions
- Most of it goes in one direction
- It goes out equally well in all horizontal directions
- Most of it is aimed high into the sky

< It goes out equally well in all horizontal directions >

B-006-010-006
****
8.9
What is an advantage of downward sloping radials on a ground plane antenna?

- It brings the feed point impedance closer to 300 ohms
- It lowers the radiation angle
- It brings the feed point impedance closer to 50 ohms
- It increases the radiation angle

< It brings the feed point impedance closer to 50 ohms >

B-006-010-007
****
8.9
What happens to the feed point impedance of a ground-plane antenna when its radials are changed from horizontal to downward-sloping?

- It increases
- It decreases
- It stays the same
- It approaches zero

< It increases >

B-006-010-008
****
8.9
Which of the following transmission lines will give the best match to the base of a quarter-wave ground-plane antenna?

- 50 ohms coaxial cable
- 300 ohms balanced transmission line
- 75 ohms balanced transmission line
- 300 ohms coaxial cable

<50 ohms coaxial cable >

B-006-010-009
****
8.9
The main characteristic of a vertical antenna is that it will:

- be easy to feed with TV ribbon transmission line
- receive signals equally well from all compass points around it
- be very sensitive to signals coming from horizontal antennas
- require few insulators

< receive signals equally well from all compass points around it >

B-006-010-010
****
8.9
Why is a loading coil often used with an HF mobile vertical antenna?

- To lower the losses
- To lower the Q
- To filter out electrical noise
- To tune out capacitive reactance

< To tune out capacitive reactance >

B-006-010-011
****
8.9
What is the main reason why so many VHF base and mobile antennas are 5/8 of a wavelength?

- It is easy to match the antenna to the transmitter
- It's a convenient length on VHF
- The angle of radiation is low
- The angle of radiation is high giving excellent local coverage

< The angle of radiation is low

6-11 Yagi antennas - types, dimensions, characteristics

B-006-011-001
****
8.10
How many directly driven elements do most Yagi antennas have?

- Two
- Three
- None
- One

< One >

B-006-011-002
****
8.5/8.10
Approximately how long is the driven element of a Yagi antenna for 14.0 MHz?

- 20.12 metres (66 feet)
- 10.21 metres (33.5 feet)
- 5.21 metres (17 feet)
- 10.67 metres (35 feet)

< 10.21 metres (33.5 feet) >

Don't forget that the driven element for a Yagi is most commonly a half-wave dipole.

B-006-011-003
****
8.5/8.10
Approximately how long is the director element of a Yagi antenna for 21.1 MHz?

- 5.18 metres (17 feet)
- 3.2 metres (10.5 feet)
- 12.8 metres (42 feet)
- 6.4 metres (21 feet)

< 6.4 metres (21 feet) >

Don't forget that the driven element for a Yagi is most commonly a half-wave dipole.

B-006-011-004
****
8.5/8.10
Approximately how long is the reflector element of a Yagi antenna for 28.1 MHz?

- 10.67 metres (35 feet)
- 2.66 metres(8.75 feet)
- 5.33 metres (17.5 feet)
- 4.88 metres (16 feet)

< 5.33 metres (17.5 feet) >

Don't forget that the driven element for a Yagi is most commonly a half-wave dipole.

B-006-011-005
****
8.10
What is one effect of increasing the boom length and adding directors to a Yagi antenna?

- Wind load decreases
- Gain increases
- SWR increases
- Weight decreases

< Gain increases >

B-006-011-006
****
8.10
What are some advantages of a Yagi with wide element spacing?

- High gain, less critical tuning and wider bandwidth
- High gain, lower loss and a low SWR
- High front-to-back ratio and lower input resistance
- Shorter boom length, lower weight and wind resistance

< High gain, less critical tuning and wider bandwidth >

B-006-011-007
****
8.10
Why is a Yagi antenna often used for radiocommunications on the 20-metre band?

- It provides the highest possible angle of radiation for the HF bands
- It helps reduce interference from other stations off to the side or behind
- It provides excellent omnidirectional coverage in the horizontal plane
- It is smaller, less expensive and easier to erect than a dipole or vertical antenna

< It helps reduce interference from other stations off to the side or behind >

B-006-011-008
****
8.10
What does “antenna front-to-back ratio” mean in reference to a Yagi antenna?

- The number of directors versus the number of reflectors
- The power radiated in the major radiation lobe compared to the power radiated in exactly the opposite direction
- The relative position of the driven element with respect to the reflectors and directors
- The power radiated in the major radiation lobe compared to the power radiated 90 degrees away from that direction

< The power radiated in the major radiation lobe compared to the power radiated in exactly the opposite direction >

B-006-011-009
****
8.10
What is a good way to get maximum performance from a Yagi antenna?

- Optimize the lengths and spacing of the elements
- Use RG-58 transmission line
- Use a reactance bridge to measure the antenna performance from each direction around the antenna
- Avoid using towers higher than 9 metres (30 feet) above the ground

< Optimize the lengths and spacing of the elements >

B-006-011-010
****
8.10
The spacing between the elements on a three-element Yagi antenna, representing the best overall choice, is _____ of a wavelength.

- 0.50
- 0.75
- 0.20
- 0.10

< 0.20 >

B-006-011-011
****
8.10
If the forward gain of a six-element Yagi is about 10 dBi, what would the gain of two of these antennas be if they were “stacked”?

- 7 dBi
- 20 dBi
- 10 dBi
- 13 dBi

<13 dBi >

6-12 Wire antennas - types, dimensions, characteristics

B-006-012-001
****
8.5
If you made a half-wavelength dipole antenna for 28.150 MHz, how long would it be?

- 5.08 metres (16.62 ft)
- 10.5 metres (34.37 ft)
- 28.55 metres (93.45 ft)
- 10.16 metres (33.26 ft)

< 5.08 metres (16.62 ft) >

B-006-012-002
****
8.8BSG8; 8.8.6BSG9
What is one disadvantage of a random wire antenna?

- You may experience RF feedback in your station
- It usually produces vertically polarized radiation
- It must be longer than 1 wavelength
- You must use an inverted T matching network for multi-band operation

< You may experience RF feedback in your station >

B-006-012-003
****
8.6
What is the low angle radiation pattern of an ideal half-wavelength dipole HF antenna installed parallel to the Earth?

- It is a circle (equal radiation in all directions)
- It is two smaller lobes on one side of the antenna, and one larger lobe on the other side
- It is a figure-eight, off both ends of the antenna
- It is a figure-eight, perpendicular to the antenna

< It is a figure-eight, perpendicular to the antenna >

B-006-012-004
****
8.8BSG8; 8.8.1/8.8.5BSG9
The impedances in ohms at the feed point of the dipole and folded dipole in free space are, respectively:

- 52 and 200
- 73 and 300
- 73 and 150
- 52 and 100

< 73 and 300 >

B-006-012-005
****
8.6
A horizontal dipole transmitting antenna, installed at an ideal height so that the ends are pointing North/South, radiates:

- equally in all directions
- mostly to the East and West
- mostly to the South and North
- mostly to the South

< mostly to the East and West >

B-006-012-006
****
8.8BSG8; 8.8.5BSG9
How does the bandwidth of a folded dipole antenna compare with that of a simple dipole antenna?

- It is less than 50%
- It is 0.707 times the bandwidth
- It is greater
- It is essentially the same

< It is greater >

B-006-012-007
****
8.8BSG8; 8.8.4BSG9
What is a disadvantage of using an antenna equipped with traps?

- It may radiate harmonics more readily
- It is too sharply directional at lower frequencies
- It must be neutralized
- It can only be used for one band

< It may radiate harmonics more readily >

B-006-012-008
****
8.8BSG8; 8.8.4BSG9
What is an advantage of using a trap antenna?

- It minimizes harmonic radiation
- It may be used for multiband operation
- It has high directivity at the higher frequencies
- It has high gain

< It may be used for multiband operation >

B-006-012-009
****
8.5/8.8
If you were to cut a half-wave dipole for 3.75 MHz, what would be its approximate length?

- 75 meters (245 ft)
- 38 meters (125 ft)
- 32 meters (105 f.)
- 45 meters (145 ft)

< 38 meters (125 ft) >

Since it is a half-wave antenna below 30 MHz, the formula will be wavelength = 143/frequency = 150/3.75 = 38.1 m.

6-13 Quad/loop antennas - types, dimensions, characteristics

B-006-013-001
****

8.10BSG8; 8.10.2BSG9
What is a cubical quad antenna?

- Four straight, parallel elements in line with each other, each approximately 1/2- electrical wavelength long
- Two or more parallel four-sided wire loops, each approximately one-electrical wavelength long
- A center-fed wire 1/2-electrical wavelength long
- A vertical conductor 1/4-electrical wavelength high, fed at the bottom

< Two or more parallel four-sided wire loops, each approximately one-electrical wavelength long >

B-006-013-002
****

8.10BSG8; 8.10.2BSG9
What is a delta loop antenna?

- An antenna whose elements are each a three-sided loop whose total length is approximately one electrical wavelength
- A large copper ring or wire loop, used in direction finding
- An antenna system made of three vertical antennas, arranged in a triangular shape
- An antenna made from several triangular coils of wire on an insulating form

< An antenna whose elements are each a three-sided loop whose total length is approximately one electrical wavelength >

B-006-013-003
****

8.5/8.10BSG8; 8.5/8.10.2BSG9
Approximately how long is each side of a cubical quad antenna driven element for 21.4 MHz?

- 3.54 metres (11.7 feet)
- 0.36 metres (1.17 feet)
- 14.33 metres (47 feet)
- 143 metres (469 feet)

< 3.54 metres (11.7 feet) >

Remember that in a cubical quad that the driven element is one wavelength long and so each side will be 1/4 wavelength long. Again, IC forgot that the frequency was below 30 MHz. The correct answer is 3.34 m but give IC the answer they want "3.54 metres (11.7 feet)".

B-006-013-004
****
8.5/8.10BSG8; 8.5/8.10.2BSG9
Approximately how long is each side of a cubical quad antenna driven element for 14.3 MHz?

- 5.36 metres (17.6 feet)
- 21.43 metres (70.3 feet)
- 53.34 metres (175 feet)
- 7.13 metres (23.4 feet)

< 5.36 metres (17.6 feet) >

Remember that in a cubical quad that the driven element is one wavelength long and each side will be 1/4 wavelength long. Again, IC forgot that the frequency was below 30 MHz. The correct answer is 5.0 m but give IC the answer they want "5.36 metres (17.6 feet)".

B-006-013-005
****
8.5/8.10BSG8; 8.5/8.10.2BSG9
Approximately how long is each leg of a symmetrical delta loop antenna driven element for 28.7 MHz?

- 3.5 metres (11.5 feet)
- 2.67 metres (8.75 feet)
- 7.13 metres (23.4 feet)
- 10.67 metres (35 feet)

< 3.5 metres (11.5 feet) >

Remember that in the delta loop, like the cubical quad, the driven element is one full wavelength long. Each "leg" or side will then be 1/3 wavelength long. Again, IC forgot that the frequency was below 30 MHz. The correct answer is 3.32 m but give IC the answer they want "3.5 metres (11.5 feet)".

B-006-013-006
****
8.10BSG8; 8.10.2BSG9
Which statement about two-element delta loops and quad antennas is true?

- They perform very well only at HF
- They are effective only when constructed using insulated wire
- They perform poorly above HF
- They compare favourably with a three-element Yagi

< They compare favourably with a three-element Yagi >

B-006-013-007
****
8.10BSG8; 8.10.2BSG9
Compared to a dipole antenna, what are the directional radiation characteristics of a cubical quad antenna?

- The quad has more directivity in the horizontal plane but less directivity in the vertical plane
- The quad has less directivity in the horizontal plane but more directivity in the vertical plane
- The quad has less directivity in both horizontal and vertical planes
- The quad has more directivity in both horizontal and vertical planes

< The quad has more directivity in both horizontal and vertical planes >

B-006-013-008
****
8.10BSG8; 8.10.2BSG9
Moving the feed point of a multi-element quad antenna from a side parallel to the ground to a side perpendicular to the ground will have what effect?

- It will change the antenna polarization from vertical to horizontal
- It will significantly decrease the antenna feed point impedance
- It will significantly increase the antenna feed point impedance
- It will change the antenna polarization from horizontal to vertical

< It will change the antenna polarization from horizontal to vertical >

B-006-013-009
****
8.10
What does the term “antenna front-to back ratio” mean in reference to a delta loop antenna?

- The number of directors versus the number of reflectors
- The power radiated in the major radiation lobe compared to the power radiated in exactly the opposite direction
- The relative position of the driven element with respect to the reflectors and directors
- The power radiated in the major radiation lobe compared to the power radiated 90 degrees away from that direction

< The power radiated in the major radiation lobe compared to the power radiated in exactly the opposite direction >

B-006-013-010
****
8.10BSG8; 8.10.2BSG9
The cubical “quad” or “quad” antenna consists of two or more square loops of wire. The driven element has an approximate overall length of:

- one wavelength
- three-quarters of a wavelength
- two wavelengths
- one-half wavelength

< one wavelength >

B-006-013-011
****
8.10BSG8; 8.10.2BSG9
The delta loop antenna consists of two or more triangular structures mounted on a boom. The overall length of the driven element is approximately:

- one wavelength
- one-quarter of a wavelength
- two wavelengths
- one-half of a wavelength

< one wavelength >

Radio Wave Propagation - 007

7-1 Line of sight, ground wave, ionospheric wave (sky wave)

B-007-001-001
****
6.10
What type of propagation usually occurs from one hand-held VHF transceiver to another nearby?

- Auroral propagation
- Line-of-sight propagation
- Tunnel propagation
- Sky-wave propagation

< Line-of-sight propagation >

B-007-001-002
****
6.4
How does the range of sky-wave propagation compare to ground-wave propagation?

- It is much longer
- It is much shorter
- It is about the same
- It depends on the weather

< It is much longer >

B-007-001-003
****
6.3
When a signal is returned to Earth by the ionosphere, what is this called?

- Tropospheric propagation
- Ground-wave propagation
- Earth-Moon-Earth propagation
- Sky-wave propagation

< Sky-wave propagation >

B-007-001-004
****
6.2
How are VHF signals propagated within the range of the visible horizon?

- By direct wave
- By sky-wave
- By plane wave
- By geometric wave

< By direct wave >

B-007-001-005
****
6.2
Sky-wave is another name for:

- inverted wave
- ionospheric wave
- tropospheric wave
- ground wave

< ionospheric wave >

B-007-001-006
****
6.2
That portion of the radiation which is directly affected by the surface of the Earth is called:

- ground wave
- tropospheric wave
- ionospheric wave
- inverted wave

< ground wave >

B-007-001-007
****
6.2
At lower HF frequencies, radiocommunication out to 200 km is made possible by:

- troposphere
- skip wave
- ionosphere
- ground wave

< ground wave >

B-007-001-008
****
6.4
The distance travelled by ground waves:

- is more at higher frequencies
- is the same for all frequencies
- is less at higher frequencies
- depends on the maximum usable frequency

< is less at higher frequencies >

B-007-001-009
****
6.2
The radio wave which follows a path from the transmitter to the ionosphere and back to Earth is known correctly as the:

- surface wave
- skip wave
- ionospheric wave
- F layer

< ionospheric wave >

B-007-001-010
****
6.3
Reception of high frequency (HF) radio waves beyond 4000 km is generally made possible by:

- ground wave
- skip wave
- surface wave
- ionospheric wave

< ionospheric wave >

7-2 Ionosphere, ionospheric regions (layers)

B-007-002-001
****
6.3
What causes the ionosphere to form?

- Lightning ionizing the outer atmosphere
- Release of fluorocarbons into the atmosphere
- Temperature changes ionizing the outer atmosphere
- Solar radiation ionizing the outer atmosphere

< Solar radiation ionizing the outer atmosphere >

B-007-002-002
****
6.3
What type of solar radiation is most responsible for ionization in the outer atmosphere?

- Ultraviolet
- Microwave
- Ionized particles
- Thermal

< Ultraviolet >

B-007-002-003
****
6.3
Which ionospheric region is closest to the Earth?

- The E region
- The F region
- The A region
- The D region

< The D region >

B-007-002-004
****
6.3
Which region of the ionosphere is the least useful for long distance radio-wave propagation?

- The D region
- The F2 region
- The F1 region
- The E region

< The D region >

B-007-002-005
****
6.3
What two sub-regions of ionosphere exist only in the daytime?

- Electrostatic and electromagnetic
- D and E
- F1 and F2
- Troposphere and stratosphere

< F1 and F2>

B-007-002-006
****
6.3
When is the ionosphere most ionized?

- Midday
- Dawn
- Midnight
- Dusk

< Midday >

B-007-002-007
****
6.3
When is the ionosphere least ionized?

- Shortly before midnight
- Shortly before dawn
- Just after noon
- Just after dusk

< Shortly before dawn >

B-007-002-008
****
6.3
Why is the F2 region mainly responsible for the longest distance radio-wave propagation?

- Because it is the lowest ionospheric region
- Because it does not absorb radio waves as much as other ionospheric regions
- Because it is the highest ionospheric region
- Because it exists only at night

< Because it is the highest ionospheric region >

B-007-002-009
****
6.9
What is the main reason the 160, 80 and 40 metre amateur bands tend to be useful only for short-distance communications during daylight hours?

- Because of magnetic flux
- Because of a lack of activity
- Because of D-region absorption
- Because of auroral propagation

< Because of D-region absorption >

B-007-002-010
****
6.3
During the day, one of the ionospheric layers splits into two parts called:

- E1 and E2
- A and B
- F1 and F2
- D1 and D2

< F1 and F2 >

B-007-002-011
****
6.3
The position of the E layer in the ionosphere is:

- below the D layer
- sporadic
- above the F layer
- below the F layer

< below the F layer >

7-3 Propagation hops, skip zone, skip distance

B-007-003-001
****
6.3
What is a skip zone?

- An area which is too far away for ground-wave propagation, but too close for sky-wave propagation
- An area which is too far away for ground-wave or sky-wave propagation
- An area covered by sky-wave propagation
- An area covered by ground-wave propagation

< An area which is too far away for ground-wave propagation, but too close for sky-wave propagation >

B-007-003-002
****
6.3
What is the maximum distance along the Earth's surface that is normally covered in one hop using the F2 region?

- 4000 km (2500 miles)
- None; the F2 region does not support radio-wave propagation
- 2000 km (1250 miles)
- 300 km (190 miles)

< 4000 km (2500 miles) >

Actually this value can be as high as 4800 km! But remember the answer IC wants.

B-007-003-003
****
6.2/6.3
What is the maximum distance along the Earth's surface that is normally covered in one hop using the E region?

- 2000 km (1250 miles)
- 300 km (190 miles)
- 4000 km (2500 miles)
- None; the E region does not support radio-wave propagation

< 2000 km (1250 miles) >

B-007-003-004
****
6.3
Skip zone is:

- a zone of silence caused by lost sky waves
- a zone between any two refracted waves
- a zone between the antenna and the return of the first refracted wave
- a zone between the end of the ground wave and the point where the first refracted wave returns to Earth

< a zone between the end of the ground wave and the point where the first refracted wave returns to Earth >

B-007-003-005
****
6.3
The distance to Europe from your location is approximately 5000 km. What sort of propagation is the most likely to be involved?

- Back scatter
- Tropospheric scatter
- Multihop
- Sporadic “E”

< Multihop >

B-007-003-006
****
6.3
For radio signals, the skip distance is determined by the:

- angle of radiation
- type of transmitting antenna used
- height of the ionosphere and the angle of radiation
- power fed to the power amplifier

< height of the ionosphere and the angle of radiation >

B-007-003-007
****
6.3
The distance from the transmitter to the nearest point where the sky wave returns to the Earth is called the:

- maximum usable frequency
- skip distance
- skip zone
- angle of radiation

< skip distance >

B-007-003-008
****
6.3
Skip distance is the:

- the minimum distance reached by a signal after one reflection by the ionosphere
- the maximum distance reached by a signal after one reflection by the ionosphere
- the minimum distance reached by a ground-wave signal
- the maximum distance a signal will travel by both a ground wave and reflected wave

< the minimum distance reached by a signal after one reflection by the ionosphere >

B-007-003-009
****
6.3
Skip distance is a term associated with signals from the ionosphere. Skip effects are due to:

- high gain antennas being used
- local cloud cover
- reflection and refraction from the ionosphere
- selective fading of local signals

< reflection and refraction from the ionosphere >

B-007-003-010
****
6.3
The skip distance of a sky wave will be greatest when the:

- polarization is vertical
- ionosphere is most densely ionized
- signal given out is strongest
- angle between ground and radiation is smallest

< angle between ground and radiation is smallest >

B-007-003-011
****
6.3
If the height of the reflecting layer of the ionosphere increases, the skip distance of a high frequency (HF) transmission:

- stays the same
- varies regularly
- decreases
- becomes greater

< becomes greater >

7-4 Ionospheric absorption, causes and variation, fading, phase shift, Faraday rotation

B-007-004-001
****
6.3
What effect does the D region of the ionosphere have on lower frequency HF signals in the daytime?

- It refracts the radio waves back to Earth
- It has little or no effect on 80-metre radio waves
- It absorbs the signals
- It bends the radio waves out into space

< It absorbs the signals >

B-007-004-002
****
6.3
What causes distant AM broadcast and 160 metre ham band stations not to be heard during daytime hours?

- The splitting of the F region
- The weather below the ionosphere
- The ionization of the D region
- The presence of ionized clouds in the E region

< The ionization of the D region >

B-007-004-003
****
6.4
Two or more parts of the radio wave follow different paths during propagation and this may result in phase differences at the receiver. This “change” at the receiver is called:

- absorption
- skip
- fading
- baffling

< fading >

B-007-004-004
****
6.4
A change or variation in signal strength at the antenna, caused by differences in path lengths, is called:

- absorption
- fluctuation
- path loss
- fading

< fading >

B-007-004-005
****
6.4
When a transmitted radio signal reaches a station by a one-hop and two-hop skip path, small changes in the ionosphere can cause:

- consistently stronger signals
- a change in the ground-wave signal
- variations in signal strength
- consistent fading of received signal

< variations in signal strength >

B-007-004-006
****
6.6
The usual effect of ionospheric storms is to:

- increase the maximum usable frequency
- cause a fade-out of sky-wave signals
- produce extreme weather changes
- prevent communications by ground wave

< cause a fade-out of sky-wave signals >

B-007-004-007
****
6.1,6.2, 6.3
On the VHF and UHF bands, polarization of the receiving antenna is very important in relation to the transmitting antenna, yet on HF bands it is relatively unimportant. Why is that so?

- Greater selectivity is possible with HF receivers making changes in polarization redundant
- The ionosphere can change the polarization of the signal from moment to moment
- The ground wave and the sky wave continually shift the polarization
- Anomalies in the Earth's magnetic field produce a profound effect on HF polarization but not on VHF & UHF frequencies

< The ionosphere can change the polarization of the signal from moment to moment >

This is a "sneaky question". You have to remember that there are differences between the "transmission paths" of VHF/UHF and HF signals. The VHF/UHF signals are Direct Wave and do not involve the ionosphere. HF signals are Sky Wave and involve the ionosphere. Re-read S6.1,S6.2, S6.3

B-007-004-008
****
6.4
What causes selective fading?

- Phase differences between radio wave components of the same transmission, as experienced at the receiving station
- Small changes in beam heading at the receiving station
- Time differences between the receiving and transmitting stations
- Large changes in the height of the ionosphere at the receiving station ordinarily occurring shortly before sunrise and sunset

< Phase differences between radio wave components of the same transmission, as experienced at the receiving station >

B-007-004-009
****
6.4
How does the bandwidth of a transmitted signal affect selective fading?

- It is the same for both wide and narrow bandwidths
- Only the receiver bandwidth determines the selective fading effect
- It is more pronounced at narrow bandwidths
- It is more pronounced at wide bandwidths

< It is more pronounced at wide bandwidths >

B-007-004-010
****
6.3
Polarization change often takes place on radio waves that are propagated over long distances. Which of these does NOT cause polarization change?

- Refractions
- Parabolic interaction
- Reflections
- Passage through magnetic fields (Faraday rotation)

< Parabolic interaction >

B-007-004-011
****
6.3
Reflection of a SSB transmission from the ionosphere causes:

- a high-pitch squeal at the receiver
- little or no phase-shift distortion
- phase-shift distortion
- signal cancellation at the receiver

< little or no phase-shift distortion >

7-5 Solar activity, sunspots, sunspot cycle

B-007-005-001
****
6.6
How do sunspots change the ionization of the atmosphere?

- The more sunspots there are, the greater the ionization
- The more sunspots there are, the less the ionization
- Unless there are sunspots, the ionization is zero
- They have no effect

< The more sunspots there are, the greater the ionization >

B-007-005-002
****
6.6
How long is an average sunspot cycle?

- 5 years
- 7 years
- 11 years
- 17 years

< 11 years >

B-007-005-003
****
6.6
What is solar flux?

- The radio energy emitted by the sun
- A measure of the tilt of the Earth's ionosphere on the side toward the sun
- The number of sunspots on the side of the sun facing the Earth
- The density of the sun's magnetic field

< The radio energy emitted by the sun >

B-007-005-004
****
6.6
What is the solar-flux index?

- A measure of solar activity that compares daily readings with results from the last six months
- A measure of solar activity that is taken annually
- A measure of solar activity that is taken at a specific frequency
- Another name for the American sunspot number

< A measure of solar activity that is taken at a specific frequency >

B-007-005-005
****
6.6
What influences all radio communication beyond ground-wave or line-of-sight ranges?

- The F2 region of the ionosphere
- The F1 region of the ionosphere
- Lunar tidal effects
- Solar radiation

< Solar radiation >

B-007-005-006
****
6.6
Which two types of radiation from the sun influence propagation?

- Polar region and equatorial emissions
- Infrared and gamma-ray emissions
- Electromagnetic and particle emissions
- Sub-audible and audio-frequency emissions

< Electromagnetic and particle emissions >

B-007-005-007
****
6.6
When sunspot numbers are high, how is propagation affected?

- High frequency radio signals become weak and distorted
- Frequencies up to 40 MHz or even higher become usable for long-distance communication
- High frequency radio signals are absorbed
- Frequencies up to 100 MHz or higher are normally usable for long-distance communication

< Frequencies up to 40 MHz or even higher become usable for long-distance communication >

B-007-005-008
****
6.6
All communication frequencies throughout the spectrum are affected in varying degrees by the:

- sun
- ionosphere
- aurora borealis
- atmospheric conditions

< sun >

B-007-005-009
****
6.6
Average duration of a solar cycle is:

- 1 year
- 11 years
- 3 years
- 6 years

<11 years >

B-007-005-010
****
6.6
The ability of the ionosphere to reflect high frequency radio signals depends on:

- the receiver sensitivity
- upper atmosphere weather conditions
- the amount of solar radiation
- the power of the transmitted signal

< the amount of solar radiation >

B-007-005-011
****
6.6
HF radio propagation cycles have a period of approximately 11:

- days
- centuries
- years
- months

< years >

7-6 MF and HF, critical and maximum useable frequencies, solar flux

B-007-006-001
****
6.8
What happens to signals higher in frequency than the critical frequency?

- Their frequency is changed by the ionosphere to be below the maximum usable frequency
- They are reflected back to their source
- They pass through the ionosphere
- They are absorbed by the ionosphere

< They pass through the ionosphere >

B-007-006-002
****
6.8
What causes the maximum usable frequency to vary?

- The speed of the winds in the upper atmosphere
- The type of weather just below the ionosphere
- The amount of radiation received from the sun, mainly ultraviolet
- The temperature of the ionosphere

< The amount of radiation received from the sun, mainly ultraviolet >

B-007-006-003
****
6.8
What does maximum usable frequency mean?

- The lowest frequency signal that will reach its intended destination
- The highest frequency signal that is most absorbed by the ionosphere
- The lowest frequency signal that is most absorbed by the ionosphere
- The highest frequency signal that will reach its intended destination

< The highest frequency signal that will reach its intended destination >

B-007-006-004
****
6.8
What can be done at an amateur station to continue HF communications during a sudden ionospheric disturbance?

- Try a different frequency shift
- Try a higher frequency band
- Try the other sideband
- Try a different antenna polarization

< Try a higher frequency band >

B-007-006-005
****
6.9
What is one way to determine if the maximum usable frequency (MUF) is high enough to support 28 MHz propagation between your station and western Europe?

- Listen for signals on the 20-metre beacon stations
- Listen for signals on the 39-metre broadcast stations
- Listen for WWVH time signals on 20 MHz
- Listen for signals on the 10-metre beacon stations

< Listen for signals on the 10-metre beacon stations >

B-007-006-006
****
6.8
What usually happens to radio waves with frequencies below the maximum usable frequency (MUF) when they are sent into the ionosphere?

- They pass through the ionosphere
- They are bent back to the Earth
- They are changed to a frequency above the MUF
- They are completely absorbed by the ionosphere

< They are bent back to the Earth >

B-007-006-007
****
6.9
At what point in the solar cycle does the 20-metre band usually support worldwide propagation during daylight hours?

- Only at the maximum point of the solar cycle
- At the summer solstice
- At any point in the solar cycle
- Only at the minimum point of the solar cycle

< At any point in the solar cycle >

B-007-006-008
****
6.8
If we transmit a signal, the frequency of which is so high we no longer receive a reflection from the ionosphere, the signal frequency is above the:

- skip distance
- speed of light
- sunspot frequency
- maximum usable frequency

< maximum usable frequency >

B-007-006-009
****
6.9
Communication on the 80 metre band is generally most difficult during:

- evening in summer
- daytime in winter
- daytime in summer
- evening in winter

< daytime in summer >

B-007-006-010
****
6.8
The optimum working frequency provides the best long range HF communication. Compared with the maximum usable frequency (MUF), it is usually:

- slightly higher
- slightly lower
- double the MUF
- half the MUF

< slightly lower >

B-007-006-011
****
6.9
During summer daytime, which bands are the most difficult for communications beyond ground wave?

- 20 metres
- 160 and 80 metres
- 40 metres
- 30 metres

<160 and 80 metres >

7-7 VHF and UHF, sporadic-E, aurora, ducting

B-007-007-001
****
6.11
Which ionospheric region most affects sky-wave propagation on the 6 metre band?

- The E region
- The F2 region
- The F1 region
- The D region

< The E region >

B-007-007-002
****
6.10
What effect does tropospheric bending have on 2-metre radio waves?

- It lets you contact stations farther away
- It causes them to travel shorter distances
- It garbles the signal
- It reverses the sideband of the signal

< It lets you contact stations farther away >

B-007-007-003
****
6.10
What causes tropospheric ducting of radio waves?

- A temperature inversion
- Lightning between the transmitting and receiving stations
- An aurora to the north
- A very low pressure area

< A temperature inversion >

B-007-007-004
****
6.10
That portion of the radiation kept close to the Earth's surface due to bending in the atmosphere is called the:

- inverted wave
- ground wave
- ionospheric wave
- tropospheric wave

< tropospheric wave >

Also known as tropospheric ducting.

B-007-007-005
****
6.10
What is a sporadic-E condition?

- Partial tropospheric ducting at E-region height
- Variations in E-region height caused by sunspot variations
- A brief decrease in VHF signals caused by sunspot variations
- Patches of dense ionization at E-region height

< Patches of dense ionization at E-region height >

B-007-007-006
****
6.10
On which amateur frequency band is the extended-distance propagation effect of sporadic-E most often observed?

- 160 metres
- 20 metres
- 2 metres
- 6 metres

<6 metres >

B-007-007-007
****
6.10
In the northern hemisphere, in which direction should a directional antenna be pointed to take maximum advantage of auroral propagation?

- South
- North
- East
- West

< North >

B-007-007-008
****
6.10
Where in the ionosphere does auroral activity occur?

- At D-region height
- At E-region height
- At F-region height
- In the equatorial band

< At E-region height >

B-007-007-009
****
6.10
Which emission mode is best for auroral propagation?

- FM
- SSB
- CW
- RTTY

< CW >

B-007-007-010
****
6.11
Excluding enhanced propagation modes, what is the approximate range of normal VHF tropospheric propagation?

- 1600 km (1000 miles)
- 800 km (500 miles)
- 2400 km (1500 miles)
- 3200 km (2000 miles)

< 800 km (500 miles) >

B-007-007-011
****
6.11
What effect is responsible for propagating a VHF signal over 800 km (500 miles)?

- Moon bounce (EME) Earth - Moon - Earth
- Tropospheric ducting
- Faraday rotation
- D-region absorption

< Tropospheric ducting >

7-8 Scatter - HF, VHF, UHF

B-007-008-001
****
6.3
What kind of unusual HF propagation allows weak signals from the skip zone to be heard occasionally?

- Sky-wave with low radiation angle
- Ducting
- Ground-wave
- Scatter-mode

< Scatter-mode >

B-007-008-002
****
6.5
If you receive a weak, distorted signal from a distance, and close to the maximum usable frequency, what type of propagation is probably occurring?

- Ducting
- Scatter
- Ground-wave
- Line-of-sight

< Scatter >

B-007-008-003
****
6.5
What is a characteristic of HF scatter signals?

- Reversed sidebands
- High intelligibility
- Rapid flutter or hollow sounding distortion
- Reversed modulation

< Rapid flutter or hollow sounding distortion >

B-007-008-004
****
6.5
What makes HF scatter signals often sound distorted?

- Auroral activity and changes in the Earth's magnetic field
- Propagation through ground waves that absorb much of the signal
- The state of the E-region at the point of refraction
- Energy scattered into the skip zone through several radio-wave paths

< Energy scattered into the skip zone through several radio-wave paths >

B-007-008-005
****
6.5
Why are HF scatter signals usually weak?

- Only a small part of the signal energy is scattered into the skip zone
- Propagation through ground waves absorbs most of the signal energy
- The F region of the ionosphere absorbs most of the signal energy
- Auroral activity absorbs most of the signal energy

< Only a small part of the signal energy is scattered into the skip zone >

B-007-008-006
****
6.5
What type of propagation may allow a weak signal to be heard at a distance too far for ground-wave propagation but too near for normal sky-wave propagation?

- Scatter
- Short-path skip
- Sporadic-E skip
- Ground wave

< Scatter >

B-007-008-007
****
6.5, 6.8
On the HF bands, when is scatter propagation most likely involved?

- When the sunspot cycle is at a minimum and D-region absorption is high
- At night
- When the F1 and F2 regions are combined
- When weak and distorted signals near or above the maximum usable frequency for normal propagation can be heard over unusual paths

< When weak and distorted signals near or above the maximum usable frequency for normal propagation can be heard over unusual paths >

B-007-008-008
****
6.5, 6.10
Which of the following IS NOT a scatter mode?

- Tropospheric scatter
- Ionospheric scatter
- Absorption scatter
- Meteor scatter

< Absorption scatter >

B-007-008-009
****
6.10
Meteor scatter is most effective on what band?

- 6 metres
- 40 metres
- 15 metres
- 160 metres

< 6 metres >

B-007-008-010
****
6.5
Which of the following IS NOT a scatter mode?

- Back scatter
- Forward scatter
- Inverted scatter
- Side scatter

< Inverted scatter >

B-007-008-011
****
6.10
In which frequency range is meteor scatter most effective for extended-range communication?

- 10 - 30 MHz
- 3 - 10 MHz
- 100 - 300 MHz
- 30 - 100 MHz

< 30 - 100 MHz >

Interference and Suppression – 008

8-1 Front-end overload, cross-modulation

B-008-001-001
****
15.3BSG8; 15.1BSG9
What is meant by receiver overload?

- Too much current from the power supply
- Too much voltage from the power supply
- Interference caused by strong signals from a nearby transmitter
- Interference caused by turning the volume up too high

< Interference caused by strong signals from a nearby transmitter >

B-008-001-002
****
15.3
What is one way to tell if radio frequency interference to a receiver is caused by front-end overload?

- If the interference is about the same no matter what frequency is used for the transmitter
- If grounding the receiver makes the problem worse
- If connecting a low pass filter to the receiver greatly cuts down the interference
- If connecting a low pass filter to the transmitter greatly cuts down the interference

< If the interference is about the same no matter what frequency is used for the transmitter >

B-008-001-003
****
15.3
If a neighbour reports television interference whenever you transmit, no matter what band you use, what is probably the cause of the interference?

- Receiver VR tube discharge
- Too little transmitter harmonic suppression
- Receiver overload
- Incorrect antenna length

< Receiver overload >

B-008-001-004
****
15.3
What type of filter should be connected to a TV receiver as the first step in trying to prevent RF overload from an amateur HF station transmission?

- Low-pass
- Band-pass
- No filter
- High-pass

< High-pass >

B-008-001-005
****
15.1, 15.3
During a club ARRL Field Day outing, reception on the 20 m SSB station is compromised every time the 20 m CW station is on the air. What might cause such interference?

- Receiver desensitization
- Both stations are fed from the same generator
- Improper station grounding
- Harmonic radiation

< Receiver desensitization >

Also called receiver overload.

B-008-001-006
****
15.3BSG8; 15.1BSG9
Inter-modulation in a broadcast receiver by a nearby transmitter would be noticed in the receiver as:

- the undesired signal in the background of the desired signal
- interference only when a broadcast signal is tuned
- distortion on transmitted voice peaks
- interference continuously across the dial

< the undesired signal in the background of the desired signal >

B-008-001-007
****
15.1, 15.3BSG8; 15.1BSG9
You have connected your hand-held VHF transceiver to an outside gain antenna. You now hear a mixture of signals together with different modulation on your desired frequency. What is the nature of this interference?

- Audio stage intermodulation interference
- Receiver intermodulation interference
- Harmonic interference from other stations
- Audio stage overload interference

< Receiver intermodulation interference >

B-008-001-008
****
15.1, 15.3BSG8; 15.1BSG9
Two or more strong out-of-band signals mix in your receiver to produce interference on a desired frequency. What is this called?

- Front-end desensitization
- Intermodulation interference
- Receiver quieting
- Capture effect

< Intermodulation interference >

B-008-001-009
****
15.3/14.2BSG9; 15.1BSG9
Two mobile stations are traveling along the same road in close proximity to each other and having trouble communicating through a local repeater. Why may it be necessary to use simplex operation to communicate between these cars?

- The strong signal of one mobile may desensitize the receiver of the other mobile receiver
- Simplex operation does not require the use of CTCSS tones
- There is less time delay using simplex operation as compared to a repeater
- There are many more simplex frequencies than repeater frequencies available

< The strong signal of one mobile may desensitize the receiver of the other mobile receiver >

B-008-001-010
****
15.3
A television receiver suffers interference on channel 5 (76 – 82 MHz) only when you transmit on 14 MHz. From your home you see the tower of a commercial FM station known to broadcast on 92.5 MHz. Which of these solutions would you try first?

- Insert a high pass filter at the antenna connector of the HF transmitter
- Insert a low pass filter at the antenna connector of the television set
- Insert a high pass filter at the antenna connector of the television
- Insert a low pass filter at the antenna connector of the HF transmitter

< Insert a high pass filter at the antenna connector of the television >

In Bloom's Taxonomy of Educational Objectives this would be described as a "synthesis and evaluation question". You know how to answer it but you have to bring different concepts into play to answer the question but without being told how to do this. The challenge here to keep any signals out of the TV set in the range 76 – 82 MHz. One possible source of interference is a harmonic of 14 MHz. Five times 14 MHz is 70 MHz and six times 14 MHz is 84 MHz. The two harmonics are above/below channel 2. Add to this that you are a good operator and your transceiver is equipped with a Low-Pass filter so your transmitter can be ruled out as the primary source. So the culprit here is probably the FM station. One possibility is that its 92.5 MHz signal mixes with your 14 MHz signal. There will be two products, a sum of the two signals (92.5 + 14=106.5 MHz) and a difference between the two signals (92.5 – 14 = 78.5 MHz). The latter falls right in the middle of Channel 6. The solution is "Insert a high pass filter at the antenna connector of the television".

B-008-001-011
****

15.3
How can intermodulation be reduced?

- By increasing the receiver RF gain while decreasing the AF gain
- By adjusting the passband tuning
- By installing a suitable filter at the receiver
- By using a better antenna

< By installing a suitable filter at the receiver >

The assumption here is that you are dealing with interference in a receiver.

8-2 Audio rectification, bypass capacitors, ferrites

B-008-002-001
****

15.3; Fig. 15-2BSG8; 15.3.1, Fig. 15-1 to 15-3BSG9
What devices would you install to reduce or eliminate audio-frequency interference to home entertainment systems?

- Metal-oxide varistors
- Bypass inductors
- Coils on ferrite cores
- Bypass resistors

< Coils on ferrite cores >

B-008-002-002
****
15.3BSG8; 15.3.3BSG9
What should be done if a properly operating amateur station is the cause of interference to a nearby telephone?

- Ground and shield the local telephone distribution amplifier
- Stop transmitting whenever the telephone is in use
- Make internal adjustments to the telephone equipment
- Install a modular plug-in telephone RFI filter close to the telephone device

< Install a modular plug-in telephone RFI filter close to the telephone device >

B-008-002-003
****
15.3BSG8; 15.3.2BSG9
What sound is heard from a public-address system if audio rectification of a nearby single-sideband phone transmission occurs?

- On-and-off humming or clicking
- A steady hum whenever the transmitter's carrier is on the air
- Distorted speech from the transmitter's signals
- Clearly audible speech from the transmitter's signals

< Distorted speech from the transmitter's signals >

B-008-002-004
****
15.3BSG8; 15.3.2BSG9
What sound is heard from a public-address system if audio rectification of a nearby CW transmission occurs?

- A steady whistling
- On-and-off humming or clicking
- Audible, possibly distorted speech,
- Muffled, severely distorted speech

< On-and-off humming or clicking >

B-008-002-005
****
15.2
How can you minimize the possibility of audio rectification of your transmitter's signals?

- Ensure that all station equipment is properly grounded
- Install bypass capacitors on all power supply rectifiers
- Use CW only
- Use a solid-state transmitter

< Ensure that all station equipment is properly grounded >

B-008-002-006
****
15.3BSG8; 15.3.2BSG9
An amateur transmitter is being heard across the entire dial of a broadcast receiver. The receiver is most probably suffering from:

- audio rectification in the receiver
- harmonics interference from the transmitter
- poor image rejection
- splatter from the transmitter

< audio rectification in the receiver >

B-008-002-007
****
15.3BSG8; 15.3, 2BSG9
Your SSB HF transmissions are heard muffled on a sound system in the living room regardless of its volume setting. What causes this?

- Harmonics generated at the transmitter
- Improper filtering in the transmitter
- Lack of receiver sensitivity and selectivity
- Audio rectification of strong signals

< Audio rectification of strong signals >

B-008-002-008
****
15.3; Fig. 15-2BSG8; 15.3.1, Fig. 15-1 to 15-3BSG9
What device can be used to minimize the effect of RF pickup by audio wires connected to stereo speakers, intercom amplifiers, telephones, etc.?

- Attenuator
- Diode
- Ferrite core
- Magnet

< Ferrite core >

B-008-002-009
****
15.3BSG8; 15.3.2BSG9
Stereo speaker leads often act as antennas to pick up RF signals. What is one method you can use to minimize this effect?

- Lengthen the leads
- Connect the speaker through an audio attenuator
- Connect a diode across the speaker
- Shorten the leads

< Shorten the leads >

B-008-002-010
****
15.3; Fig. 15-2BSG8; 15.3.1, Fig. 15-1 to 15-3BSG9
One method of preventing RF from entering a stereo set through the speaker leads is to wrap each of the speaker leads:

- through a ferrite core
- around a copper bar
- around an iron bar
- around a wooden dowel

< through a ferrite core >

B-008-002-011
****
15.3BSG8; 15.3.2BSG9
Stereo amplifiers often have long leads which pick up transmitted signals because they act as:

- transmitting antennas
- RF attenuators
- frequency discriminators
- receiving antennas

< receiving antennas >

8-3 Intermodulation, spurious, key-clicks

B-008-003-001
****
15.7BSG8; 15.8BSG9
How can you prevent key-clicks?

- By increasing power
- By using a better power supply
- By sending CW more slowly
- By using a key-click filter

< By using a key-click filter >

B-008-003-002
****
15.7BSG8; 15.8BSG9
If someone tells you that signals from your hand-held transceiver are interfering with other signals on a frequency near yours, what could be the cause?

- Your hand-held is transmitting spurious emissions
- You need a power amplifier for your hand-held
- Your hand-held has a chirp from weak batteries
- You need to turn the volume up on your hand-held

< Your hand-held is transmitting spurious emissions >

B-008-003-003
****
15.3BSG8, 15.1BSG9
If your transmitter sends signals outside the band where it is transmitting, what is this called?

- Side tones
- Transmitter chirping
- Off-frequency emissions
- Spurious emissions

< Spurious emissions >

B-008-003-004
****
15.3BSG8, 15.1BSG9
What problem may occur if your transmitter is operated without the cover and other shielding in place?

- It may interfere with other stations operating near its frequency
- It may transmit a chirpy signal
- It may radiate spurious emissions
- It may transmit a weak signal

< It may radiate spurious emissions >

B-008-003-005
****
15.7BSG8; 15.8BSG9
In Morse code transmission, local RF interference (key-clicks) is produced by:

- frequency shifting caused by poor voltage regulation
- the power amplifier, and is caused by high frequency parasitics
- poor waveshaping caused by a poor voltage regulator
- the making and breaking of the circuit at the Morse key

< the making and breaking of the circuit at the Morse key >

B-008-003-006
****
15.7BSG8; 15.8BSG9
Key-clicks, heard from a Morse code transmitter at a distant receiver, are the result of:

- changes in oscillator frequency on keying
- too sharp rise and decay times of the keyed carrier
- power supply hum modulating the carrier
- sparks emitting RF from the key contacts

< too sharp rise and decay times of the keyed carrier >

B-008-003-007
****
15.7BSG8; 15.8BSG9
In a Morse code transmission, broad bandwidth RF interference (key-clicks) heard at a distance is produced by:

- shift in frequency when keying the transmitter
- sparking at the key contacts
- sudden movement in the receiver loudspeaker
- poor shaping of the waveform

< poor shaping of the waveform >

B-008-003-008
****
15.7; Fig. 15-5BSG8; 15.8, Fig. 15-5BSG9
What should you do if you learn that your transmitter is causing key-clicks?

- Turn the receiver down
- Regulate the oscillator supply voltage
- Use a choke in the RF power output
- Check the keying filter and the functioning of later stages

< Check the keying filter and the functioning of later stages >

B-008-003-009
****
15.3BSG8; 15.1, 15.3.4BSG9
A parasitic oscillation:

- is generated by parasitic elements of a Yagi beam
- does not cause any radio interference
- is produced in a transmitter oscillator stage
- is an unwanted signal developed in a transmitter

< is an unwanted signal developed in a transmitter >

B-008-003-010
****
15.3BSG8; 15.1, 15.3.4BSG9
Parasitic oscillations in the RF power amplifier stage of a transmitter may be found:

- on harmonic frequencies
- at high frequencies only
- at low frequencies only
- at high or low frequencies

< at high or low frequencies >

B-008-003-011
****

15.3BSG8; 15.1, 15.3.4BSG9
Transmitter RF amplifiers can generate parasitic oscillations:

- on VHF frequencies only
- on the transmitter fundamental frequency
- on harmonics of the transmitter frequency
- above or below the transmitter frequency

< above or below the transmitter frequency >

8-4 Harmonics, splatter, transmitter adjustments

B-008-004-001
****

15.3BSG8; 15.3, 15.3.1, 15.3.2BSG9
If a neighbour reports television interference on one or two channels only when you transmit on 15 metres, what is probably the cause of the interference?

- TV receiver front-end overload
- Too much low pass filtering on the transmitter
- Harmonic radiation from your transmitter
- De-ionization of the ionosphere near your neighbour's TV antenna

< Harmonic radiation from your transmitter >

The important fact here is that there is only interference on one or two channels. Say it is channel 3 and this is on 60 – 66 MHz. Check the range of interference from 15 meters.

IC also says that the interference only occurs when you are on the 15 metre band which we know lies between 21.000 and 21.450 MHz. If we might digress here, this question is very much pre-HDTV. With HDTV you cannot assume that the TV signal is on the reporting channel and therefore you cannot assume that a station reporting as channel 3 lies between 60 and 66 MHz.

For example, in the Toronto area, CKVR (Barrie) reports as channel 3 but is actually on digital channel 10 (DTV pilot carrier on 192.31 MHz). The pilot carrier generally lies 310 kHz above the lower band edge but may be offset to reduce co-channel interference. If you have TVI on an HDTV receiver your first problem would be to discover what the true frequency of the station with which you are interfering is. A good starting point is an Internet search, or try Wikipedia. Our initial position here is that harmonic interference from the transmitter is the culprit. A few sample calculations show that the third harmonic of a 15 m signal will fall between 63.00 MHz and 64.35 MHz, all of which lie in the range occupied by channel 3. Harmonic radiation from the transmitter is the most likely cause. You might suspect another possibility, that the TV tuner is suffering from front end overload because it is too close to your transmitter. This can be eliminated because the problem would probably show up when you were on other bands, and when the TV was on other channels.

B-008-004-002
****
15.1
What is meant by harmonic radiation?

- Signals which cause skip propagation to occur
- Unwanted signals at frequencies which are multiples of the fundamental (chosen) frequency
- Unwanted signals that are combined with a 60-Hz hum
- Unwanted signals caused by sympathetic vibrations from a nearby transmitter

< Unwanted signals at frequencies which are multiples of the fundamental (chosen) frequency >

B-008-004-003
****
15.1
Why is harmonic radiation from an amateur station not wanted?

- It may cause sympathetic vibrations in nearby transmitters
- It may cause auroras in the air
- It may cause interference to other stations and may result in out-of-band signals
- It uses large amounts of electric power

< It may cause interference to other stations and may result in out-of-band signals >

B-008-004-004
****
15.1
What type of interference may come from a multi-band antenna connected to a poorly tuned transmitter?

- Harmonic radiation
- Parasitic excitation
- Intermodulation
- Auroral distortion

< Harmonic radiation >

B-008-004-005
****
15.1
If you are told your station was heard on 21 375 kHz, but at the time you were operating on 7125 kHz, what is one reason this could happen?

- Your transmitter was radiating harmonic signals
- Your transmitter's power-supply filter choke was bad
- You were sending CW too fast
- Your transmitter's power-supply filter capacitor was bad

< Your transmitter was radiating harmonic signals >

The third harmonic of 7.125 MHz is 21.375 MHz.

B-008-004-006
****
13.4
What causes splatter interference?

- Overmodulation of a transmitter
- Keying a transmitter too fast
- Signals from a transmitter's output circuit are being sent back to its input circuit
- The transmitting antenna is the wrong length

< Overmodulation of a transmitter >

B-008-004-007
****
15.1
Your amateur radio transmitter appears to be creating interference to the television on channel 3 (60 - 66 MHz) when you are transmitting on the 15 metre band. Other channels are not affected. The most likely cause is:

- a bad ground at the transmitter
- front-end overload of the TV
- harmonic radiation from the transmitter
- no high-pass filter on the TV

< harmonic radiation from the transmitter >

The 15 m band is 21.00 – 21.450 MHz. Channel 3 is 60 – 66 MHz. For the sake of argument let us assume that you are transmitting CW on 21.050 MHz. If your transmitter is generating harmonics the third harmonic of 21.050 MHz is 63.150 MHz, right in the middle of Channel 3.

B-008-004-008
****
15.3BSG8; 15.3.4BSG9
One possible cause of TV interference by harmonics from an SSB transmitter is from "flat topping" - driving the final amplifier into non-linear operation. The most appropriate remedy for this is:

- reduce oscillator output
- reduce microphone gain
- retune transmitter output
- use another antenna

< reduce microphone gain >

B-008-004-009
****
15.3BSG8; 15.3.4BSG9
In a transmitter, excessive harmonics are produced by:

- resonant circuits
- a linear amplifier
- overdriven stages
- low SWR

< overdriven stages >

B-008-004-010
****
15.3BSG8; 15.1BSG9
An interfering signal from a transmitter is found to have a frequency of 57 MHz (TV Channel 2 is 54 - 60 MHz). This signal could be the:

- third harmonic of a 15 metre transmission
- second harmonic of a 10 metre transmission
- crystal oscillator operating on its fundamental
- seventh harmonic of an 80 metre transmission

< second harmonic of a 10 metre transmission >

The 10 m band is 28.00 - 29.70 MHz. The interfering signal is found to have a frequency of 57 MHz. If the offending station is transmitting on 28.5 MHz and also generating harmonics, the second harmonic is 57 MHz.

B-008-004-011
****
15.3BSG8; 15.3.4BSG9
Harmonics may be produced in the RF power amplifier of a transmitter if:

- the oscillator frequency is unstable
- modulation is applied to a high-level stage
- excessive drive signal is applied to it
- the output tank circuit is tuned to the fundamental frequency

< excessive drive signal is applied to it >

8-5 Use of filters: low-pass, high-pass, band-pass, band-reject

B-008-005-001
****
B-15.3
What type of filter might be connected to an amateur HF transmitter to cut down on harmonic radiation?

- A CW filter
- A low pass filter
- A key-click filter
- A high pass filter

< A low pass filter >

B-008-005-002
****
15.3
Why do modern HF transmitters have a built-in low pass filter in their RF output circuits?

- To reduce harmonic radiation
- To reduce fundamental radiation
- To reduce low frequency interference to other amateurs
- To reduce RF energy below a cut-off point

< To reduce harmonic radiation >

B-008-005-003
****
15.3
What circuit blocks RF energy above and below a certain limit?

- A low pass filter
- A band pass filter
- A high pass filter
- An input filter

< A band pass filter >

B-008-005-004
****
15.3
What should be the impedance of a low pass filter as compared to the impedance of the transmission line into which it is inserted?

- About the same
- Substantially lower
- Twice the transmission line impedance
- Substantially higher

< About the same >

B-008-005-005
****
15.3
In order to reduce the harmonic output of a high frequency (HF) transmitter, which of the following filters should be installed at the transmitter?

- Low pass
- Key click
- High pass
- Rejection

< Low pass >

B-008-005-006
****
15.3
To reduce harmonic output from a high frequency transmitter, you would put a _____ in the transmission line as close to the transmitter as possible.

- high pass filter
- band reject filter
- wave trap
- low pass filter

< low pass filter >

B-008-005-007
****
15.3
To reduce energy from an HF transmitter getting into a television set, you would place a _____ as close to the TV as possible.

- wave trap
- band reject filter
- high pass filter
- low pass filter

< high pass filter >

B-008-005-008
****
15.3
A band pass filter will:

- allow only certain frequencies through
- attenuate high frequencies but not low
- pass frequencies each side of a band
- stop frequencies in a certain band

< allow only certain frequencies through >

B-008-005-009
****
15.3
A band reject filter will:

- pass frequencies each side of a band
- allow only two frequencies through
- pass frequencies below 100 MHz
- stop frequencies each side of a band

< pass frequencies each side of a band >

B-008-005-010
****
15.3
A high pass filter would normally be fitted:

- between transmitter output and transmission line
- at the antenna terminals of the TV receiver
- between microphone and speech amplifier
- at the Morse key or keying relay in a transmitter

< at the antenna terminals of the TV receiver >

B-008-005-011
15.3
A low pass filter suitable for a high frequency transmitter would:

- attenuate frequencies above 30 MHz
- pass audio frequencies above 3 kHz
- attenuate frequencies below 30 MHz
- pass audio frequencies below 3 kHz

< attenuate frequencies above 30 MHz >

Remember that the HF band is 3–30 MHz, so you want to attenuate frequencies above 30 MHz and not below 30 MHz. Audio frequencies in this question are a red herring.

You have reached the end of the Basic Qualification Question Bank.

Congratulations!