The Amateur Radio Examination Question Bank – SHORT SUMMARY

This is the **Master Question-Bank** with all distractors removed, Version 11.3, Sept 2012

01 Radio Regulations 1:

01-0-(c).
A brief definition for the Amateur Service is: *a radiocommunication service for the purpose of self-training, intercommunication and technical investigation.*

01-1-(b).
The International Radio Regulations are developed by the: *International Telecommunication Union.*

01-2-(d).
International radio regulatory matters are coordinated in New Zealand by the: *Ministry of Business, Innovation and Employment.*

01-3-(a).
The Amateur Service in New Zealand is administered through this prime document: *the New Zealand Radiocommunications Regulations.*

01-4-(c).
The world is divided into radio regulatory regions each with different radio spectrum allocations. New Zealand is in: *Region 3.*

01-5-(b).
The Amateur Service in New Zealand is administered by: *the Ministry of Business, Innovation and Employment, Radio Spectrum Management.*

01-6-(d).
An Amateur Station is quoted in the regulations as a station: *in the Amateur Service.*

01-7-(a).
An authorised officer from the Ministry of Business, Innovation and Employment, can inspect a General Amateur Operator's Certificate of Competency: *at any time.*

01-8-(c).
The basic regulations for the control of the Amateur Service are to be found in the: *International Radio Regulations from the ITU.*

01-9-(b).
The holder of a General Amateur Operator Certificate of Competency may: *transmit in bands allocated to the Amateur Service.*

02 Radio Regulations 2:

02-0-(d).
As the holder of a New Zealand General Amateur Operator Certificate of Competency you may operate: *anywhere in New Zealand and in any other country that recognises the Certificate.*

02-1-(a).
As the holder of a General Amateur Operator Certificate of Competency you may operate transmitters in your station: *any number at one time.*

02-2-(c).
The following document must be kept at your amateur station: *your General Amateur Operator Certificate of Competency.*

02-3-(b).
An Amateur Station is a station that is: *operated by the holder of a General Amateur Operator Certificate of Competency on the amateur radio bands.*

02-4-(d).
The qualified operator of an amateur radio station is absent overseas so the home station may be used by: *any person with an appropriate General Amateur Operator Certificate of Competency.*

02-5-(a).
Regardless of the mode of transmission used, all amateur stations must be equipped with: *a reliable means for determining the operating radio frequency.*

02-6-(c).
Unidentified signals may be transmitted by an amateur station: *never, such transmissions are not permitted.*

02-7-(b).
For short periods you may operate your amateur radio station somewhere in New Zealand away from the location entered in the administration's database: *whenever you want to.*

02-8-(d).
To operate an amateur station in a motor vehicle, you must: *hold a current General Amateur Operator Certificate of Competency.*

02-9-(a).
An application for the New Zealand General Amateur Operator Certificate of Competency and a callsign must be supported with an appropriate examination pass qualification and may be made by: *a citizen or a permanent resident of New Zealand, or others after an approval from a referral to the RSM Licensing Manager.*

03 Radio Regulations 3:

03-0-(c).
An amateur radio operator must have current mail and email addresses so the Ministry of Business, Innovation and Employment, *can send mail to the operator.*

03-1-(b).
The person responsible for its proper operation if you transmit from another amateur's station, is: *you, the operator.*

03-2-(d).
As a station operator you must: *be responsible for the proper operation of the station in accordance with the Radiocommunications Regulations.*

03-3-(a).
A qualified operator is required at an amateur station: *whenever the station is used for transmitting.*

03-4-(c).
A log-book for recording information about stations worked: *is recommended for all amateur radio operators*.

03-5-(b).
Persons in your family who are unqualified cannot transmit using your amateur station if they are alone with your equipment because they must: *hold a General Amateur Operator Certificate of Competency before they are allowed to be operators.*

03-6-(d).
Repeater equipment and frequencies used by New Zealand radio amateurs are co-ordinated by: *the NZART Frequency Management and Technical Advisory Group.*

03-7-(a).
Anyone may be permitted by the qualified operator of an amateur radio station to: *pass brief comments of a personal nature provided no fees or other considerations are requested or accepted.*

03-8-(c).
A person may hold a General Amateur Operator Certificate of Competency after reaching this minimum age: *there is no age limit.*

03-9-(b).
If your signal is strong and perfectly readable at a distant station, you should: *reduce your transmitter power output to the minimum needed to maintain contact .*

04 Radio Regulations 4.

04-0-(d).
You must surrender your General Amateur Operator Certificate of Competency at the age of: *there is no age limit.*

04-1-(a).
Power output quoted as peak envelope power (PEP). is the: *average power output at the crest of the modulating cycle.*

04-2-(c).
The maximum output power permitted from an amateur station is: *specified in the amateur radio General User Radio Licence.*

04-3-(b).
The transmitter output power for amateur stations at all times is: *the minimum power necessary to communicate and within the terms of the amateur radio GURL.*

04-4-(d).
Your amateur station is identified by transmitting your: *callsign.*

04-5-(a).
This callsign could be that allocated to a New Zealand amateur radio operator: *ZL2KMJ.*

04-6-(c).
The callsigns of New Zealand amateur radio stations: *are listed in the administration's database.*

04-7-(b).
These letters are in general use for the first letters in New Zealand amateur radio callsigns: *ZL.*

04-8-(d).
In New Zealand amateur radio callsigns, the figures normally used are: *a single digit, 1 to 4*

04-9-(a).
Before a relinquished callsign is reissued, it is normally kept for: *1 year.*

05 Radio Regulations 5:

05-0-(c).
A person in distress: *may use any available communication means to attract attention*.

05-1-(b).
A General Amateur Operator Certificate of Competency authorises the use of: *amateur radio transmitting apparatus only.*

05-2-(d).
Callsigns and General Amateur Operator Certificates of Competency are issued pursuant to the Regulations by the: *Ministry of Business, Innovation and Employment, Approved Radio Examiners.*

05-3-(a).
A printed copy of your General Amateur Operator Certificate of Competency can be replaced by: *downloading and printing yours from the official database (or have an Approved Radio Examiner do this for you).*

05-4-(c).
Permanent changes to postal and email addresses to update the official database records must be advised by a General Amateur Operator Certificate of Competency holder within: *one month.*

05-5-(b).
A General Amateur Operator Certificate of Competency: *contains the unique callsign(s). to be used by that operator.*

05-6-(d).
A General Amateur Operator Certificate of Competency is usually issued for: *life.*

05-7-(a).
A licence that authorises a given class of radio transmitter to be used without requiring a licence in the owner's own name is known as: *a general user radio licence.*

05-8-(c).
A General Amateur Operator Certificate of Competency holder may permit any other person to: *pass brief messages of a personal nature provided no fees or other consideration are requested or accepted.*

05-9-(b).
Messages on behalf of third parties to international destinations may be transmitted by an amateur station only if: *such communications have been authorised by the countries concerned.*

0**6 Radio Regulations 6:**

06-0-(d).
The expression "amateur third party communications" refers to: *messages to or on behalf of non-licensed people or organisations.*

06-1-(a).
The Morse code signal SOS indicates that a station is: *in grave and imminent danger and requires immediate assistance.*

06-2-(c).
If you receive distress traffic and are unable to render assistance, you should: *maintain watch until you are certain that assistance is forthcoming.*

06-3-(b).
A secret code for the transmission of messages by the operator of an amateur station is: *not permitted except for control signals by the licensees of remote beacon or repeater stations.*

06-4-(d).
The following messages from an amateur station are expressly forbidden: *secret cipher.*

06-5-(a).
The expression "harmful interference" means: *interference which obstructs or repeatedly interrupts radiocommunication services.*

06-6-(c).
If interference to the reception of radiocommunications is caused by the operation of an amateur station, the station operator: *must immediately comply with any action required by the MED to prevent the interference.*

06-7-(b).
Amateur radio operators may knowingly interfere with other radio communications or signals: *never*.

06-8-(d).
After gaining a General Amateur Operator Certificate of Competency you are permitted to: *first operate for three months on amateur radio bands below 5 MHz and above 25 MHz to log fifty or more contacts.*

06-9-(a).
The Morse code is permitted for use by: *any amateur radio operator.*

07 Radio Regulations 7:

07-0-(c).
A New Zealand amateur radio operator may communicate with: *other amateur stations world-wide.*

07-1-(b).
A New Zealand amateur radio operator may: *train for and support disaster relief activities.*

07-2-(d).
The holder of a General Amateur Operator Certificate of Competency may: *establish and operate an earth station in the amateur satellite service.*

07-3-(a).
A station using the callsign “VK3XYZ stroke ZL” is heard on your local VHF repeater. This is: *the station of an overseas visitor.*

07-4-(c).
The abbreviation “HF” refers to radio spectrum between: *3 MHz and 30 MHz.*

07-5-(b).
Bandplans showing the transmission modes in New Zealand amateur radio bands are published for the mutual respect and advantage of all operators: *to ensure that your operations do not impose problems on other operators and that their operations do not impact on you.*

07-6-(d).
The abbreviation “VHF” refers to radio spectrum between: *30 MHz and 300 MHz.*

07-7-(a).
An amateur radio operator must be able to: *verify that transmissions are within an authorised frequency band.*

07-8-(c).
An amateur station may be shut down at any time by: *a demand from an authorised official of the Ministry of Business, Innovation and Employment.*

07-9-(b).
A General Amateur Operator Certificate of Competency: *does not confer on its holder a monopoly on the use of any frequency or band.*

08 Radio Frequency Bands 1:

08-0-(d).
Amateur stations are often described as being "frequency agile". This means: *operators can change frequency on a shared band to avoid interfering*

08-1-(a).
When first qualified, an amateur radio operator is permitted to: *work on specified bands for 3 months, log at least 50 contacts and retain the log book for at least one year for possible official inspection*

08-2-(c).
The “80 metre band” frequency limits are: *3.50 to 3.90 MHz*

08-3-(b).
In New Zealand the “40 metre band” frequency limits are: *7.00 to 7.30 MHz*

08-4-(d).
The “20 metre band” frequency limits are: *14.00 to 14.35 MHz*

08-5-(a).
The “15 metre band” frequency limits are: *21.00 to 21.45 MHz*

08-6-(c).
The “10 metre band” frequency limits are: *28.00 to 29.70 MHz*

08-7-(b).
The “2 metre band” frequency limits are: *144 to 148 MHz*

08-8-(d).
The frequency limits of the “70 centimetre band” are: *430 to 440 MHz*

08-9-(a).
The published New Zealand amateur bandplans: *should be adhered to in the interests of all band occupants*.

09 Radio Frequency Bands 2:

09-0-(c).
Operation on the 130 to 190 kHz band requires: *power output limited to a maximum of 5 watt e.i.r.p.*

09-1-(b).
Amateur satellites may operate on these two bands: *28.0 to 29.7 MHz and 144.0 to 146.0 MHz*

09-2-(d).
The 50 to 51 MHz band is available to: *amateur radio operators subject to special access conditions*

09-3-(a).
In the following band amateurs are secondary to another service: *7.2 to 7.3 MHz*

09-4-(c).
The band 146 to 148 MHz is: *shared with other communication services*

09-5-(b).
The following band used by amateurs is shared with another service in New Zealand: *51 to 53 MHz*

09-6-(d).
The New Zealand amateur radio bandplans are: *recommended, all amateur radio operators should observe them*

09-7-(a).
The following band is an exclusive primary allocation for New Zealand amateur radio operators: *21 to 21.45 MHz*

09-8-(c).
When the Amateur Service is a secondary user of a band and another service is the primary user, this means: *the band may be used by amateurs provided harmful interference is not caused to other services*

09-9-(b).
This rule applies if two amateur stations want to use the same frequency: *both stations have an equal right to operate, the second-comer courteously giving way after checking that the frequency is in use*

10 Electronics Fundamentals 1:

10-0-(d).
An element which acts somewhere between being an insulator and a conductor is called a: *semiconductor*

10-1-(a).
Silicon, as used in diodes and transistors, has been doped to become: *a semiconductor*

10-2-(c).
In the classic model of the atom: *the electrons orbit the nucleus*

10-3-(b).
An atom that loses an electron becomes: *a positive ion*

10-4-(d).
An electric current passes through a wire and produces around the wire: *a magnetic field*

10-5-(a).
These magnetic poles will repel: *like*

10-6-(c).
This material is better for making permanent magnets: *steel*

10-7-(b).
A better conductor of electricity is: *copper*

10-8-(d).
The term describing opposition to electron flow in a circuit is: *resistance*

10-9-(a).
A substance which will readily allow an electric current to flow is: *a conductor*

11 Electronics Fundamentals 2:

11-0-(c).
The plastic coating around wire is: *an insulator*

11-1-(b).
This is a source of electrical energy: *an NiMH cell*

11-2-(d).
An important difference between a lead acid battery and a common torch battery is that only the lead acid battery: *can be re-charged*

11-3-(a).
As the temperature increases, the resistance of a conductor: *increases*

11-4-(c).
In an n-type semiconductor, the current carriers are: *electrons*

11-5-(b).
In a p-type semiconductor, the current carriers are: *holes*

11-6-(d).
An electrical insulator: *does not let electricity flow through it*

11-7-(a).
Four good electrical insulators are: *glass, air, plastic, porcelain*

11-8-(c).
Three good electrical conductors are: *gold, silver, aluminium*

11-9-(b).
The name for the flow of electrons in an electric circuit is: *current*

12 Measurement Units:

12-0-(d).
The unit of impedance is the: *ohm*

12-1-(a).
One kilohm is: *1000 ohm*

12-2-(c).
One kilovolt is equal to: *1000 volt*

12-3-(b).
One quarter of one ampere may be written as: *250 milliampere*

12-4-(d).
The watt is the unit of: *power*

12-5-(a).
The voltage 'two volt' is also: *2000 mV*

12-6-(c).
The unit for potential difference between two points in a circuit is the: *volt*

12-7-(b).
Impedance is a combination of: *resistance with reactance*

12-8-(d).
One mA is: *one thousandth of one ampere*

12-9-(a).
The unit of resistance is the: *ohm*

13 Ohm's Law 1:

13-0-(c).
The voltage across a resistor carrying current can be calculated using the formula:
E = I x R [voltage equals current times resistance]

13-1-(b).
A current of 10 mA is measured in a 500 ohm resistor. The voltage across the resistor will be: *5 volt*

13-2-(d).
The value of a resistor to drop 100 volt with a current of 0.8 milliampere is: *125 kilohm*

13-3-(a).
I = E/R is a mathematical equation describing: *Ohm's Law*

13-4-(c).
The voltage to cause a current of 4.4 ampere in a 50 ohm resistance is: *220 volt*

13-5-(b).
A current of 2 ampere flows through a 16 ohm resistance. The applied voltage is: *32 volt*

13-6-(d).
A current of 5 ampere in a 50 ohm resistance produces a potential difference of: *250 volt*

13-7-(a).
This voltage is needed to cause a current of 200 mA to flow in a lamp of 25 ohm resistance: *5 volt*

13-8-(c).
A current of 0.5 ampere flows through a resistance when 6 volt is applied. To change the current to 0.25 ampere the voltage must be: *reduced to 3 volt*

13-9-(b).
The current flowing through a resistor can be calculated by using the formula:
I = E / R [current equals voltage divided by resistance]

14 Ohm's Law 2:

14-0-(d).
When an 8 ohm resistor is connected across a 12 volt supply the current flow is: *12 / 8 amp*

14-1-(a).
A circuit has a total resistance of 100 ohm and 50 volt is applied across it. The current flow will be: *500 mA*

14-2-(c).
The following formula gives the resistance of a circuit: *R = E / I. . . [resistance equals voltage divided by current]*

14-3-(b).
A resistor with 10 volt applied across it and passing a current of 1 mA has a value of: *10 kilohm*

14-4-(d).
If a 3 volt battery causes 300 mA to flow in a circuit, the circuit resistance is: *10 ohm*

14-5-(a).
A current of 0.5 ampere flows through a resistor when 12 volt is applied. The value of the resistor is: *24 ohm*

14-6-(c).
The resistor which gives the greatest opposition to current flow is: *0.5 megohm*

14-7-(b).
The ohm is the unit of: *electrical resistance*

14-8-(d).
If a 12 volt battery supplies 0.15 ampere to a circuit, the circuit's resistance is: *80 ohm*

14-9-(a).
If a 4800 ohm resistor is connected to a 12 volt battery, the current flow is: *2.5 mA*

15 Resistance 1:

15-0-(c).
The total resistance in a parallel circuit: *is always less than the smallest branch resistance*

15-1-(b).
Two resistors are connected in parallel and are connected across a 40 volt battery. If each resistor is 1000 ohms, the total battery current is: *80 milliampere*

15-2-(d).
The total current in a parallel circuit is equal to the: *sum of the currents through all the parallel branches*

15-3-(a).
One way to operate a 3 volt bulb from a 9 volt supply is to connect it in: *series with a resistor*

15-4-(c).
You can operate this greatest number of identical lamps, each drawing a current of 250 mA, from a 5A supply: *20*

15-5-(b).
Six identical 2-volt bulbs are connected in series. The supply voltage to cause the bulbs to light normally is: *12 V*

15-6-(d).
This many 12 volt bulbs can be arranged in series to form a string of lights to operate from a 240 volt power supply: *240 / 12*

15-7-(a).
Three 10,000 ohm resistors are connected in series across a 90 volt supply. The voltage drop across one of the resistors is: *30 volt*

15-8-(c).
Two resistors are connected in parallel. One is 75 ohm and the other is 50 ohm. The total resistance of this parallel circuit is: *30 ohm*

15-9-(b).
A dry cell has an open circuit voltage of 1.5 volt. When supplying a large current the voltage drops to 1.2 volt. This is due to the cell's: *internal resistance*

16 Resistance 2:

16-0-(d).
A 6 ohm resistor is connected in parallel with a 30 ohm resistor. The total resistance of the combination is: *5 ohm*

16-1-(a).
The total resistance of several resistors connected in series is: *greater than the resistance of any one resistor*

16-2-(c).
Five 10 ohm resistors connected in series give a total resistance of: *50 ohm*

16-3-(b).
Resistors of 10, 270, 3900, and 100 ohm are connected in series. The total resistance is: *4280 ohm*

16-4-(d).
This combination of series resistors could replace a single 120 ohm resistor: *five 24 ohm*

16-5-(a).
If a 2.2 megohm and a 100 kilohm resistor are connected in series, the total resistance is: *2.3 megohm*

16-6-(c).
If ten resistors of equal value R are wired in parallel, the total resistance is: *R/10*

16-7-(b).
The total resistance of four 68 ohm resistors wired in parallel is: *17 ohm*

16-8-(d).
Resistors of 68 ohm, 47 kilohm, 560 ohm and 10 ohm are connected in parallel. The total resistance is: *less than 10 ohm*

16-9-(a).
The following resistor combination can most nearly replace a single 150 ohm resistor: *three 47 ohm resistors in series*

17 Resistance 3:

17-0-(c).
Two 120 ohm resistors are arranged in parallel to replace a faulty resistor. The faulty resistor had an original value of: *60 ohm*

17-1-(b).
Two resistors are in parallel. Resistor A carries twice the current of resistor B which means that: *A has half the resistance of B*

17-2-(d).
The smallest resistance that can be made with five 1 k ohm resistors is: *200 ohm by arranging them in parallel*

17-3-(a).
The following combination of 28 ohm resistors has a total resistance of 42 ohm: *a combination of two resistors in parallel, then placed in series with another resistor*

17-4-(c).
Two 100 ohm resistors connected in parallel are wired in series with a 10 ohm resistor. The total resistance of the combination is: *60 ohm*

17-5-(b).
A 5 ohm and a 10 ohm resistor are wired in series and connected to a 15 volt power supply. The current flowing from the power supply is: *1 ampere*

17-6-(d).
Three 12 ohm resistors are wired in parallel and connected to an 8 volt supply. The total current flow from the supply is: *2 amperes*

17-7-(a).
Two 33 ohm resistors are connected in series with a power supply. If the current flowing is 100 mA, the voltage across one of the resistors is: *3.3 volt*

17-8-(c).
A simple transmitter requires a 50 ohm dummy load. You can fabricate this from: *six 300 ohm resistors in parallel*

17-9-(b).
Three 500 ohm resistors are wired in series. Short-circuiting the centre resistor will change the value of the network from: *1500 ohm to 1000 ohm*

18 Power calculations 1:

18-0-(d).
A transmitter power amplifier requires 30 mA at 300 volt. The DC input power is: *9 watt*

18-1-(a).
The DC input power of a transmitter operating at 12 volt and drawing 500 milliamp would be: *6 watt*

18-2-(c).
When two 500 ohm 1 watt resistors are connected in series, the maximum total power they can dissipate is: *2 watt*

18-3-(b).
When two 1000 ohm 5 watt resistors are connected in parallel, they can dissipate a maximum total power of: *10 watt*

18-4-(d).
The current in a 100 kilohm resistor is 10 mA. The power dissipated is: *10 watt*

18-5-(a).
A current of 500 milliamp passes through a 1000 ohm resistance. The power dissipated is: *250 watt*

18-6-(c).
A 20 ohm resistor carries a current of 0.25 ampere. The power dissipated is: *1.25 watt*

18-7-(b).
If 200 volt is applied to a 2000 ohm resistor, the resistor will dissipate: *20 watt*

18-8-(d).
The power delivered to an antenna is 500 watt. The effective antenna resistance is 20 ohm. The antenna current is: *5 amp*

18-9-(a).
The unit for power is the: *watt*

19 Power calculations 2:

19-0-(c).
The following two quantities should be multiplied together to find power: *voltage and current*

19-1-(b).
The following two electrical units multiplied together give the unit 'watt': *volt and ampere*

19-2-(d).
The power dissipation of a resistor carrying a current of 10 mA with 10 volt across it is: *0.1 watt*

19-3-(a).
If two 10 ohm resistors are connected in series with a 10 volt battery, the battery load is: *5 watt*

19-4-(c).
Each of 9 resistors in a circuit is dissipating 4 watt. If the circuit operates from a 12 volt supply, the total current flowing in the circuit is: *3 ampere*

19-5-(d).
Three 18 ohm resistors are connected in parallel across a 12 volt supply. The total power dissipation of the resistor load is: *24 watt*

19-6-(a).
A resistor of 10 kilohm carries a current of 20 mA. The power dissipated in the resistor is: *4 watt*

19-7-(c).
A resistor in a circuit becomes very hot and starts to burn. This is because the resistor is dissipating too much: *power*

19-8-(b).
A current of 10 ampere rms at a frequency of 50 Hz flows through a 100 ohm resistor. The power dissipated is: *10,000 watt*

19-9-(d).
The voltage applied to two resistors in series is doubled. The total power dissipated will: *increase by four times*

20 Alternating current:

20-0-(a).
An 'alternating current' is so called because: *it reverses direction periodically*

20-1-(c).
The time for one cycle of a 100 Hz signal is: *0.01 seconds*

20-2-(b).
A 50 hertz current in a wire means that:
the current changes direction, 50 complete cycles in each second

20-3-(d).
The current in an AC circuit completes a cycle in 0.1 second. So the frequency is: *10 Hz*

20-4-(a).
An impure signal is found to have 2 kHz and 4 kHz components. This 4 kHz signal is: *a harmonic of the 2 kHz signal*

20-5-(c).
The correct name for the equivalent of 'one cycle per second' is one: *hertz*

20-6-(b).
One megahertz is equal to: *1000 kHz*

20-7-(d).
One GHz is equal to: *1000 MHz*

20-8-(a).
The 'rms voltage' of a sine-wave signal is: *0.707 times the peak voltage*

20-9-(c).
A sine-wave alternating current of 10 ampere peak has an rms value of: *7.07 amp*

21 Capacitors, Inductors, Resonance 1:

21-0-(b).
The total capacitance of two or more capacitors in series is: *always less than that of the smallest capacitor*

21-1-(d).
Filter capacitors in power supplies are sometimes connected in series to: *withstand a greater voltage than a single capacitor can withstand*

21-2-(a).
A radio component in a circuit diagram is identified as a capacitor if its value is measured in: *microfarads*

21-3-(c).
Two metal plates separated by air form a 0.001 uF capacitor. Its value may be changed to 0.002 uF by: *bringing the metal plates closer together*

21-4-(b).
The material separating the plates of a capacitor is the: *dielectric*

21-5-(d).
Three 15 picofarad capacitors are wired in parallel. The value of the combination is: *45 picofarad*

21-6-(a).
Capacitors and inductors oppose an alternating current. This is known as: *reactance*

21-7-(c).
The reactance of a capacitor increases as the: *frequency decreases*

21-8-(b).
The reactance of an inductor increases as the: *frequency increases*

21-9-(d).
Increasing the number of turns on an inductor will make its inductance:
increase

22 Capacitors, Inductors, Resonance 2:

22-0-(a).
The unit of inductance is the: *henry*

22-1-(c).
Two 20 uH inductances are connected in series. The total inductance is: *40 uH*

22-2-(b).
Two 20 uH inductances are connected in parallel. The total inductance is: *10 uH*

22-3-(d).
A toroidal inductor is one in which the: *windings are wound on a closed ring of magnetic material*

22-4-(a).
A transformer with 500 turns on the primary winding and 50 turns on the secondary winding is connected to 230 volt AC mains. The voltage across the secondary is: *23 volt*

22-5-(c).
An inductor and a capacitor are connected in series. At the resonant frequency the resulting impedance is: *minimum*

22-6-(b).
An inductor and a capacitor are connected in parallel. At the resonant frequency the resulting impedance is: *maximum*

22-7-(d).
An inductor and a capacitor form a resonant circuit. The capacitor value is increased by four times. The resonant frequency will: *decrease to half*

22-8-(a).
An inductor and a capacitor form a resonant circuit. If the value of the inductor is decreased by a factor of four, the resonant frequency will: *increase by a factor of two*

22-9-(c).
A "high Q" resonant circuit is one which: *is highly selective*

23 Electrical Safety:

23-0-(b).
You can safely remove an unconscious person from contact with a high voltage source by: *turning off the high voltage and then removing the person*

23-1-(d).
For your safety, before checking a fault in a mains operated power supply unit, first: *turn off the power and remove the power plug*

23-2-(a).
Wires carrying high voltages in a transmitter should be well insulated to avoid: *short circuits*

23-3-(c).
A residual current device is recommended for protection in a mains power circuit because it: *removes power to the circuit when the phase and neutral currents are not equal*

23-4-(b).
An earth wire should be connected to the metal chassis of a mains-operated power supply to ensure that if a fault develops, the chassis: *does not develop a high voltage with respect to earth*

23-5-(d).
The purpose of using three wires in the mains power cord and plug on amateur radio equipment is to: *prevent the chassis from becoming live in case of an internal short to the chassis*

23-6-(a).
The correct colour coding for the phase wire in a flexible mains lead is: *brown*

23-7-(c).
The correct colour coding for the neutral wire in a flexible mains lead is: *blue*

23-8-(b).
The correct colour coding for the earth wire in a flexible mains lead is: *yellow and green*

23-9-(d).
An isolating transformer is used to: *ensure that no voltage is developed between either output lead and ground*

24 Semiconductors 1:

24-0-(a).
The basic semiconductor amplifying device is a: *transistor*

24-1-(c).
Zener diodes are normally used as: *voltage regulators*

24-2-(b).
The voltage drop across a germanium signal diode when conducting is about: *0.3V*

24-3-(d).
A bipolar transistor has three terminals named: *emitter, base and collector*

24-4-(a).
The three leads from a PNP transistor are named the: *collector, emitter, base*

24-5-(c).
A low-level signal is applied to a transistor circuit input and a higher-level signal is present at the output. This effect is known as: *amplification*

24-6-(b).
The type of rectifier diode found most often in power supplies is: *silicon*

24-7-(d).
One important application for diodes is recovering information from transmitted signals. This is referred to as: *demodulation*

24-8-(a).
In a forward biased PN junction, the electrons: *flow from n to p*

24-9-(c).
The following material is considered to be a semiconductor: *silicon*

25 Semiconductors 2:

25-0-(b).
A varactor diode acts like a variable: *capacitance*

25-1-(d).
A semiconductor is said to be doped when small quantities of the following are added: *impurities*

25-2-(a).
The connections to a semiconductor diode are known as: *anode and cathode*

25-3-(c).
Bipolar transistors usually have: *3 connecting leads*

25-4-(b).
A semiconductor is described as a "general purpose audio NPN device". This is a: *bipolar transistor*

25-5-(d).
Two basic types of bipolar transistors are: *NPN and PNP types*

25-6-(a).
A transistor can be destroyed in a circuit by: excessive heat

25-7-(c).
To bias a transistor to cut-off, the base must be: *at the emitter potential*

25-8-(b).
Two basic types of field effect transistors are: *n-channel and p-channel*

25-9-(d).
A semiconductor device with leads labelled gate, drain and source, is best described as a: *field-effect transistor*

26 Electronic devices

26-0-(a).
In a tetrode valve, the electron flow is from the: *cathode through the control grid then screen grid to the anode*

26-1-(a).
In a bipolar transistor, this compares closest to the control grid of a triode valve: *base*

26-2-(c).
This semi-conductor device has characteristics most similar to a triode valve: *field effect transistor*

26-3-(b).
This is a reason why a triode valve might be used instead of a transistor in a circuit: *it may be able to handle higher power*

26-4-(d).
This component can amplify a small signal but uses high voltages: *a thermionic valve*

26-5-(a).
A feature common to thermionic valves and transistors is that both: *can amplify signals*

26-6-(c).
The electrode that is operated with the highest positive potential in a thermionic valve is the: *anode*

26-7-(b).
The electrode that is usually a cylinder of wire mesh in a thermionic valve is the: *grid*

26-8-(d).
This is usually found on the inside of a thermionic valve: *a vacuum*

26-9-(a).
A triode valve has this many grids: *one*

27 Meters and Measuring:

27-0-(a).
An ohmmeter measures the: *value of any resistance placed between its terminals*

27-1-(c).
A VSWR meter switched to the "reverse" position provides an indication of: *relative reflected voltage*

27-2-(b).
The correct instrument for measuring the supply current to an amplifier is a: *ammeter*

27-3-(d).
The following meter could be used to measure the power supply current drawn by a small hand-held transistorised receiver: *a DC ammeter*

27-4-(a).
When measuring the current drawn by a light bulb from a DC supply, the meter will act in circuit as: *a low value resistance*

27-5-(c).
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*

27-6-(b).
An ammeter should not be connected directly across the terminals of a 12 volt car battery because: *the resulting high current will probably destroy the ammeter*

27-7-(d).
A good ammeter should have: *a very low internal resistance*

27-8-(a).
A good voltmeter should have: *a very high internal resistance*

27-9-(c).
An rms-reading voltmeter is used to measure a 50 Hz sinewave of known peak voltage 14 volt. The meter reading will be about: *10 volt*

28 Decibels, Amplification and Attenuation:

28-0-(b).
Assuming the same impedances, the input to an amplifier is 1 volt rms and the output 10 volt rms. This is an increase of: *20 dB*

28-1-(d).
The input to an amplifier is 1 volt rms and output 100 volt rms. Assuming the same impedances, this is an increase of: *40 dB*

28-2-(a).
An amplifier has a gain of 40 dB. Assuming the same impedances, the ratio of the rms output voltage to the rms input voltage is: *100*

28-3-(c).
A transmitter power amplifier has a gain of 20 dB. The ratio of the output power to the input power is: *100*

28-4-(b).
An attenuator network comprises two 100 ohm resistors in series with the input applied across both resistors and the output taken from across one of them. The attenuation of the network is: *0.5*

28-5-(d).
An attenuator network has 10 volt rms applied to its input with 1 volt rms measured at its output. The attenuation of the network is: *20 dB*

28-6-(a).
An attenuator network has 10 volt rms applied to its input with 5 volt rms measured at its output. The attenuation of the network is: *6 dB*

28-7-(c).
Two amplifiers with gains of 10 dB and 40 dB are connected in cascade. The gain of the combination is: *50 dB*

28-8-(b).
An amplifier with a gain of 20 dB has a -10 dB attenuator connected in cascade. The gain of the combination is: *10 dB*

28-9-(d).
Each stage of a three-stage amplifier provides 5 dB gain. The total amplification is: *15 dB*

29 HF Stations

29-0-(d).
In designing an HF station, you would use this to reduce the effects of harmonic radiation: *low pass filter*

29-1-(a).
In your HF station, this is the most useful for determining the effectiveness of the antenna system: *SWR bridge*

29-2-(c).
Of the components in an HF station, you would use this to match impedances between the transceiver and antenna: *antenna tuner*

29-3-(b).
In your HF station, this component can be temporarily connected for transmitter tuning adjustments: *dummy load*

29-4-(d).
In an HF station, the "linear amplifier" is: *an optional amplifier to be switched in when higher power is required*

29-5-(a).
In an HF station, the "low pass filter" must be rated to: *carry the full power output from the station*

29-6-(c).
In an HF station, the "dummy load" is: *used to allow adjustment of the transmitter without causing interference to others*

29-7-(b).
In an HF station, the connection between the SWR bridge and the switch used for selecting between multiple antennas, is normally a: *coaxial cable*

29-8-(d).
In an HF station, an "antenna tuner" is not normally necessary when: *the antenna input impedance is 50 ohms*

29-9-(a).
In an HF station, the connection between the "antenna tuner" and the "antenna feed-point" could be made with: *50 ohm coaxial cable*

30 Receivers 1:

30-0-(c).
In a frequency modulation receiver, this is connected to the input of the radio frequency amplifier: *the antenna*

30-1-(b).
In a frequency modulation receiver, this is in between the antenna and the mixer: *the radio frequency amplifier*

30-2-(d).
In a frequency modulation receiver, the output of the high frequency oscillator is fed to the: *mixer*

30-3-(a).
In a frequency modulation receiver, the output of this is connected to the mixer: *the high frequency oscillator*

30-4-(c).
In a frequency modulation receiver, this is in between the mixer and the intermediate frequency amplifier: *a filter*

30-5-(b).
In a frequency modulation receiver, this is located between the filter and the limiter: *the intermediate frequency amplifier*

30-6-(d).
In a frequency modulation receiver, this is in between the intermediate frequency amplifier and the frequency discriminator: *the limiter*

30-7-(a).
In a frequency modulation receiver, this is located between the limiter and the audio frequency amplifier: *the frequency discriminator*

30-8-(c).
In a frequency modulation receiver, this is located between the frequency discriminator and the speaker and/or headphones: *audio frequency amplifier*

30-9-(b).
In a frequency modulation receiver, this connects to the audio frequency amplifier output: *the speaker and/or headphones*

31 Receivers 2:

31-0-(d).
In a single sideband and CW receiver, the antenna is connected to the: *radio frequency amplifier*

31-1-(a).
In a single sideband and CW receiver, the output of this is connected to the mixer: *the radio frequency amplifier*

31-2-(c).
In a single sideband and CW receiver, this is connected to the radio frequency amplifier and the high frequency oscillator: *the mixer*

31-3-(b).
In a single sideband and CW receiver, the output of this is connected to the mixer: *the high frequency oscillator*

31-4-(d).
In a single sideband and CW receiver, this is in between the mixer and intermediate frequency amplifier: *a filter*

31-5-(a).
In a single sideband and CW receiver, this is in between the filter and product detector: *the intermediate frequency amplifier*

31-6-(c).
In a single sideband and CW receiver, the output from this is connected to the audio frequency amplifier*: the product detector*

31-7-(b).
In a single sideband and CW receiver, the output from this is connected to the product detector: *the beat frequency oscillator*

31-8-(d).
In a single sideband and CW receiver, this is connected to the output of the product detector: *the audio frequency amplifier*

31-9-(a).
In a single sideband and CW receiver, this is connected to the output of the audio frequency amplifier: *the speaker and/or headphones*

32 Receivers 3:

32-0-(c).
The frequency stability of a receiver is its ability to: *stay tuned to the desired signal*

32-1-(b).
The sensitivity of a receiver specifies: *its ability to receive weak signals*

32-2-(d).
Of two receivers, the one capable of receiving the weakest signal will have: *the least internally-generated noise*

32-3-(a).
The figure in a receiver's specifications which indicates its sensitivity is the: *signal plus noise to noise ratio*

32-4-(c).
If two receivers are compared, the more sensitive receiver will produce: *more signal and less noise*

32-5-(b).
The ability of a receiver to separate signals close in frequency is called its: *selectivity*

32-6-(d).
A receiver with high selectivity has a: *narrow bandwidth*

32-7-(a).
The BFO in a superhet receiver operates on a frequency nearest to that of its: *IF amplifier*

32-8-(c).
To receive Morse code signals, a BFO is employed in a superhet receiver to: *beat with the IF signal to produce an audio tone*

32-9-(b).
The following transmission mode is usually demodulated by a product detector: *single sideband suppressed carrier modulation*

33 Receivers 4:

33-0-(d).
This audio shaping network is added at an FM receiver to restore proportionally attenuated lower audio frequencies: *a de-emphasis network*

33-1-(a).
A stage in a receiver with input and output circuits tuned to the received frequency is the: *RF amplifier*

33-2-(c).
An RF amplifier ahead of the mixer stage in a superhet receiver: *increases the sensitivity of the receiver*

33-3-(b).
A communication receiver may have several IF filters of different bandwidths. The operator selects one to: *improve the reception of different types of signal*

33-4-(d).
The stage in a superhet receiver with a tuneable input and fixed tuned output is the: *mixer stage*

33-5-(a).
The mixer stage of a superhet receiver: *produces an intermediate frequency signal*

33-6-(c).
A 7 MHz signal and a 16 MHz oscillator are applied to a mixer stage. The output will contain the input frequencies and: *9 and 23 MHz*

33-7-(b).
Selectivity in a superhet receiver is achieved primarily in the: *IF amplifier*

33-8-(d).
The abbreviation AGC means: *automatic gain control*

33-9-(a).
The AGC circuit in a receiver usually controls the: *RF and IF stages*

34 Receivers 5:

34-0-(c).
The tuning control of a superhet receiver changes the tuned frequency of the: *local oscillator*

34-1-(b).
A superhet receiver, with an IF at 500 kHz, is receiving a 14 MHz signal. The local oscillator frequency is: *14.5 MHz*

34-2-(d).
An audio amplifier is necessary in a receiver because: *signals leaving the detector are weak*

34-3-(a).
An audio output transformer is sometimes used in a receiver to: *match the output impedance of the audio amplifier to the speaker*

34-4-(c).
A superhet receiver, with a 500 kHz IF, is receiving a signal at 21.0 MHz. A strong unwanted signal at 22 MHz is interfering. The cause is: *22 MHz is the image frequency*

34-5-(b).
If the carrier insertion oscillator is counted, then a single conversion superhet receiver has: *two oscillators*

34-6-(d).
A superhet receiver receives an incoming signal of 3540 kHz and the local oscillator produces a signal of 3995 kHz. The IF amplifier is tuned to: *455 kHz*

34-7-(a).
A double conversion receiver usually has: *a high-frequency IF stage followed by a much lower frequency IF stage*

34-8-(c).
An advantage of a double conversion receiver is that it: *has improved image rejection characteristics*

34-9-(b).
A receiver squelch circuit: *silences the receiver speaker during periods of no received signal*

35 Receivers 6:

35-0-(d).
A communications receiver provides a choice of four IF bandpass filters installed in it, one at 250 Hz, one at 500 Hz, one at 2.4 kHz, and one at 6 kHz. If you were listening to a single sideband transmission, you would use: *2.4 kHz*

35-1-(a).
In a communications receiver, a highly-selective filter would be located in the: *IF circuits*

35-2-(c).
A multi-conversion superhet receiver is more susceptible to spurious responses than a single-conversion receiver because of the: *additional oscillators and mixing frequencies involved in the design*

35-3-(b).
A single conversion receiver with a 9 MHz IF has a local oscillator operating at 16 MHz. The frequency it is tuned to is: *7 MHz*

35-4-(d).
A double-conversion receiver designed for SSB reception has a beat frequency oscillator and: *two IF stages and two local oscillators*

35-5-(a).
The mixer stage of a superheterodyne receiver is used to: *change the frequency of the incoming signal to that of the IF*

35-6-(c).
The first mixer in the receiver mixes the incoming signal with the local oscillator to produce: *an intermediate frequency*

35-7-(b).
The BFO is off-set slightly (500 - 1500 Hz). from the incoming signal to the detector. This is required: *to beat with the incoming signal*

35-8-(d).
It is very important that the oscillators contained in a superhet receiver are: *stable and spectrally pure*

35-9-(a).
The noise floor of a receiver means: *the weakest signal that can be detected above the receiver internal noise*

36 Receivers 7:

36-0-(c).
The gain used in the RF amplifier stage of a receiver should be: *sufficient to allow weak signals to overcome noise generated in the first mixer stage*

36-1-(b).
The primary purpose of an RF amplifier in a receiver is to: *improve the receiver noise figure*

36-2-(d).
The primary source of noise that can be heard in a UHF band receiver with its antenna connected is: *receiver front-end noise*

36-3-(a).
The noise generated in a receiver of good design originates in the: *RF amplifier and mixer*

36-4-(c).
Very low noise figures for a high frequency receiver are relatively unimportant because: *external HF noise, man-made and natural, are higher than the internal noise generated by the receiver*

36-5-(b).
Front-end selectivity is provided by resonant networks both before and after the RF stage in a superhet receiver. This whole section of the receiver is often referred to as the: *preselector*

36-6-(d).
In a superhet receiver with AGC, as the strength of the signal increases, the AGC: *reduces the receiver gain*

36-7-(a).
This part of a superhet receiver determines the image rejection ratio of the receiver: *RF amplifier*

36-8-(c).
The term for the reduction in receiver sensitivity caused by a strong signal near the received frequency is: *desensitisation*

36-9-(b).
Which list of emission types is in order from the narrowest bandwidth to the widest bandwidth: *CW, RTTY, SSB voice, FM voice*

37 Transmitters 1:

37-0-(d).
In a frequency modulation transmitter, the input to the speech amplifier is from the: *microphone*

37-1-(a).
In a frequency modulation transmitter, the microphone is connected to the: *speech amplifier*

37-2-(c).
In a frequency modulation transmitter, this is in between the speech amplifier and the oscillator: *modulator*

37-3-(b).
In an elementary frequency modulation transmitter, this is located between the modulator and the frequency multiplier: *oscillator*

37-4-(d).
In an elementary frequency modulation transmitter, this is located between the oscillator and the power amplifier: *frequency multiplier*

37-5-(a).
In an elementary frequency modulation transmitter, this is located between the frequency multiplier and the antenna: *power amplifier*

37-6-(c).
In a frequency modulation transmitter, the power amplifier output is fed to the: *antenna*

37-7-(b).
In a CW transmitter, the output from this is connected to the driver/buffer: *master oscillator*

37-8-(d).
In a typical transmitter, this is the primary source of direct current: *power supply*

37-9-(a).
In a CW transmitter, this is between the master oscillator and the power amplifier: *driver/buffer*

38 Transmitters 2:

38-0-(c).
In a CW transmitter, this controls when RF energy is applied to the antenna: *telegraph key*

38-1-(b).
In a CW transmitter, this is in between the driver/buffer stage and the antenna: *power amplifier*

38-2-(d).
In a single sideband transceiver, the device common to both transmit and receive that sets most of the performance characteristics is the: *sideband filter*

38-3-(a).
In a single sideband transmitter, the output of this is connected to a sideband-selecting filter: *balanced modulator*

38-4-(c).
In a single sideband transmitter, this is in between the balanced modulator and the mixer: *filter*

38-5-(b).
In a single sideband transmitter, this is connected to the input of the speech amplifier: *microphone*

38-6-(d).
In a single sideband transmitter, the output of this is connected to the balanced modulator: *speech amplifier*

38-7-(a).
In a single sideband transmitter, the output of the variable frequency oscillator is connected to the: *mixer*

38-8-(c).
In a single sideband transmitter, the output of this is connected to the mixer: *variable frequency oscillator*

38-9-(b).
In an single sideband transmitter, this is in between the mixer and the antenna: *linear amplifier*

39 Transmitters 3:

39-0-(d).
The signal from a balanced modulator consists of: *no carrier and two sidebands*

39-1-(a).
The signal from a CW transmitter consists of: *an RF waveform which is keyed on and off to form Morse characters*

39-2-(c).
The following signal can be amplified using a non-linear amplifier: *FM*

39-3-(b).
SSB transmissions: *occupy about half the bandwidth of AM transmissions*

39-4-(d).
The purpose of a balanced modulator in a SSB transmitter is to: *suppress the carrier while producing two sidebands*

39-5-(a).
Several stations advise that your FM simplex transmission in the "two metre" band is distorted. The cause might be that: *the transmitter modulation deviation is too high*

39-6-(c).
The difference between DC input power and RF power output of a transmitter RF amplifier: *is dissipated as heat*

39-7-(b).
The process of modulation allows: *information to be impressed on to a carrier*

39-8-(d).
The output power rating of a linear amplifier in a SSB transmitter is specified by the: *peak envelope power*

39-9-(a).
Speech compression associated with SSB transmission implies: *full amplification of low level signals and reducing or eliminating amplification of high level signals*

40 Harmonics and Parasitics 1:

40-0-(c).
A harmonic of a signal transmitted at 3525 kHz would be expected to occur at: *7050 kHz*

40-1-(b).
The third harmonic of 7 MHz is: *21 MHz*

40-2-(d).
The fifth harmonic of 7 MHz is: *35 MHz*

40-3-(a).
Increased harmonic output may be produced in a transmitter by: *overdriven amplifier stages*

40-4-(c).
Adjacent channel interference may be produced in the RF power amplifier of a transmitter if: *the modulation level is too high*

40-5-(b).
Harmonics produced in an early stage of a transmitter may be reduced in a later stage by: *using tuned circuit coupling between stages*

40-6-(d).
Harmonics are produced when: *a sine wave is distorted*

40-7-(a).
Harmonic frequencies are: *at multiples of the fundamental frequency*

40-8-(c).
An interfering signal from a transmitter has a frequency of 57 MHz. This signal could be the: *second harmonic of a 10 metre transmission*

40-9-(b).
To minimise the radiation of one particular harmonic, one can use a: *wave trap in the transmitter output*

41 Harmonics and Parasitics 2:

41-0-(d).
Harmonics are to be avoided because they: *cause possible interference to services using other bands*

41-1-(a).
Parasitic oscillations are to be avoided because: *they cause possible interference to other users of the radio frequency spectrum.*

41-2-(c).
A low pass filter will: *reduce harmonics*

41-3-(b).
A spurious transmission from a transmitter is: *an unwanted emission unrelated to the output signal frequency*

41-4-(d).
A parasitic oscillation: *is an unwanted signal developed in a transmitter*

41-5-(a).
Parasitic oscillations in a RF power amplifier can be suppressed by: *placing suitable chokes, ferrite beads or resistors within the amplifier*

41-6-(c).
Parasitic oscillations in the RF power amplifier stage of a transmitter may occur: *at high or low frequencies*

41-7-(b).
Transmitter power amplifiers can generate parasitic oscillations on: *frequencies unrelated to the transmitter's output frequency*

41-8-(d).
Parasitic oscillations tend to occur in: *high gain amplifier stages*

41-9-(a).
Parasitic oscillations can cause interference. They are: *not related to the operating frequency*

42 Power Supplies 1:

42-0-(c).
A mains operated DC power supply: *converts energy from the mains into DC for operating electronic equipment*

42-1-(b).
The following unit in a DC power supply performs a rectifying operation: *a full-wave diode bridge*

42-2-(d).
The following unit in a DC power supply performs a smoothing operation: *an electrolytic capacitor*

42-3-(a).
The following could power a solid-state 10 watt VHF transceiver: *a 12 volt car battery*

42-4-(c).
A fullwave DC power supply operates from the New Zealand AC mains. The ripple frequency is: *100 Hz*

42-5-(b).
The capacitor value best suited for filtering the output of a 12 volt 1 amp DC power supply is: *10,000 uF*

42-6-(d).
The following should always be included as a standard protection device in any power supply: *a fuse in the mains lead*

42-7-(a).
A halfwave DC power supply operates from the New Zealand AC mains. The ripple frequency will be: *50 Hz*

42-8-(c).
The output voltage of a DC power supply decreases when current is drawn from it because: *all power supplies have some internal resistance*

42-9-(b).
Electrolytic capacitors are used in power supplies because: *they can be obtained in larger values than other types*

43 Power Supplies 2:

43-0-(d).
A filter is used in a power supply to: *smooth the rectified waveform from the rectifier*

43-1-(a).
A regulator device is used in a power supply to: *keep the output voltage at a constant value*

43-2-(c).
A transformer is used in a power supply to: *transform the mains AC voltage to a more convenient AC voltage*

43-3-(b).
A rectifier is used in a power supply to: *turn the AC voltage from the transformer into a fluctuating DC voltage*

43-4-(d).
The regulator device in a power supply could consist of: *a three-terminal regulator chip*

43-5-(a).
A power supply is to replace a car battery to power a solid-state transceiver to 200 watt PEP output ratings. A typical expected maximum current load will be: *30 - 60 amp*

43-6-(c).
A power supply is to power a solid-state transceiver. A suitable over-voltage protection device is a: *crowbar across the regulator output*

43-7-(b).
In a regulated power supply, the 'crowbar' is a: *last-ditch protection against over-voltage resulting from failure of the regulator in the supply*

43-8-(d).
In a regulated power supply, 'current limiting' is sometimes used to: *minimise short-circuit current passing through the regulator*

43-9-(a).
The purpose of a series pass transistor in a regulated power supply is to: *maintain the output voltage at a constant value*

44 General Operating Procedures:

44-0-(c).
The correct order for callsigns in a callsign exchange at the start and end of a transmission is: *the other callsign followed by your own callsign*

44-1-(b).
The following phonetic code is correct for the callsign "ZL2KMJ": *zulu lima two kilo mike juliet*

44-2-(d).
The accepted way to call "CQ" with a SSB transceiver is: "CQ CQ CQ this is ZL1XXX ZL1XXX ZL1XXX"

44-3-(a).
A signal report of "5 and 1" indicates: *perfect intelligibility but very low signal strength*

44-4-(c).
The correct phonetic code for the callsign VK5ZX is: *victor kilo five zulu xray*

44-5-(b).
The accepted way to announce that you are listening to a VHF repeater is: *"ZL2ZZZ listening on 7225"*

44-6-(d).
A rare DX station calling CQ on CW and repeating "up 2" at the end of the call means the station: *will be listening for replies 2 kHz higher in frequency*

44-7-(a).
When conversing via a VHF or UHF repeater you should pause between overs for about: *3 seconds*

44-8-(c).
Before calling CQ on the HF bands, you should: *listen first, then ask if the frequency is in use*

44-9-(b).
The phrase "you are fully quieting the repeater" means: *your signal into the repeater is strong enough to be noise-free on the output frequency*

45 Practical Operating Knowledge 1:

45-0-(d).
You are mobile and talking through a VHF repeater. The other station reports that you keep "dropping out". This means: *your signal does not have enough strength to operate the repeater*

45-1-(a).
Your CQ call from your transceiver on 3.58 MHz is answered by someone slightly off that frequency. You should: *not change your main frequency dial to tune in the signal but instead use the RIT*

45-2-(c).
"Break-in keying" means: *key-down changes the station to transmit, key-up to receive*

45-3-(b).
A repeater operating with a "positive 600 kHz split": *listens on a frequency 600 kHz higher than its designated frequency*

45-4-(d).
The standard frequency offset (split). for 2 metre repeaters in New Zealand is: *plus 600 kHz above 147 MHz, minus 600 kHz on or below 147 MHz*

45-5-(a).
The standard frequency offset (split). for 70 cm repeaters in New Zealand is plus or minus: *5 MHz*

45-6-(c).
You are adjusting an antenna matching unit using an SWR bridge. You should adjust for: *minimum reflected power*

45-7-(b).
The "squelch" or "muting" circuitry on a VHF receiver: *inhibits the audio output unless a station is being received*

45-8-(d).
The "S meter" on a receiver: *indicates relative incoming signal strengths*

45-9-(a).
The "National System" is: *a series of nationwide amateur radio linked repeaters in the 70 cm band*

46 Practical Operating Knowledge 2:

46-0-(c).
A noise blanker on a receiver is most effective to reduce: *ignition noise*

46-1-(b).
The purpose of a VOX unit in a transceiver is to: *change from receiving to transmitting using the sound of the operator's voice*

46-2-(b).
"VOX" stands for: *voice operated transmit*

46-3-(a).
"RIT" stands for: *receiver incremental tuning*

46-4-(c).
The "RIT" control on a transceiver: *changes the frequency of the receiver section without affecting the frequency of the transmitter section*

46-5-(b).
The "split frequency" function on a transceiver allows the operator to: *transmit on one frequency and receive on another*

46-6-(d).
The term "ALC" stands for: *automatic level control*

46-7-(a).
The AGC circuit is to: *minimise the adjustments needed to the receiver gain control knobs*

46-8-(c).
Many receivers have both RF and AF gain controls. These allow the operator to: *vary the gain of the radio frequency and audio frequency amplifier stages independently*

46-9-(b).
The term "PTT" means: *push to talk*

47 The Q-code

47-0-(c).
The signal "QRM?" means: *is my transmission being interfered with?*

47-1-(b).
The signal "QRN" means: *I am being troubled with static*

47-2-(d).
The "Q signal" requesting the other station to send slower Morse code is: *QRS*

47-3-(a).
The question "who is calling me?" is asked by: *QRZ?*

47-4-(c).
The "Q" signal "what is your location?" is: *QTH?*

47-5-(b).
The "Q" signal "are you busy?" is: *QRL?*

47-6-(d).
The "Q" signal "shall I decrease transmitter power?" is: *QRP?*

47-7-(a).
The "Q" signal "your signals are fading" is: *QSB*

47-8-(c).
The signal "QSY?" means: *shall I transmit on another frequency?*

47-9-(b).
The "Q" signal which means "when will you call me again?" is: *QRX?*

48 Transmission lines 1:

48-0-(d).
Any length of transmission line may be made to appear as an infinitely long line by: *terminating the line in its characteristic impedance*

48-1-(a).
The characteristic impedance of a transmission line is determined by the: *physical dimensions and relative positions of the conductors*

48-2-(c).
The characteristic impedance of a 20 metre length of transmission line is 52 ohm. If 10 metres is cut off, the impedance will be: *52 ohm*

48-3-(b).
The following feeder is the best match to the base of a quarter wave ground plane antenna: *50 ohm coaxial cable*

48-4-(d).
The designed output impedance of the antenna socket of most modern transmitters is nominally: *50 ohm*

48-5-(a).
To obtain efficient transfer of power from a transmitter to an antenna, it is important that there is a: *correct impedance match between transmitter and antenna*

48-6-(c).
An HF coaxial feedline is constructed from: *braid and insulation around a central conductor*

48-7-(b).
An RF transmission line should be matched at the transmitter end to: *transfer maximum power to the antenna*

48-8-(d).
A damaged antenna or feedline attached to the output of a transmitter will present an incorrect load resulting in: *excessive heating or protection shut-down in the transmitter output stage*

48-9-(a).
A result of mismatch between the power amplifier of a transmitter and the antenna is: *reduced antenna radiation*

49 Transmission lines 2:

49-0-(c).
Losses occurring on a transmission line between a transmitter and the antenna result in: *less RF power being radiated*

49-1-(b).
If the characteristic impedance of a feedline does not match the antenna input impedance then: *standing waves are produced in the feedline*

49-2-(d).
A result of standing waves on a non-resonant transmission line is: *reduced transfer of RF energy to the antenna*

49-3-(a).
A quarter-wave length of 50-ohm coaxial line is shorted at one end. The impedance seen at the other end of the line is: *infinite*

49-4-(c).
A switching system to use a single antenna for a separate transmitter and receiver should also: *disable the unit not being used*

49-5-(b).
An instrument to check whether RF power in the transmission line is transferred to the antenna is: *a standing wave ratio meter*

49-6-(d).
This type of transmission line will exhibit the lowest loss: *open-wire feeder*

49-7-(a).
The velocity factor of a coaxial cable with solid polythene dielectric is about: *0.66*

49-8-(c).
This commonly available antenna feedline can be buried directly in the ground for some distance without adverse effects: *coaxial cable*

49-9-(b).
If an antenna feedline must pass near grounded metal objects, the following type should be used: *coaxial cable*

50 Antennas 1:

50-0-(d).
The support member for the elements of a Yagi antenna is known as the: *boom*

50-1-(a).
The longest “active” element of a Yagi antenna is the: *reflector*

50-2-(c).
The shortest “active” element of a Yagi antenna is the: *director(s).*

50-3-(b).
A centre-fed dipole is formed by an insulator separating two equal lengths of antenna wire ‘X’. The optimum operating frequency will be when the: *length X+X is a little shorter than one-half of the signal wavelength*

50-4-(d).
A centre-fed dipole antenna for HF working can be made to operate on several bands if the following item is installed at points in each leg: *a parallel-tuned trap*

50-5-(a).
The physical length of an antenna can be shortened but the electrical length maintained, if one of the following items is added at an appropriate point in the antenna: *an inductor*

50-6-(c).
The approximate physical length of a half-wave antenna for a frequency of 1000 kHz is: *150 metres*

50-7-(b).
The wavelength for a frequency of 25 MHz is: *12 metres*

50-8-(d).
Magnetic and electric fields about an antenna are: *perpendicular to each other*

50-9-(a).
Radio wave polarisation is defined by the orientation of the radiated: *electric field*

51 Antennas 2:

51-0-(c).
A half wave dipole antenna is normally fed at the point of: *maximum current*

51-1-(b).
An important factor to consider when high angle radiation is desired from a horizontal half-wave antenna is the: *height of the antenna*

51-2-(d).
An antenna which transmits equally well in all compass directions is a: *quarterwave grounded vertical*

51-3-(a).
A groundplane antenna emits a: *vertically polarised wave*

51-4-(c).
The impedance at the feed point of a folded dipole antenna is approximately: *300 ohm*

51-5-(b).
The centre impedance of a 'half-wave' dipole in 'free space' is approximately: *73 ohm*

51-6-(d).
The effect of adding a series inductance to an antenna is to: *decrease the resonant frequency*

51-7-(a).
The purpose of a balun in a transmitting antenna system is to: *match unbalanced and balanced transmission lines*

51-8-(c).
A dummy antenna: *duplicates the characteristics of an antenna without radiating signals*

51-9-(b).
A half-wave antenna resonant at 7100 kHz is approximately this long: *20 metres*

52 Antennas 3:

52-0-(d).
A radio wave with a frequency of 3.8 MHz has a wavelength of: *78.94m*

52-1-(a).
A half wave antenna cut for 7 MHz can be used on this band without change: *15 metre*

52-2-(c).
This property of an antenna broadly defines the range of frequencies to which it will be effective: *bandwidth*

52-3-(b).
The resonant frequency of an antenna may be increased by: *shortening the radiating element*

52-4-(d).
Insulators are used at the end of suspended antenna wires to: *limit the electrical length of the antenna*

52-5-(a).
To lower the resonant frequency of an antenna, the operator should: *lengthen the antenna*

52-6-(c).
A half-wave antenna is often called a: *dipole*

52-7-(b).
The resonant frequency of a dipole antenna is mainly determined by: *its length*

52-8-(d).
A transmitting antenna for 28 MHz for mounting on the roof of a car could be a: *quarter wave vertical*

52-9-(a).
A vertical antenna which uses a flat conductive surface at its base is the: *quarter wave ground plane*

53 Antennas 4:

53-0-(c).
The main characteristic of a vertical antenna is that it: *receives signals from all points around it equally well*

53-1-(b).
At the ends of a half-wave dipole the: *voltage is high and current is low*

53-2-(d).
An antenna type commonly used on HF is the: *cubical quad*

53-3-(a).
A Yagi antenna is said to have a power gain over a dipole antenna for the same frequency band because: *it concentrates the radiation in one direction*

53-4-(c).
The maximum radiation from a three element Yagi antenna is: *in the direction of the director end of the boom*

53-5-(b).
The reflector and director(s). in a Yagi antenna are called: *parasitic elements*

53-6-(d).
An isotropic antenna is a: *hypothetical point source*

53-7-(a).
The main reason why many VHF base and mobile antennas in amateur use are 5/8 of a wavelength long is that: *most of the energy is radiated at a low angle*

53-8-(c).
A more important consideration when selecting an antenna for working stations at great distances is: *angle of radiation*

53-9-(b).
On VHF and UHF bands, polarisation of the receiving antenna is important in relation to the transmitting antenna, but on HF it is relatively unimportant because: *the ionosphere can change the polarisation of the signal from moment to moment*

54 Propagation 1:

54-0-(d).
A 'skip zone' is: *the distance between the far end of the ground wave and where the refracted wave first returns to earth*

54-1-(a).
The medium which reflects high frequency radio waves back to the earth's surface is called the: *ionosphere*

54-2-(c).
The highest frequency that will be reflected back to the earth at any given time is known as the: *MUF*

54-3-(b).
Solar cycles have an average length of: *11 years*

54-4-(d).
The electric field of an electromagnetic wave is: *perpendicular to the direction of wave motion*

54-5-(a).
That portion of HF radiation which is directly affected by the surface of the earth is called: *ground wave*

54-6-(c).
Scattered patches of high ionisation developed seasonally at the height of one of the layers is called: *sporadic-E*

54-7-(b).
For long distance propagation, the radiation angle of energy from the antenna should be: *less than 30 degrees*

54-8-(d).
The path radio waves normally follow from a transmitting antenna to a receiving antenna at VHF and higher frequencies is a: *straight line*

54-9-(a).
A radio wave may follow two or more different paths during propagation and produce slowly-changing phase differences between signals at the receiver resulting in a phenomenon called:
fading

55 Propagation 2:

55-0-(c).
High Frequency long-distance propagation is most dependent on: *ionospheric reflection*

55-1-(b).
The layer of the ionosphere mainly responsible for long distance communication is: *F*

55-2-(d).
One of the ionospheric layers splits into two parts during the day called: *F1 & F2*

55-3-(a).
Signal fadeouts resulting from an 'ionospheric storm' or 'sudden ionospheric disturbance' are usually attributed to: *solar flare activity*

55-4-(c).
The skip distance of radio signals is determined by: *both the height of the ionosphere and the angle of radiation from the antenna*

55-5-(b).
Propagation on 80 metres during the summer daylight hours is limited to relatively short distances because of: *high absorption in the D layer*

55-6-(d).
The distance from the transmitter to the nearest point where the sky wave returns to the earth is called the: *skip distance*

55-7-(a).
A variation in received signal strength caused by slowly changing differences in path lengths is called: *fading*

55-8-(c).
VHF and UHF bands are frequently used for satellite communication because: *waves at these frequencies travel to and from the satellite relatively unaffected by the ionosphere*

55-9-(b).
The 'critical frequency' is defined as the: *highest frequency which will be reflected back to earth at vertical incidence*

56 Propagation 3:

56-0-(b).
The speed of a radio wave: *is the same as the speed of light*

56-1-(a).
The MUF for a given radio path is the: *maximum usable frequency*

56-2-(c).
A distant amplitude-modulated station is heard quite loudly but the modulation is at times severely distorted. A similar local station is not affected. The probable cause of this is: *selective fading*

56-3-(b).
Skip distance is a term associated with signals through the ionosphere. Skip effects are due to: *reflection and refraction from the ionosphere*

56-4-(d).
The type of atmospheric layers which will best return signals to earth are: *ionised layers*

56-5-(a).
The ionosphere: *is formed from layers of ionised gases around the earth*

56-6-(c).
The skip distance of a sky wave will be greatest when the: *angle of radiation is smallest*

56-7-(b).
VHF or UHF signals transmitted towards a tall building are often received at a more distant point in another direction because: *these waves are easily reflected by objects in their path*

56-8-(d).
A 'line of sight' transmission between two stations uses mainly the: *ground wave*

56-9-(a).
Regular changes in the ionosphere occur approximately every 11: *years*

57 Interference and Filtering 1:

57-0-(c).
Electromagnetic compatibility is: *the ability of equipment to function satisfactorily in its own environment without introducing intolerable electromagnetic disturbances*

57-1-(b).
On an amateur receiver, unwanted signals are found at every 15.625 kHz. This is probably due to: *radiation from a nearby TV line oscillator*

57-2-(d).
Narrow-band interference can be caused by: *transmitter harmonics*

57-3-(a).
Which of the following is most likely to cause broad-band continuous interference: *poor commutation in an electric motor*

57-4-(c).
If broadband noise interference varies when it rains, the most likely cause could be from: *outside overhead power lines*

57-5-(b).
Before explaining to a neighbour that the reported interference is due to a lack of immunity in the neighbour's electronic equipment: *make sure that there is no interference on your own domestic equipment*

57-6-(d).
A neighbour's stereo system is suffering RF break-through. One possible cure is to: *use screened wire for the loudspeaker leads*

57-7-(a).
When living in a densely-populated area, it is wise to: *use the minimum transmitter output power necessary*

57-8-(c).
When someone in the neighbourhood complains of TVI it is wise to: *check your log to see if it coincides with your transmissions*

57-9-(b).
Cross-modulation is usually caused by: *rectification of strong signals in overloaded stages*

58 Interference and Filtering 2:

58-0-(d).
When the signal from a transmitter overloads the audio stages of a broadcast receiver, the transmitted signal: *can be heard irrespective of where the receiver is tuned*

58-1-(a).
Cross-modulation of a broadcast receiver by a nearby transmitter would be noticed in the receiver as: *the undesired signal in the background of the desired signal*

58-2-(c).
Unwanted signals from a radio transmitter which cause harmful interference to other users are known as: *harmonic and other spurious signals*

58-3-(b).
To reduce harmonic output from a transmitter, the following could be put in the transmission line as close to the transmitter as possible: *low-pass filter*

58-4-(d).
To reduce energy from an HF transmitter getting into a television receiver, the following could be placed in the TV antenna lead as close to the TV as possible: *high-pass filter*

58-5-(a).
A low-pass filter used to eliminate the radiation of unwanted signals is connected to the: *output of the amateur transmitter*

58-6-(c).
A band-pass filter will: *attenuate frequencies each side of a band*

58-7-(b).
A band-stop filter will: *pass frequencies each side of a band*

58-8-(d).
A low-pass filter for a high frequency transmitter output would: *attenuate frequencies above 30 MHz*

58-9-(a).
Installing a low-pass filter between the transmitter and transmission line will: *permit lower frequency signals to pass to the antenna*

59 Interference and Filtering 3:

59-0-(c).
A low-pass filter may be used in an amateur radio installation: *to attenuate signals higher in frequency than the transmission*

59-1-(b).
Television interference caused by harmonics radiated from an amateur transmitter could be eliminated by fitting: *a low-pass filter in the transmitter output*

59-2-(d).
A high-pass filter can be used to: *prevent interference to a TV receiver*

59-3-(a).
A high-pass RF filter would normally be fitted: *at the antenna terminals of a TV receiver*

59-4-(c).
A high-pass filter attenuates: *low frequencies but not high frequencies*

59-5-(b).
An operational amplifier connected as a filter always utilises: *negative feedback*

59-6-(d).
The voltage gain of an operational amplifier at low frequencies is: *very high but purposely reduced using circuit components*

59-7-(a).
The input impedance of an operational amplifier is generally: *very high*

59-8-(c).
An active audio low-pass filter could be constructed using: *an operational amplifier, resistors and capacitors*

59-9-(b).
A filter used to attenuate a very narrow band of frequencies centred on 3.6 MHz would be called: *a notch filter*

60 Digital Systems:

60-0-(d).
A "modem" is a: *modulator/demodulator*

60-1-(a).
In amateur radio service, a "modem": *translates digital signals to and from audio signals*

60-2-(c).
The following can be adapted for use as a modem: *a computer sound-card*

60-3-(b).
The following are three digital communication modes: *AMTOR, PACTOR, PSK31*

60-4-(d).
In digital communications, FSK stands for: *frequency shift keying*

60-5-(a).
In digital communications, BPSK stands for: *binary phase shift keying*

60-6-(c).
When your HF digital transmission is received with errors due to multi-path conditions, you should: *reduce transmitted baud rate*

60-7-(b).
The letters BBS stand for: *bulletin board system*

60-8-(d).
"ITA2" is: *a 5 bit alphabet used for digital communications*

60-9-(a).
The following communication mode is generally used for connecting to a VHF packet radio bulletin board: *FM*
