The Question Bank for the Amateur Radio Examination

This is the Examination MASTER document, Version 11.3, September 2012

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Question Numbering: [Cluster Number] – [Question selected from the cluster] – [Correct answer choice]

01 Radio Regulations 1:

01-0-(c)
A brief definition for the Amateur Service is:
a a private radio service intended only for emergency communications
b a public radio service used for public service communications
c a radiocommunication service for the purpose of self-training, intercommunication and technical investigation
d a radio service for personal gain and public benefit

01-1-(b)
The International Radio Regulations are developed by the:
a United Nations
b International Telecommunication Union
c International Amateur Radio Union
d International Standards Organisation

01-2-(d)
International radio regulatory matters are coordinated in New Zealand by the:
a Ministry of External Affairs
b Cabinet Committee on Communications
c Department of Customs and Immigration
d Ministry of Business, Innovation and Employment

01-3-(a)
The Amateur Service in New Zealand is administered through this prime document:
a the New Zealand Radiocommunications Regulations
b the Broadcasting Act
c the Telecommunications Act
d the Radio Amateur's Handbook

01-4-(c)
The world is divided into radio regulatory regions, each with different radio spectrum allocations. New Zealand is in:
a Region 1
b Region 2
c Region 3
d Region 4

01-5-(b)
The Amateur Service in New Zealand is administered by:
a the Radio Division of the Ministry of Police
b the MBIE RSM
c the Department of Internal Affairs
d the Broadcasting Commission

01-6-(d)
An Amateur Station is quoted in the regulations as a station:
a for training new radio operators
b using amateur equipment for commercial purposes
c for public emergency purposes
d in the Amateur Service

01-7-(a)
An authorised officer from the MBIE can inspect a General Amateur Operator's Certificate of Competency:
a at any time
b during business hours
c at any time, but not on public holidays
d at any time, but not after 9 p.m.

01-8-(c)
The basic regulations for the control of the Amateur Service are to be found in the:
a Radio Amateur's Handbook
b NZART Callbook
c International Radio Regulations from the ITU
d New Zealand Gazette

01-9-(b)
The holder of a General Amateur Operator Certificate of Competency may:
a retransmit public broadcasts
b transmit in bands allocated to the Amateur Service
c repair radio equipment for profit
d transmit on public service frequencies

02 Radio Regulations 2:

02-0-(d)
As the holder of a General Amateur Operator Certificate of Competency, you may operate:
a within your local Postal District
b anywhere in the world
c only at your home address
d 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:
a any number at one time
b only one at any time, except in emergencies
c one at a time
d any number, but they must be on different bands

02-2-(c)
The following document must be kept at your amateur station:
a a copy of the Amateur Service Regulations
b a copy of the local Callbook
c your General Amateur Operator Certificate of Competency
d a copy of local bandplans

02-3-(b)
An Amateur Station is a station that is:
a used primarily for emergency communications
b operated by the holder of a General Amateur Operator Certificate of Competency on the amateur radio bands
c owned and operated by a non-professional person
d used exclusively to support communications for sporting organisations

02-4-(d)
The qualified operator of an amateur radio station is absent overseas, so the home station may be used by:
a any member of the family, to maintain contact with the traveller
b the family, to contact other amateur radio operators
c anyone who knows how to operate it
d 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 a reliable means for determining the operating radio frequency
b an overmodulation indicator
c a dummy antenna
d a power output meter

02-6-(c)
Unidentified signals may be transmitted by an amateur station:
a when making brief tests not intended to be received
b when security of message content is required
c never, such transmissions are not permitted
d on any frequency clear of interference

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:
a after notifying the RSM of your new location by e-mail
b whenever you want to
c only after a declared emergency
d during an emergency traffic exercise

02-8-(d)
To operate an amateur station in a motor vehicle, you must:
a advise the Land Transport Authority of your installation
b inform the RSM
c obtain an additional callsign
d 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 a citizen or a permanent resident of New Zealand, or others, after an approval from a referral to the RSM Licensing Manager
b any visitor, but only after acquiring a New Zealand contact address
c anyone, except the representative of a foreign government
d anyone, except an employee of the RSM

03 Radio Regulations 3:

03-0-(c)
An amateur radio operator must have current mail and e-mail addresses, so the Ministry of Business, Innovation and Employment:
a has a record of the location of every amateur station
b can reimburse your station expenses
c can send mail to the operator
d can publish a callsign directory

03-1-(b)
If you transmit from another amateur's station, the person responsible for its proper operation is:
a both of you
b you, the operator
c the station's owner
d the land-owner of the site

03-2-(d)
As a station operator, you must:
a be present whenever the station is operated
b notify the RSM if another operator uses the station
c allow other operators to use your equipment without question
d 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:
a whenever the station is used for transmitting
b whenever the station receiver is operated
c when it is used for transmitting and receiving
d only when training another operator

03-4-(c)
A logbook for recording information about stations worked:
a is compulsory for every amateur radio operator
b must list all messages sent
c is recommended for all amateur radio operators
d must record time in UTC

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:
a know the right frequencies and emissions required
b hold a General Amateur Operator Certificate of Competency before they are allowed to be operators
c not use your equipment without your express permission
d know the correct abbreviations and the Q-code

03-6-(d)
Repeater equipment and frequencies used by New Zealand radio amateurs are co-ordinated by:
a a panel of repeater trustees
b the MBIE RSM
c representatives from affected radio clubs
d 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:
a pass brief comments of a personal nature, provided no fees or other considerations are requested or accepted
b operate the station when the operator is called away
c send business traffic to any other station
d broadcast a music programme

03-8-(c)
A person may hold a General Amateur Operator Certificate of Competency after reaching this minimum age:
a 18 years
b 21 years
c there is no age limit
d the age for holding a motor vehicle driver's licence

03-9-(b)
If your signal is strong and perfectly readable at a distant station, you should:
a reduce your SWR
b reduce your transmitter power output to the minimum needed to maintain contact
c not change anything or you may lose contact
d switch on your speech processor

04 Radio Regulations 4:

04-0-(d)
You must surrender your General Amateur Operator Certificate of Competency at the age of:
a 65 years
b 70 years
c 75 years
d there is no age limit

04-1-(a)
Power output quoted as peak envelope power (PEP) is the:
a average power output at the crest of the modulating cycle
b total power radiated by your station
c transmitted power in the key-up condition
d carrier power only

04-2-(c)
The maximum output power permitted from an amateur station is:
a that needed to overcome interference from other stations on the frequency you use
b 400 watt mean power adjusted for antenna gain
c specified in the amateur radio General User Radio Licence
d the output rating of your final amplifier

04-3-(b)
The transmitter output power for amateur stations at all times is:
a set by the level required for interference-free local television viewing
b the minimum power necessary to communicate and within the terms of the amateur radio GURL
c reduced by 20dB when installed on a motor vehicle
d set to a low level for newly-qualified operators

04-4-(d)
Your amateur station is identified by transmitting your:
a full name and address
b "handle"
c first name and location
d callsign

04-5-(a)
This callsign could be that allocated to a New Zealand amateur radio operator:
a ZL2KMJ
b ZK-CFK
c ZM4432
d ZLGA

04-6-(c)
The callsigns of New Zealand amateur radio stations:
a can be any sequence of characters made up by the user
b must not be changed
c are listed in the administration's database
d must be changed annually

04-7-(b)
These letters are in general use for the first letters of New Zealand amateur radio callsigns:
a LZ
b ZL
c VK
d KV

04-8-(d)
In New Zealand amateur radio callsigns, the figures normally used are:
a any two-digit number, 10 to 40
b a single digit, 5 to 9
c any two-digit number, 50 to 90
d a single digit, 1 to 4

04-9-(a)
Before a relinquished callsign is reissued, it is normally kept for:
a 1 year
b 2 years
c 3 years
d 4 years

05 Radio Regulations 5:

05-0-(c)
A person in distress:
a must avoid passing third-party traffic
b should use only the approved distress channels
c may use any available communication means to attract attention
d should quote the GPS coordinates of the current position

05-1-(b)
A General Amateur Operator Certificate of Competency authorises the use of:
a a TV receiver for interference tests
b amateur radio transmitting apparatus only
c maritime mobile equipment in emergencies
d all amateur transceivers and test equipment

05-2-(d)
Callsigns and General Amateur Operator Certificates of Competency are issued pursuant to the Regulations by the:
a local radio club tutors
b Minister of Communications
c Department of External Affairs
d 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:
a downloading and printing yours from the official database (or have an Approved Radio Examiner do this for you)
b download an application form from the RSM website, then complete and submit it by post
c phone the RSM, give your callsign and request one by post
d report your need to the nearest Approved Radio Examiner

05-4-(c)
Permanent changes to postal and e-mail addresses to update the official database records must be advised by a General Amateur Operator Certificate of Competency holder within:
a a fortnight
b six months
c one month
d one year

05-5-(b)
A General Amateur Operator Certificate of Competency:
a expires after 12 months
b contains the unique callsign(s) to be used by that operator
c is transferable to any member of the family
d gives licence for the transmission of radio waves

05-6-(d)
A General Amateur Operator Certificate of Competency is usually issued for:
a two years
b five years
c ten years
d 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 a general user radio licence
b a reciprocal licence
c a temporary licence
d an interim licence

05-8-(c)
A General Amateur Operator Certificate of Competency holder may permit any other person to:
a take part in amateur radio communication
b operate that operator's home station
c pass brief messages of a personal nature, provided no fees or other considerations are requested or accepted
d to work on radio repairs under their supervision

05-9-(b)
Messages on behalf of third parties to international destinations may be transmitted by an amateur station only if:
a it is in the language of both countries
b such communications have been authorised by the countries concerned
c the message is in encrypted English
d payment has been made for its transmission

06 Radio Regulations 6:

06-0-(d)
The expression "amateur third party communications" refers to:
a three operators in a sequential contact
b the legal transmission of encrypted messages
c amateur operators passing messages for remuneration
d messages to or on behalf of non-licensed people or organisations

06-1-(a)
The Morse code signal "SOS" indicates that a station is:
a in grave and imminent danger and requires immediate assistance
b reporting a shipping hazard
c about to send an important message for payment
d about to go silent

06-2-(c)
If you receive distress traffic and are unable to render assistance, you should:
a log the circumstances and close down
b continue with what you were doing
c maintain watch until you are certain that assistance is forthcoming
d take no action

06-3-(b)
A secret code for the transmission of messages by the operator of an amateur station is:
a permitted for emergency messages to be passed on to a government agency
b not permitted except for control signals by the licensees of remote beacon or repeater stations
c often used in amateur radio contests
d only permitted for third-party traffic

06-4-(d)
The following messages from an amateur station are expressly forbidden:
a International No.2 code
b Baudot code
c ASCII
d secret cipher

06-5-(a)
The expression "harmful interference" means:
a interference which obstructs or repeatedly interrupts radiocommunication services
b interference by a station in a secondary service
c a receiver with intolerably loud audio
d arcing on a nearby power pole in wet weather

06-6-(c)
If interference to the reception of radiocommunications is caused by the operation of an amateur station, the station operator:
a may continue to operate
b need not take any action
c must immediately comply with any action required by the RSM to prevent the interference
d may continue and fix the problem when finances permit

06-7-(b)
Amateur radio operators may knowingly interfere with other radio communications or signals:
a when tuning up a transmitting system
b never
c when another station already occupies your proposed transmitting frequency
d if resulting interference is going to be inevitable

06-8-(d)
After gaining a General Amateur Operator Certificate of Competency you are permitted to:
a disregard all bandplans until you gain more experience
b operate anywhere in the radio spectrum
c operate for 12 months on the 80-metre band
d first operate for three months on amateur radio bands below 5 MHz and above 25 MHz and to log fifty or more contacts

06-9-(a)
The Morse code is permitted for use by:
a any amateur radio operator
b only amateurs who own a vintage Morse key and for transmission only
c anyone for emergency traffic only
d anyone with headphones for reception only

07 Radio Regulations 7:

07-0-(c)
A New Zealand amateur radio operator may communicate with:
a only amateur stations within New Zealand
b other amateur stations anywhere, in the English language only
c other amateur stations world-wide
d other stations known to have the same output power rating

07-1-(b)
A New Zealand amateur radio operator may:
a be prepared with emergency radio apparatus available on 12-hour notice
b train for and support disaster relief activities
c operate with emergency traffic-handling, using solar cells during week-end days
d use portable antennas, but only during daylight hours

07-2-(d)
The holder of a General Amateur Operator Certificate of Competency may:
a service household appliances
b operate on the citizen band with amateur station power levels
c service commercial communication equipment above 1kW rating
d 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:
a the station of an overseas visitor
b a confused person, probably with a stolen transceiver
c an unauthorised callsign
d an illegal operator

07-4-(c)
The abbreviation "HF" refers to the radio spectrum between:
a 30 kHz and 300 kHz
b 300 kHz and 3 MHz
c 3 MHz and 30 MHz
d 30 MHz and 300 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:
a to separate experimental work from regular daily communications
b to ensure that your operations do not impose problems on other operators and that their operations do not impact on you
c to separate incompatible transmission modes with different power levels
d to keep distant stations separate from local stations

07-6-(d)
The abbreviation "VHF" refers to the radio spectrum between:
a 30 kHz and 300 kHz
b 300 kHz and 3 MHz
c 3 MHz and 30 MHz
d 30 MHz and 300 MHz

07-7-(a)
An amateur radio operator must be able to:
a verify that transmissions are within an authorised frequency band
b copy Morse at 5 words-per-minute
c converse in the languages shown on the Certificate of Competency
d monitor and record standard frequency transmissions

07-8-(c)
An amateur station may be shut down at any time by:
a a neighbour with a gripe about your aerial system
b a neighbour with an old and damaged television aerial
c a demand from an authorised official of the MBIE
d a neighbour with a gripe about interference on his old model television receiver

07-9-(b)
A General Amateur Operator Certificate of Competency:
a has a limited life-time
b does not confer on its holder a monopoly on the use of any frequency or band
c is transferable to your descendants
d provides a waiver over copyright

08 Radio Frequency Bands 1:

08-0-(d)
Amateur stations are often described as being "frequency agile". This means:
a operation is restricted to frequency modulation only
b operators can operate anywhere on a shared band
c a bandswitch is required on all transmitters
d operators can change frequency on a shared band to avoid interfering

08-1-(a)
When first qualified, an amateur radio operator is permitted to:
a 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
b operate on all HF bands at least weekly, using a computer for log-keeping
c operate only in the amateur bands between 5 and 25 MHz for 12 months and present the log book for official inspection
d operate on amateur bands between 5 and 25 MHz, as and when the operator chooses

08-2-(c)
In New Zealand, the "80 metre band" frequency limits are:
a 3.50 to 4.00 MHz
b 3.50 to 3.95 MHz
c 3.50 to 3.90 MHz
d 3.60 to 3.85 MHz

08-3-(b)
In New Zealand, the "40 metre band" frequency limits are:
a 7.10 to 7.20 MHz
b 7.00 to 7.30 MHz
c 7.00 to 7.35 MHz
d 7.00 to 7.40 MHz

08-4-(d)
In New Zealand, the "20 metre band" frequency limits are:
a 14.00 to 14.20 MHz
b 14.00 to 14.25 MHz
c 14.00 to 14.30 MHz
d 14.00 to 14.35 MHz

08-5-(a)
In New Zealand, the "15 metre band" frequency limits are:
a 21.00 to 21.45 MHz
b 21.00 to 21.40 MHz
c 21.00 to 21.35 MHz
d 21.00 to 21.30 MHz

08-6-(c)
In New Zealand, the "10 metre band" frequency limits are:
a 28.00 to 28.55 MHz
b 28.00 to 28.65 MHz
c 28.00 to 29.70 MHz
d 28.00 to 29.75 MHz

08-7-(b)
In New Zealand, the "2 metre band" frequency limits are:
a 144 to 149 MHz
b 144 to 148 MHz
c 146 to 148 MHz
d 144 to 150 MHz

08-8-(d)
In New Zealand, the "70 centimetre band" frequency limits are:
a 430 to 438 MHz
b 430 to 450 MHz
c 435 to 438 MHz
d 430 to 440 MHz

08-9-(a)
The published New Zealand amateur bandplans:
a should be adhered to in the interests of all band occupants
b regularly change with daylight saving
c are to limit the operating frequencies of high-power stations
d are determined by the RSM

09 Radio Frequency Bands 2:

09-0-(c)
Operation on the 130 to 190 kHz band requires:
a a vertical half-wave dipole antenna
b special permission to operate in hours of darkness
c power output limited to a maximum of 5 watt e.i.r.p.
d receivers and computers with sound cards

09-1-(b)
Amateur satellites may operate on these two bands:
a 21.0 to 21.1 MHz and 146.0 to 148.0 MHz
b 28.0 to 29.7 MHz and 144.0 to 146.0 MHz
c 3.5 to 3.8 MHz and 7.0 to 7.1 MHz
d 7.1 to 7.3 MHz and 10.1 to 10.15 MHz

09-2-(d)
In New Zealand, the 50 to 51 MHz band is available to:
a broadcasting stations only
b all amateur radio operators, as part of the 6 metre band
c television broadcasting only
d amateur radio operators, subject to special access conditions

09-3-(a)
In the following band, amateurs are secondary to another service:
a 7.2 to 7.3 MHz
b 14.00 to 14.35 MHz
c 18.068 to 18.168 MHz
d 144.0 to 146.0 MHz

09-4-(c)
The band 146 to 148 MHz is:
a exclusive to repeater operation
b allocated exclusively for police communications
c shared with other communication services
d reserved for emergency communications

09-5-(b)
The following band used by amateurs is shared with another service in New Zealand:
a 144 to 146 MHz
b 51 to 53 MHz
c 7.0 to 7.1 MHz
d 24.89 to 24.99 MHz

09-6-(d)
The New Zealand amateur radio bandplans are:
a obligatory for all amateur radio operators
b only for testing and development purposes
c indicators of where distant stations can be worked
d 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:
a 21 to 21.45 MHz
b 10.1 to 10.15 MHz
c 146 to 148 MHz
d 3.5 to 3.9 MHz

09-8-(c)
When the Amateur Service is a secondary user of a band and another service is the primary user, this means:
a nothing at all, because all services have equal rights to operate
b amateurs may only use the band during declared emergencies
c the band may be used by amateurs provided harmful interference is not caused to other services
d you may increase transmitter power to overcome any interference

09-9-(b)
This rule applies if two amateur stations want to use the same frequency:
a the operator with the older licence must receive priority
b both stations have an equal right to operate, the second-comer courteously giving way after checking that the frequency is in use
c the station with the lower power output must have priority over the station with the higher power output
d stations in ITU Regions 1 and 2 must yield the frequency to stations in Region 3

10 Electronics Fundamentals 1:

10-0-(d)
An element which acts somewhere between being an insulator and a conductor is called a:
a P-type conductor
b N-type conductor
c intrinsic conductor
d semiconductor

10-1-(a)
Silicon, as used in diodes and transistors, has been doped to become:
a a semiconductor
b a superconductor
c a conductor
d an insulator

10-2-(c)
In the classic model of the atom:
a the neutrons and the electrons orbit the nucleus
b the protons and the neutrons orbit the nucleus in opposite directions
c the electrons orbit the nucleus
d the protons orbit around the neutrons

10-3-(b)
An atom that loses an electron becomes:
a an isotope
b a positive ion
c a negative ion
d a radioactive atom

10-4-(d)
An electric current passes through a wire and produces around the wire:
a nothing
b an electric field
c an electrostatic field
d a magnetic field

10-5-(a)
These magnetic poles will repel:
a like
b unlike
c positive
d negative

10-6-(c)
This material is better for making permanent magnets:
a copper
b aluminium
c steel
d soft iron

10-7-(b)
A better conductor of electricity is:
a carbon
b copper
c silicon
d aluminium

10-8-(d)
The term describing opposition to electron flow in a circuit is:
a current
b voltage
c power
d resistance

10-9-(a)
A substance which will readily allow an electric current to flow is:
a a conductor
b an insulator
c a resistor
d a dielectric

11 Electronics Fundamentals 2:

11-0-(c)
The plastic coating around wire is:
a a conductor
b an inductor
c an insulator
d a magnet

11-1-(b)
This is a source of electrical energy:
a a p-channel FET
b an NiMH cell
c a carbon resistor
d a germanium diode

11-2-(d)
An important difference between a lead acid battery and a common torch battery is that only the lead acid battery:
a has two terminals
b contains an electrolyte
c can be operated upside-down
d can be recharged

11-3-(a)
As the temperature increases, the resistance of a conductor:
a increases
b decreases
c remains constant
d becomes negative

11-4-(c)
In an n-type semiconductor, the current carriers are:
a holes
b positive ions
c electrons
d photons

11-5-(b)
In a p-type semiconductor, the current carriers are:
a photons
b holes
c electrons
d positive ions

11-6-(d)
An electrical insulator:
a lets electricity flow through it in one direction
b lets electricity flow through it
c lets electricity flow through it when light shines on it
d does not let electricity flow through it

11-7-(a)
Four good electrical insulators are:
a glass, air, plastic, porcelain
b plastic, rubber, wood, carbon
c glass, wood, copper, porcelain
d paper, glass, air, aluminium

11-8-(c)
Three good electrical conductors are:
a copper, gold, mica
b gold, silver, wood
c gold, silver, aluminium
d copper, aluminium, paper

11-9-(b)
The name for the flow of electrons in an electric circuit is:
a voltage
b current
c resistance
d capacitance

12 Measurement Units 1:

12-0-(d)
The unit of impedance is the:
a farad
b ampere
c henry
d ohm

12-1-(a)
One kilohm is equal to:
a 1000 ohm
b 10 ohm
c 0.01 ohm
d 0.001 ohm

12-2-(c)
One kilovolt is equal to:
a 10 volt
b 100 volt
c 1000 volt
d 10,000 volt

12-3-(b)
One quarter of one ampere may be written as:
a 0.5 microampere
b 250 milliampere
c 0.25 milliampere
d 250 ampere

12-4-(d)
The watt is the unit of:
a magnetic flux
b electromagnetic field strength
c breakdown voltage
d power

12-5-(a)
The voltage "two volts" is also:
a 2000 mV
b 2000 kV
c 2000 uV
d 2000 MV

12-6-(c)
The unit for the potential difference between two points in a circuit is the:
a ampere
b ohm
c volt
d coulomb

12-7-(b)
Impedance is a combination of:
a reactance with reluctance
b resistance with reactance
c resistance with conductance
d reactance with radiation

12-8-(d)
One mA is:
a one millionth of one ampere
b one tenth of one ampere
c one millionth of admittance
d one thousandth of one ampere

12-9-(a)
The unit of resistance is the:
a ohm
b farad
c watt
d resistor

13 Ohm's Law 1:

13-0-(c)
The voltage across a resistor carrying current can be calculated using the formula:
a E = I + R [voltage equals current plus resistance]
b E = I - R [voltage equals current minus resistance]
c E = I x R [voltage equals current times resistance]
d E = I / R [voltage equals current divided by resistance]

13-1-(b)
A current of 10 mA is measured in a 500 ohm resistor. The voltage across the resistor will be:
a 50 volt
b 5 volt
c 500 volt
d 5000 volt

13-2-(d)
The value of a resistor to drop 100 volt with a current of 0.8 milliampere is:
a 125 ohm
b 1250 ohm
c 1.25 kilohm
d 125 kilohm

13-3-(a)
I = E/R is a mathematical equation describing:
a Ohm's Law
b Thevenin's Theorem
c Kirchoff's First Law
d Kirchoff's Second Law

13-4-(c)
The voltage to cause a current of 4.4 ampere to flow in a 50 ohm resistance is:
a 2220 volt
b 22.0 volt
c 220 volt
d 0.222 volt

13-5-(b)
A current of 2 ampere flows through a 16 ohm resistance. The applied voltage is:
a 8 volt
b 32 volt
c 14 volt
d 18 volt

13-6-(d)
A current of 5 ampere in a 50 ohm resistance produces a potential difference of:
a 20 volt
b 45 volt
c 55 volt
d 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:
a 5 volt
b 8 volt
c 175 volt
d 225 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:
a increased to 12 volt
b held constant
c reduced to 3 volt
d reduced to zero

13-9-(b)
The current flowing through a resistor can be calculated by using the formula:
a I = E x R [current equals voltage times resistance]
b I = E / R [current equals voltage divided by resistance]
c I = E + R [current equals voltage plus resistance]
d I = E - R [current equals voltage minus 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:
a 8 / 12 amp
b 12 - 8 amp
c 12 + 8 amp
d 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:
a 500 mA
b 50 mA
c 2 ampere
d 20 ampere

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

14-3-(b)
A resistor with 10 volt applied across it and passing a current of 1 mA has a value of:
a 10 ohm
b 10 kilohm
c 100 ohm
d 1 kilohm

14-4-(d)
If a 3 volt battery causes 300 mA to flow in a circuit, the circuit resistance is:
a 9 ohm
b 5 ohm
c 3 ohm
d 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:
a 24 ohm
b 6 ohm
c 12.5 ohm
d 17 ohm

14-6-(c)
The resistor which gives the greatest opposition to current flow is:
a 230 ohm
b 1.2 kilohm
c 0.5 megohm
d 1600 ohm

14-7-(b)
The ohm is the unit of:
a supply voltage
b electrical resistance
c electrical pressure
d current flow

14-8-(d)
If a 12 volt battery supplies 0.15 ampere to a circuit, the circuit's resistance is:
a 0.15 ohm
b 1.8 ohm
c 12 ohm
d 80 ohm

14-9-(a)
If a 4800 ohm resistor is connected to a 12 volt battery, the current flow is:
a 2.5 mA
b 25 mA
c 40 A
d 400 A

15 Resistance 1:

15-0-(c)
The total resistance in a parallel circuit:
a depends upon the voltage drop across each branch
b could be equal to the resistance of one branch
c is always less than the smallest branch resistance
d depends upon the applied voltage

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:
a 40 ampere
b 80 milliampere
c 40 milliampere
d 80 ampere

15-2-(d)
The total current in a parallel circuit is equal to the:
a current in any one of the parallel branches
b applied voltage divided by the value of one of the resistive elements
c source voltage divided by the sum of the resistive elements
d 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:
a series with a resistor
b series with the supply
c parallel with the supply
d parallel 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:
a 50
b 30
c 20
d 5

15-5-(b)
Six identical 2-volt bulbs are connected in series. The supply voltage to cause the bulbs to light normally is:
a 1.2 V
b 12 V
c 6 V
d 2 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:
a 240 x 12
b 240 + 12
c 240 - 12
d 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:
a 30 volt
b 60 volt
c 90 volt
d 15.8 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:
a 10 ohm
b 70 ohm
c 30 ohm
d 40 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:
a voltage capacity
b internal resistance
c electrolyte becoming dry
d current capacity

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:
a 8 ohm
b 24 ohm
c 35 ohm
d 5 ohm

16-1-(a)
The total resistance of several resistors connected in series is:
a greater than the resistance of any one resistor
b less than the resistance of any one resistor
c equal to the highest resistance present
d equal to the lowest resistance present

16-2-(c)
Five 10 ohm resistors connected in series give a total resistance of:
a 1 ohm
b 5 ohm
c 50 ohm
d 10 ohm

16-3-(b)
Resistors of 10, 270, 3900, and 100 ohm are connected in series. The total resistance is:
a 9 ohm
b 4280 ohm
c 3900 ohm
d 10 ohm

16-4-(d)
This combination of series resistors could replace a single 120 ohm resistor:
a six 22 ohm
b two 62 ohm
c five 100 ohm
d five 24 ohm

16-5-(a)
If a 2.2 megohm and a 100 kilohm resistor are connected in series, the total resistance is:
a 2.3 megohm
b 2.1 megohm
c 2.11 megohm
d 2.21 megohm

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

16-7-(b)
The total resistance of four 68 ohm resistors wired in parallel is:
a 12 ohm
b 17 ohm
c 34 ohm
d 272 ohm

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

16-9-(a)
The following resistor combination can most nearly replace a single 150 ohm resistor:
a three 47 ohm resistors in series
b four 47 ohm resistors in parallel
c five 33 ohm resistors in parallel
d five 33 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:
a 15 ohm
b 30 ohm
c 60 ohm
d 120 ohm

17-1-(b)
Two resistors are in parallel. Resistor A carries twice the current of resistor B, which means that:
a B has half the resistance of A
b A has half the resistance of B
c the voltage across A is twice that across B
d the voltage across B is twice that across B

17-2-(d)
The smallest resistance that can be made with five 1 kilohm resistors is:
a 50 ohm by arranging them in series
b 50 ohm by arranging them in parallel
c 200 ohm by arranging them in series
d 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 a combination of two resistors in parallel, then placed in series with another resistor
b a combination of two resistors in parallel, then placed in series with another two in parallel
c three resistors in series
d three resistors in parallel

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:
a 180 ohm
b 190 ohm
c 60 ohm
d 210 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:
a 0.5 ampere
b 1 ampere
c 2 ampere
d 15 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:
a 1 ampere
b 3 ampere
c 4.5 ampere
d 2 ampere

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:
a 3.3 volt
b 66 volt
c 33 volt
d 1 volt

17-8-(c)
A simple transmitter requires a 50 ohm dummy load. You can fabricate this from:
a four 300 ohm resistors in parallel
b five 300 ohm resistors in parallel
c six 300 ohm resistors in parallel
d seven 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:
a 500 ohm to 1000 ohm
b 1500 ohm to 1000 ohm
c 1000 ohm to 500 ohm
d 1000 ohm to 1500 ohm

18 Power calculations 1:

18-0-(d)
A transmitter power amplifier requires 30 mA at 300 volt. The DC input power is:
a 300 watt
b 9000 watt
c 6 watt
d 9 watt

18-1-(a)
The DC input power of a transmitter operating at 12 volt and drawing 500 milliamp would be:
a 6 watt
b 12 watt
c 20 watt
d 500 watt

18-2-(c)
When two 500 ohm 1 watt resistors are connected in series, the maximum total power they can dissipate is:
a 4 watt
b 1/2 watt
c 2 watt
d 1 watt

18-3-(b)
When two 1000 ohm 5 watt resistors are connected in parallel, they can dissipate a maximum total power of:
a 40 watt
b 10 watt
c 20 watt
d 5 watt

18-4-(d)
The current in a 100 kilohm resistor is 10 mA. The power dissipated is:
a 1 watt
b 100 watt
c 10,000 watt
d 10 watt

18-5-(a)
A current of 500 milliamp passes through a 1000 ohm resistance. The power dissipated is:
a 250 watt
b 0.25 watt
c 2.5 watt
d 25 watt

18-6-(c)
A 20 ohm resistor carries a current of 0.25 ampere. The power dissipated is:
a 5 watt
b 2.50 watt
c 1.25 watt
d 10 watt

18-7-(b)
If 200 volt is applied to a 2000 ohm resistor, the resistor will dissipate:
a 30 watt
b 20 watt
c 10 watt
d 40 watt

18-8-(d)
The power delivered to an antenna is 500 watt. The effective antenna resistance is 20 ohm. The antenna current is:
a 25 amp
b 2.5 amp
c 10 amp
d 5 amp

18-9-(a)
The unit for power is the:
a watt
b ohm
c ampere
d volt

19 Power calculations 2:

19-0-(c)
The following two quantities should be multiplied together to find power:
a resistance and capacitance
b voltage and inductance
c voltage and current
d inductance and capacitance

19-1-(b)
The following two electrical units multiplied together give the unit "watt":
a volt and farad
b volt and ampere
c farad and henry
d ampere and henry

19-2-(d)
The power dissipation of a resistor carrying a current of 10 mA with 10 volt across it is:
a 0.01 watt
b 1 watt
c 10 watt
d 0.1 watt

19-3-(a)
If two 10 ohm resistors are connected in series with a 10 volt battery, the battery load is:
a 5 watt
b 10 watt
c 20 watt
d 100 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:
a 48 ampere
b 36 ampere
c 3 ampere
d 9 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:
a 3 watt
b 18 watt
c 36 watt
d 24 watt

19-6-(a)
A resistor of 10 kilohm carries a current of 20 mA. The power dissipated in the resistor is:
a 4 watt
b 2 watt
c 20 watt
d 40 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:
a current
b voltage
c power
d resistance

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:
a 500 watt
b 10,000 watt
c 707 watt
d 50,000 watt

19-9-(d)
The voltage applied to two resistors in series is doubled. The total power dissipated will:
a decrease to half
b double
c not change
d increase by four times

20 Alternating current 1:

20-0-(a)
An "alternating current" is so called because:
a it reverses direction periodically
b its direction of travel can be altered by a switch
c its direction of travel is uncertain
d it travels through a circuit using alternate paths

20-1-(c)
The time for one cycle of a 100 Hz signal is:
a 1 second
b 10 second
c 0.01 second
d 0.0001 second

20-2-(b)
A 50 Hertz current in a wire means that:
a a potential difference of 50 volts exists across the wire
b the current changes direction, 50 complete cycles in each second
c the current flowing in the wire is 50 amperes
d the power dissipated in the wire is 50 watts

20-3-(d)
The current in an AC circuit completes a cycle in 0.1 second. So the frequency is:
a 1 Hz
b 1000 Hz
c 100 Hz
d 10 Hz

20-4-(a)
An impure signal is found to have 2 kHz and 4 kHz components. This 4 kHz signal is:
a a harmonic of the 2 kHz signal
b a fundamental of the 2 kHz signal
c a sub-harmonic of 2 kHz
d the DC component of the main signal

20-5-(c)
The correct name for the equivalent of "one cycle per second" is one:
a henry
b volt
c hertz
d coulomb

20-6-(b)
One megahertz is equal to:
a 0.0001 Hz
b 1000 kHz
c 100 kHz
d 10 Hz

20-7-(d)
One GHz is equal to:
a 1000 kHz
b 10 MHz
c 100 MHz
d 1000 MHz

20-8-(a)
The "rms voltage" of a sinewave signal is:
a 0.707 times the peak voltage
b half the peak voltage
c 1.414 times the peak voltage
d the peak-to-peak voltage

20-9-(c)
A sinewave alternating current of 10 ampere peak has an rms value of:
a 5 amp
b 14.14 amp
c 7.07 amp
d 20 amp

21 Capacitors, Inductors, Resonance 1:

21-0-(b)
The total capacitance of two or more capacitors in series is:
a always greater than that of the largest capacitor
b always less than that of the smallest capacitor
c found by adding each of the capacitances together
d found by adding the capacitances together and dividing by their total number

21-1-(d)
Filter capacitors in power supplies are sometimes connected in series to:
a increase the total capacity
b reduce the ripple voltage further
c resonate the filter circuit
d 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:
a microfarads
b microvolts
c millihenrys
d megohms

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:
a making the plates smaller in size
b moving the plates apart
c bringing the metal plates closer together
d touching the two plates together

21-4-(b)
The material separating the plates of a capacitor is the:
a semiconductor
b dielectric
c resistor
d lamination

21-5-(d)
Three 15 picofarad capacitors are wired in parallel. The value of the combination is:
a 18 picofarad
b 12 picofarad
c 5 picofarad
d 45 picofarad

21-6-(a)
Capacitors and inductors oppose an alternating current. This is known as:
a reactance
b resistance
c resonance
d conductance

21-7-(c)
The reactance of a capacitor increases as the:
a applied voltage increases
b frequency increases
c frequency decreases
d applied voltage decreases

21-8-(b)
The reactance of an inductor increases as the:
a frequency decreases
b frequency increases
c applied voltage increases
d applied voltage decreases

21-9-(d)
Increasing the number of turns on an inductor will make its inductance:
a decrease
b remain unchanged
c become resistive
d increase

22 Capacitors, Inductors, Resonance 2:

22-0-(a)
The unit of inductance is the:
a henry
b farad
c ohm
d reactance

22-1-(c)
Two 20 uH inductances are connected in series. The total inductance is:
a 10 uH
b 20 uH
c 40 uH
d 80 uH

22-2-(b)
Two 20 uH inductances are connected in parallel. The total inductance is:
a 20 uH
b 10 uH
c 40 uH
d 80 uH

22-3-(d)
A toroidal inductor is one in which the:
a windings are air-spaced
b windings are wound on a ferrite rod
c inductor is enclosed in a magnetic shield
d 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 has its primary winding connected to 230 volt AC mains. The voltage across the secondary is:
a 23 volt
b 10 volt
c 110 volt
d 2300 volt

22-5-(c)
An inductor and a capacitor are connected in series. At the resonant frequency, the resulting impedance is:
a totally reactive
b maximum
c minimum
d totally inductive

22-6-(b)
An inductor and a capacitor are connected in parallel. At the resonant frequency, the resulting impedance is:
a minimum
b maximum
c totally reactive
d totally inductive

22-7-(d)
An inductor and a capacitor form a resonant circuit. The capacitor value is increased by four times. The resonant frequency will:
a increase by four times
b double
c decrease to one quarter
d 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:
a increase by a factor of two
b increase by a factor of four
c decrease by a factor of two
d decrease by a factor of four

22-9-(c)
A "high Q" resonant circuit is one which:
a carries a high quiescent current
b has a wide bandwidth
c is highly selective
d uses a high value inductance

23 Electrical Safety 1:

23-0-(b)
You can safely remove an unconscious person from contact with a high voltage source by:
a pulling an arm or a leg
b turning off the high voltage and then removing the person
c wrapping the person in a blanket and pulling to a safe area
d calling an electrician

23-1-(d)
For your safety, before checking a fault in a mains operated power supply unit, first:
a short the leads of the filter capacitor
b check the action of the capacitor bleeder resistance
c remove and check the fuse in the power supply
d 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:
a short circuits
b overheating
c over modulation
d SWR effects

23-3-(c)
A residual current device is recommended for protection in a mains power circuit because it:
a reduces electrical interference from the circuit
b removes power to the circuit when the current in the phase wire equals the current in the earth wire
c removes power to the circuit when the phase and neutral currents are not equal
d limits the power provided to the circuit

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:
a does not develop a high voltage with respect to the phase lead
b does not develop a high voltage with respect to earth
c becomes a conductor to bleed away static charge
d provides a path to ground in case of lightning strikes

23-5-(d)
The purpose of using three wires in the mains power cord and plug on amateur radio equipment is to:
a make it inconvenient to use
b prevent the plug from being reversed in the wall outlet
c prevent short circuits
d 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:
a brown
b blue
c yellow and green
d white

23-7-(c)
The correct colour coding for the neutral wire in a flexible mains lead is:
a brown
b yellow and green
c blue
d white

23-8-(b)
The correct colour coding for the earth wire in a flexible mains lead is:
a brown
b yellow and green
c blue
d white

23-9-(d)
An isolating transformer is used to:
a ensure that faulty equipment connected to it will blow a fuse in the distribution board
b ensure that no voltage is developed between the output leads
c step down the mains voltage to a safe value
d 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:
a transistor
b PN-junction
c diode
d silicon gate

24-1-(c)
Zener diodes are normally used as:
a RF detectors
b AF detectors
c voltage regulators
d current regulators

24-2-(b)
The voltage drop across a germanium signal diode when conducting is about:
a 0.6V
b 0.3V
c 0.7V
d 1.3V

24-3-(d)
A bipolar transistor has three terminals named:
a base, emitter and drain
b collector, base and source
c drain, source and gate
d emitter, base and collector

24-4-(a)
The three leads from a PNP transistor are named the:
a collector, emitter, base
b collector, source, drain
c gate, source, drain
d drain, base, source

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:
a detection
b modulation
c amplification
d rectification

24-6-(b)
The type of rectifier diode found most often in power supplies is:
a lithium
b silicon
c germanium
d copper oxide

24-7-(d)
One important application for diodes is recovering information from transmitted signals. This is referred to as:
a biasing
b rejuvenation
c ionisation
d demodulation

24-8-(a)
In a forward biased PN junction, the electrons:
a flow from n to p
b flow from p to n
c remain in the n region
d remain in the p region

24-9-(c)
The following material is considered to be a semiconductor:
a copper
b sulphur
c silicon
d tantalum

25 Semiconductors 2:

25-0-(b)
A varactor diode acts like a variable:
a resistance
b capacitance
c voltage regulator
d inductance

25-1-(d)
A semiconductor is said to be doped when small quantities of the following are added:
a electrons
b protons
c ions
d impurities

25-2-(a)
The connections to a semiconductor diode are known as:
a anode and cathode
b cathode and drain
c gate and source
d collector and base

25-3-(c)
Bipolar transistors usually have:
a 4 connecting leads
b 1 connecting lead
c 3 connecting leads
d 2 connecting leads

25-4-(b)
A semiconductor device is described as a "general purpose audio NPN device". This is a:
a triode
b bipolar transistor
c silicon diode
d field-effect transistor

25-5-(d)
The two basic types of bipolar transistors are:
a p-channel and n-channel types
b diode and triode types
c varicap and zener types
d NPN and PNP types

25-6-(a)
A transistor can be destroyed in a circuit by:
a excessive heat
b excessive light
c saturation
d cut-off

25-7-(c)
To bias a transistor to cut-off, the base must be:
a at the collector potential
b mid-way between collector and emitter potentials
c at the emitter potential
d mid-way between the collector and the supply potentials

25-8-(b)
The two basic types of field-effect transistors are:
a NPN and PNP
b n-channel and p-channel
c germanium and silicon
d inductive and capacitive

25-9-(d)
A semiconductor device, with leads labelled gate, drain and source, is best described as a:
a bipolar transistor
b silicon diode
c gated transistor
d field-effect transistor

26 Electronic devices 1:

26-0-(a)
In a tetrode valve, the electron flow is from the:
a cathode through the control grid then screen grid to the anode
b emitter through the control grid to the collector
c cathode through the screen grid then control grid to the anode
d source through the Faraday shield to the drain

26-1-(a)
In a bipolar transistor, this compares closest to the control grid of a triode valve:
a base
b emitter
c source
d collector

26-2-(c)
This semiconductor device has characteristics most similar to a triode valve:
a junction diode
b zener diode
c field-effect transistor
d bipolar transistor

26-3-(b)
This is a reason why a triode valve might be used instead of a transistor in a circuit:
a it uses less current
b it may be able to handle higher power
c it is much smaller
d it uses lower voltages

26-4-(d)
This component can amplify a small signal, but uses high voltages:
a a transistor
b an electrolytic capacitor
c a multiple-cell battery
d a thermionic valve

26-5-(a)
A feature common to thermionic valves and transistors is that both:
a can amplify signals
b have electrons drifting through a vacuum
c convert electrical energy to radio waves
d use heat to cause electron movement

26-6-(c)
The electrode that is operated with the highest positive potential in a thermionic valve is the:
a filament (heater)
b cathode
c anode
d grid

26-7-(b)
The electrode that is usually a cylinder of wire mesh in a thermionic valve is the:
a filament (heater)
b grid
c cathode
d anode

26-8-(d)
This is usually found on the inside of a thermionic valve:
a argon
b air
c neon
d a vacuum

26-9-(a)
A triode valve has this many grids:
a one
b two
c three
d three plus a filament

27 Meters and Measuring 1:

27-0-(a)
An ohmmeter measures the:
a value of any resistance placed between its terminals
b impedance of any component placed between its terminals
c power factor of any inductor or capacitor placed between its terminals
d voltage across any resistance placed between its terminals

27-1-(c)
A VSWR meter switched to the "reverse" position provides an indication of:
a power output in watts
b relative forward voltage
c relative reflected voltage
d reflected power in dB

27-2-(b)
The correct instrument for measuring the supply current to an amplifier is a:
a wattmeter
b ammeter
c voltmeter
d ohmmeter

27-3-(d)
The following meter could be used to measure the power supply current drawn by a small hand-held transistorised receiver:
a a power meter
b an RF ammeter
c an electrostatic voltmeter
d 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 a low value resistance
b an insulator
c a perfect conductor
d an extra current drain

27-5-(c)
When measuring the current drawn by a receiver from a power supply, the current meter should be placed:
a in parallel with both receiver power supply leads
b in parallel with one of the receiver power leads
c in series with one of the receiver power leads
d in series with both receiver power leads

27-6-(b)
An ammeter should not be connected directly across the terminals of a 12 volt car battery because:
a no current will flow because no other components are in the circuit
b the resulting high current will probably destroy the ammeter
c the battery voltage will be too low for a measurable current to flow
d the battery voltage will be too high for a measurable current to flow

27-7-(d)
A good ammeter should have:
a a very high internal resistance
b a resistance equal to that of all other components in the circuit
c an infinite resistance
d a very low internal resistance

27-8-(a)
A good voltmeter should have:
a a very high internal resistance
b a resistance equal to that of all other components in the circuit
c a very low internal resistance
d an inductive reactance

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:
a 14 volt
b 28 volt
c 10 volt
d 50 volt

28 Decibels, Amplification and Attenuation 1:

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:
a 3 dB
b 20 dB
c 6 dB
d 10 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:
a 10 dB
b 20 dB
c 100 dB
d 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:
a 100
b 20
c 40
d 400

28-3-(c)
A transmitter power amplifier has a gain of 20 dB. The ratio of the output power to the input power is:
a 10
b 20
c 100
d 40

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:
a 0.707
b 0.5
c 0.35
d 0.25

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:
a 6 dB
b 10 dB
c 40 dB
d 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:
a 6 dB
b 10 dB
c 20 dB
d 40 dB

28-7-(c)
Two amplifiers with gains of 10 dB and 40 dB are connected in cascade. The gain of the combination is:
a 8 dB
b 30 dB
c 50 dB
d 400 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:
a 8 dB
b 10 dB
c -10 dB
d -200 dB

28-9-(d)
Each stage of a three-stage amplifier provides 5 dB gain. The total amplification is:
a 10 dB
b 125 dB
c 25 dB
d 15 dB

29 HF Stations 1:

29-0-(d)
In designing an HF station, you would use this to reduce the effects of harmonic radiation:
a dummy load
b antenna switch
c SWR bridge
d low pass filter

29-1-(a)
In your HF station, this is the most useful device for determining the effectiveness of the antenna system:
a SWR bridge
b antenna switch
c linear amplifier
d dummy load

29-2-(c)
Of the components in an HF station, you would use this to match impedances between the transceiver and antenna:
a antenna switch
b dummy load
c antenna tuner
d SWR bridge

29-3-(b)
In your HF station, this component can be temporarily connected for transmitter tuning adjustments:
a SWR bridge
b dummy load
c low pass filter
d antenna tuner

29-4-(d)
In an HF station, the "linear amplifier" is:
a an amplifier to remove distortion in signals from the transceiver
b an amplifier with all components arranged in-line
c a push-pull amplifier to cancel second harmonic distortion
d 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:
a carry the full power output from the station
b filter out higher-frequency modulation components for maximum intelligibility
c filter out high-amplitude sideband components
d emphasise low-speed Morse code output

29-6-(c)
In an HF station, the "dummy load" is:
a a load used to absorb surplus power which is rejected by the antenna system
b used to absorb high-voltage impulses caused by lightning strikes to the antenna
c used to allow adjustment of the transmitter without causing interference to others
d an additional load used to compensate for a badly-tuned antenna system

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:
a twisted pair cable
b coaxial cable
c quarter-wave matching section
d short length of balanced ladder-line

29-8-(d)
In an HF station, an "antenna tuner" is not normally necessary when:
a a half-wave antenna is used, fed at one end
b the antenna is very long compared to a wavelength
c the antenna is very short compared to a wavelength
d 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:
a 50 ohm coaxial cable
b three-wire mains power cable
c heavy hook-up wire
d an iron-cored transformer

30 Receivers 1:

30-0-(c)
In a frequency modulation receiver, this is connected to the input of the radio frequency amplifier:
a the mixer
b the frequency discriminator
c the antenna
d the limiter

30-1-(b)
In a frequency modulation receiver, this is located between the antenna and the mixer:
a the audio frequency amplifier
b the radio frequency amplifier
c the high frequency oscillator
d the intermediate frequency amplifier

30-2-(d)
In a frequency modulation receiver, the output of the high frequency oscillator is fed to the:
a radio frequency amplifier
b limiter
c antenna
d mixer

30-3-(a)
In a frequency modulation receiver, the output of this is connected to the mixer:
a the high frequency oscillator
b the frequency discriminator
c the intermediate frequency amplifier
d the speaker and/or headphones

30-4-(c)
In a frequency modulation receiver, this is located between the mixer and the intermediate frequency amplifier:
a the limiter
b the frequency discriminator
c a filter
d the radio frequency amplifier

30-5-(b)
In a frequency modulation receiver, this is located between the filter and the limiter:
a the high frequency oscillator
b the intermediate frequency amplifier
c the mixer
d the radio frequency amplifier

30-6-(d)
In a frequency modulation receiver, this is located between the intermediate frequency amplifier and the frequency discriminator:
a a filter
b the high frequency oscillator
c the radio frequency amplifier
d the limiter

30-7-(a)
In a frequency modulation receiver, this is located between the limiter and the audio frequency amplifier:
a the frequency discriminator
b the intermediate frequency amplifier
c the speaker and/or headphones
d the high frequency oscillator

30-8-(c)
In a frequency modulation receiver, this is located between the frequency discriminator and the speaker and/or headphones:
a limiter
b intermediate frequency amplifier
c audio frequency amplifier
d radio frequency amplifier

30-9-(b)
In a frequency modulation receiver, this connects to the audio frequency amplifier output:
a the intermediate frequency amplifier
b the speaker and/or headphones
c the frequency discriminator
d the limiter

31 Receivers 2:

31-0-(d)
In a single sideband and CW receiver, the antenna is connected to the:
a product detector
b high frequency oscillator
c intermediate frequency amplifier
d radio frequency amplifier

31-1-(a)
In a single sideband and CW receiver, the output of this is connected to the mixer:
a the radio frequency amplifier
b the intermediate frequency amplifier
c the audio frequency amplifier
d a filter

31-2-(c)
In a single sideband and CW receiver, this is connected to the radio frequency amplifier and the high frequency oscillator:
a the beat frequency oscillator
b the product detector
c the mixer
d a filter

31-3-(b)
In a single sideband and CW receiver, the output of this is connected to the mixer:
a the intermediate frequency amplifier
b the high frequency oscillator
c the beat frequency oscillator
d the product detector

31-4-(d)
In a single sideband and CW receiver, this is located between the mixer and intermediate frequency amplifier:
a the radio frequency amplifier
b the beat frequency oscillator
c the product detector
d a filter

31-5-(a)
In a single sideband and CW receiver, this is located between the filter and product detector:
a the intermediate frequency amplifier
b the audio frequency amplifier
c the beat frequency oscillator
d the radio frequency amplifier

31-6-(c)
In a single sideband and CW receiver, the output from this is connected to the audio frequency amplifier:
a the high frequency oscillator
b the beat frequency oscillator
c the product detector
d the intermediate frequency amplifier

31-7-(b)
In a single sideband and CW receiver, the output from this is connected to the product detector:
a the mixer
b the beat frequency oscillator
c the radio frequency amplifier
d the audio frequency amplifier

31-8-(d)
In a single sideband and CW receiver, this is connected to the output of the product detector:
a the intermediate frequency amplifier
b the high frequency oscillator
c the radio frequency amplifier
d 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:
a the speaker and/or headphones
b the mixer
c the radio frequency amplifier
d the beat frequency oscillator

32 Receivers 3:

32-0-(c)
The frequency stability of a receiver is its ability to:
a track the incoming signal as it drifts
b provide a frequency standard
c stay tuned to the desired signal
d provide a digital readout

32-1-(b)
The sensitivity of a receiver specifies:
a the bandwidth of the RF preamplifier
b its ability to receive weak signals
c the stability of the oscillator
d its ability to reject strong signals

32-2-(d)
Of two receivers, the one capable of receiving the weakest signal will have:
a an RF gain control
b the loudest audio output
c the greatest tuning range
d the least internally generated noise

32-3-(a)
The figure in a receiver's specifications which indicates its sensitivity is the:
a signal plus noise to noise ratio
b bandwidth of the IF in kilohertz
c audio output in watts
d number of RF amplifiers

32-4-(c)
If two receivers are compared, the more sensitive receiver will produce:
a more than one signal
b less signal and more noise
c more signal and less noise
d a steady oscillator drift

32-5-(b)
The ability of a receiver to separate signals close in frequency is called its:
a noise figure
b selectivity
c sensitivity
d bandwidth

32-6-(d)
A receiver with high selectivity has a:
a wide bandwidth
b wide tuning range
c narrow tuning range
d narrow bandwidth

32-7-(a)
The BFO in a superhet receiver operates on a frequency nearest to that of its:
a intermediate frequency amplifier
b radio frequency amplifier
c audio amplifier
d local oscillator

32-8-(c)
To receive Morse code signals on a superhet receiver, a BFO is employed to:
a produce IF signals
b beat with the local oscillator signal to produce sidebands
c beat with the IF signal to produce an audio tone
d produce an audio tone to beat with the IF signal

32-9-(b)
The following transmission mode is usually demodulated by a product detector:
a pulse modulation
b single sideband suppressed carrier modulation
c double sideband full carrier modulation
d frequency 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 a pre-emphasis network
b an audio prescaler
c a heterodyne suppressor
d a de-emphasis network

33-1-(a)
A stage in a receiver with input and output circuits tuned to the received frequency is the:
a RF amplifier
b local oscillator
c audio frequency amplifier
d detector

33-2-(c)
An RF amplifier ahead of the mixer stage in a superhet receiver:
a enables the receiver to tune a greater frequency range
b means no BFO stage is needed
c increases the sensitivity of the receiver
d makes it possible to receive SSB signals

33-3-(b)
A communication receiver may have several IF filters of different bandwidths. The operator selects one to:
a improve the S-meter readings
b improve the reception of different types of signal
c improve the receiver sensitivity
d increase the noise received

33-4-(d)
The stage in a superhet receiver with a tuneable input and fixed tuned output is the:
a RF amplifier
b IF amplifier
c local oscillator
d mixer stage

33-5-(a)
The mixer stage of a superhet receiver:
a produces an intermediate frequency signal
b produces spurious signals
c acts as a buffer stage
d demodulates SSB signals

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:
a 8 and 9 MHz
b 7 and 9 MHz
c 9 and 23 MHz
d 3.5 and 9 MHz

33-7-(b)
Selectivity in a superhet receiver is achieved primarily in the:
a RF amplifier
b IF amplifier
c Mixer
d audio stage

33-8-(d)
The abbreviation AGC means:
a attenuating gain capacitor
b anode-grid capacitor
c amplified grid conductance
d automatic gain control

33-9-(a)
The AGC circuit in a receiver usually controls the:
a RF and IF stages
b audio stage
c mixer stage
d power supply

34 Receivers 5:

34-0-(c)
The tuning control of a superhet receiver changes the tuned frequency of the:
a audio amplifier
b intermediate frequency amplifier
c local oscillator
d post-detector amplifier

34-1-(b)
A superhet receiver, with an IF at 500 kHz, is receiving a 14 MHz signal. The local oscillator frequency is:
a 19 MHz
b 14.5 MHz
c 500 kHz
d 28 MHz

34-2-(d)
An audio amplifier is necessary in a receiver because:
a the carrier frequency must be replaced
b the signal requires demodulation
c RF signals are not heard by the human ear
d signals leaving the detector are weak

34-3-(a)
An audio output transformer is sometimes used in a receiver to:
a match the output impedance of the audio amplifier to the speaker
b step up the audio gain
c protect the loudspeaker from high currents
d improve the audio tone

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:
a insufficient IF selectivity
b the 22 MHz signal is out-of-band
c 22 MHz is the image frequency
d insufficient RF gain

34-5-(b)
If the carrier insertion oscillator is counted, then a single conversion superhet receiver has:
a one oscillator
b two oscillators
c three oscillators
d four 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:
a 3540 kHz
b 3995 kHz
c 7435 kHz
d 455 kHz

34-7-(a)
A double conversion receiver usually has:
a a high-frequency IF stage followed by a much lower frequency IF stage
b only one IF stage
c poor image frequency rejection
d two IF stages and a discriminator

34-8-(c)
An advantage of a double conversion receiver is that it:
a does not drift off frequency
b produces a louder audio signal
c has improved image rejection characteristics
d is a more sensitive receiver

34-9-(b)
A receiver squelch circuit:
a automatically keeps the audio output at maximum level
b silences the receiver speaker during periods of no received signal
c provides a noisy operating environment
d is not suitable for pocket-size receivers

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:
a 250 Hz
b 6 kHz
c 500 Hz
d 2.4 kHz

35-1-(a)
In a communications receiver, a highly-selective filter would be located in the:
a IF circuits
b local oscillator
c audio output stage
d detector

35-2-(c)
A multi-conversion superhet receiver is more susceptible to spurious responses than a single-conversion receiver, because of the:
a poorer selectivity in the IF caused by the multitude of frequency changes
b greater sensitivity introducing higher levels of RF to the receiver
c additional oscillators and mixing frequencies involved in the design
d AGC being forced to work harder, causing the stages concerned to overload

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:
a 16 MHz
b 7 MHz
c 21 MHz
d 9 MHz

35-4-(d)
A double-conversion receiver designed for SSB reception has a beat frequency oscillator and:
a one IF stage and one local oscillator
b two IF stages and three local oscillators
c two IF stages and one local oscillator
d two IF stages and two local oscillators

35-5-(a)
The mixer stage of a superheterodyne receiver is used to:
a change the frequency of the incoming signal to that of the IF
b allow a number of IF frequencies to be used
c remove image signals from the receiver
d produce an audio frequency for the speaker

35-6-(c)
The first mixer in the receiver mixes the incoming signal with the local oscillator to produce:
a an audio frequency
b a radio frequency
c an intermediate frequency
d a high frequency oscillator (HFO) frequency

35-7-(b)
The BFO is off-set slightly (500 - 1500 Hz) from the incoming signal to the detector. This is required:
a to pass the signal without interruption
b to beat with the incoming signal
c to provide additional amplification
d to protect the incoming signal from interference

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

35-9-(a)
The noise floor of a receiver means:
a the weakest signal that can be detected above the receiver internal noise
b the weakest signal that can be detected under noisy atmospheric conditions
c the minimum level of noise that will overload the receiver RF amplifier stage
d the amount of noise generated by the receiver local oscillator

36 Receivers 7:

36-0-(c)
The gain used in the RF amplifier stage of a receiver should be:
a as much as possible, short of self-oscillation
b determined by the amplification factor of the first IF stage
c sufficient to allow weak signals to overcome noise generated in the first mixer stage
d sufficient to keep weak signals below the noise of the first mixer stage

36-1-(b)
The primary purpose of an RF amplifier in a receiver is to:
a vary the receiver image rejection by using the AGC
b improve the receiver noise figure
c develop the AGC voltage
d provide most of the receiver gain

36-2-(d)
The primary source of noise that can be heard in a UHF band receiver with its antenna connected is:
a detector noise
b atmospheric noise
c man-made noise
d receiver front-end noise

36-3-(a)
The noise generated in a receiver of good design originates in the:
a RF amplifier and mixer
b detector and AF amplifier
c BFO and detector
d IF amplifier and detector

36-4-(c)
Very low noise figures for a high frequency receiver are relatively unimportant because:
a the received signal creates high noise levels
b the use of SSB and CW on the HF bands overcomes the noise, regardless of the front end
c external HF noise, man-made and natural, is higher than the internal noise generated by the receiver
d the succeeding stages, when used on HF, are very noisy

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:
a preamble
b preselector
c preamplifier
d pass-selector

36-6-(d)
In a superhet receiver with AGC, as the strength of the signal increases, the AGC:
a increases the receiver gain
b distorts the signal
c introduces limiting
d reduces the receiver gain

36-7-(a)
This part of a superhet receiver determines the image rejection ratio of the receiver:
a RF amplifier
b product detector
c AGC loop
d IF filter

36-8-(c)
The term for the reduction in receiver sensitivity caused by a strong signal near the received frequency is:
a cross-modulation interference
b squelch gain rollback
c desensitisation
d quieting

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

37 Transmitters 1:

37-0-(d)
In a frequency modulation transmitter, the input to the speech amplifier is from the:
a modulator
b power amplifier
c frequency multiplier
d microphone

37-1-(a)
In a frequency modulation transmitter, the microphone is connected to the:
a speech amplifier
b modulator
c power amplifier
d oscillator

37-2-(c)
In a frequency modulation transmitter, this is located between the speech amplifier and the oscillator:
a power amplifier
b microphone
c modulator
d frequency multiplier

37-3-(b)
In an elementary frequency modulation transmitter, this is located between the modulator and the frequency multiplier:
a speech amplifier
b oscillator
c power amplifier
d microphone

37-4-(d)
In an elementary frequency modulation transmitter, this is located between the oscillator and the power amplifier:
a microphone
b speech amplifier
c modulator
d frequency multiplier

37-5-(a)
In an elementary frequency modulation transmitter, this is located between the frequency multiplier and the antenna:
a power amplifier
b modulator
c speech amplifier
d oscillator

37-6-(c)
In a frequency modulation transmitter, the power amplifier output is fed to the:
a frequency multiplier
b microphone
c antenna
d modulator

37-7-(b)
In a CW transmitter, the output from this is connected to the driver/buffer:
a power amplifier
b master oscillator
c telegraph key
d power supply

37-8-(d)
In a typical transmitter, this is the primary source of direct current:
a driver/buffer
b power amplifier
c master oscillator
d power supply

37-9-(a)
In a CW transmitter, this is located between the master oscillator and the power amplifier:
a driver/buffer
b audio amplifier
c power supply
d telegraph key

38 Transmitters 2:

38-0-(c)
In a CW transmitter, this controls when RF energy is applied to the antenna:
a master oscillator
b driver/buffer
c telegraph key
d power amplifier

38-1-(b)
In a CW transmitter, this is located between the driver/buffer stage and the antenna:
a power supply
b power amplifier
c telegraph key
d master oscillator

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:
a mixer
b variable frequency oscillator (VFO)
c linear amplifier
d sideband filter

38-3-(a)
In a single sideband transmitter, the output of this is connected to a sideband-selecting filter:
a balanced modulator
b microphone
c mixer
d radio frequency oscillator

38-4-(c)
In a single sideband transmitter, this is located between the balanced modulator and the mixer:
a radio frequency oscillator
b speech amplifier
c filter
d microphone

38-5-(b)
In a single sideband transmitter, this is connected to the input of the speech amplifier:
a radio frequency oscillator
b microphone
c filter
d mixer

38-6-(d)
In a single sideband transmitter, the output of this is connected to the balanced modulator:
a filter
b variable frequency oscillator
c linear amplifier
d speech amplifier

38-7-(a)
In a single sideband transmitter, the output of the variable frequency oscillator is connected to the:
a mixer
b antenna
c balanced modulator
d linear amplifier

38-8-(c)
In a single sideband transmitter, the output of this is connected to the mixer:
a radio frequency oscillator
b linear amplifier
c variable frequency oscillator
d antenna

38-9-(b)
In an single sideband transmitter, this is located between the mixer and the antenna:
a variable frequency oscillator
b linear amplifier
c balanced modulator
d radio frequency oscillator

39 Transmitters 3:

39-0-(d)
The signal from a balanced modulator consists of:
a a carrier and two sidebands
b a carrier and one sideband
c no carrier and one sideband
d no carrier and two sidebands

39-1-(a)
The signal from a CW transmitter consists of:
a an RF waveform which is keyed on and off to form Morse characters
b a continuous unmodulated RF waveform
c a continuous RF waveform modulated with an 800 Hz Morse signal
d a continuous RF waveform which changes frequency in synchronism with an applied Morse signal

39-2-(c)
The following signal can be amplified using a non-linear amplifier:
a SSB
b AM
c FM
d DSBSC

39-3-(b)
SSB transmissions:
a occupy about twice the bandwidth of AM transmissions
b occupy about half the bandwidth of AM transmissions
c contain more information than AM transmissions
d are compatible with FM transmissions

39-4-(d)
The purpose of a balanced modulator in an SSB transmitter is to:
a make sure that the carrier and both sidebands are in phase
b ensure that the percentage of modulation is kept constant
c make sure that the carrier and both sidebands are 180 degrees out of phase
d 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:
a the transmitter modulation deviation is too high
b your antenna is too low
c the transmitter has become unsynchronised
d your transmitter frequency split is incorrect

39-6-(c)
The difference between DC input power and RF power output of a transmitter RF amplifier:
a radiates from the antenna
b is lost in the feedline
c is dissipated as heat
d is due to oscillating current

39-7-(b)
The process of modulation allows:
a information to be removed from a carrier
b information to be impressed on to a carrier
c voice and Morse code to be combined
d none of these

39-8-(d)
The output power rating of a linear amplifier in an SSB transmitter is specified by the:
a peak DC input power
b mean AC input power
c unmodulated carrier power
d peak envelope power

39-9-(a)
Speech compression associated with SSB transmission implies:
a full amplification of low level signals and reducing or eliminating amplification of high level signals
b full amplification of high level signals and reducing or eliminating amplification of low level signals
c a lower signal-to-noise ratio
d circuit level instability

40 Harmonics and Parasitics 1:

40-0-(c)
A harmonic of a signal transmitted at 3525 kHz would be expected to occur at:
a 3573 kHz
b 21050 kHz
c 7050 kHz
d 14025 kHz

40-1-(b)
The third harmonic of 7 MHz is:
a 10 MHz
b 21 MHz
c 14 MHz
d 28 MHz

40-2-(d)
The fifth harmonic of 7 MHz is:
a 12 MHz
b 19 MHz
c 28 MHz
d 35 MHz

40-3-(a)
Increased harmonic output may be produced in a transmitter by:
a overdriven amplifier stages
b a linear amplifier
c a low SWR
d resonant circuits

40-4-(c)
Adjacent channel interference may be produced in the RF power amplifier of a transmitter if:
a the modulation level is too low
b the oscillator frequency is unstable
c the modulation level is too high
d modulation is applied to more than one stage

40-5-(b)
Harmonics produced in an early stage of a transmitter may be reduced in a later stage by:
a increasing the signal input to the final stage
b using tuned circuit coupling between stages
c using FET power amplifiers
d using larger value coupling capacitors

40-6-(d)
Harmonics are produced when:
a a resonant circuit is detuned
b negative feedback is applied to an amplifier
c a transistor is biased for class A operation
d a sine wave is distorted

40-7-(a)
Harmonic frequencies are:
a at multiples of the fundamental frequency
b always lower in frequency than the fundamental frequency
c any unwanted frequency above the fundamental frequency
d any frequency causing TVI

40-8-(c)
An interfering signal from a transmitter has a frequency of 57 MHz. This signal could be the:
a seventh harmonic of an 80 meter transmission
b third harmonic of a 15 metre transmission
c second harmonic of a 10 metre transmission
d crystal oscillator operating on its fundamental

40-9-(b)
To minimise the radiation of one particular harmonic, one can use a:
a resistor
b wave trap in the transmitter output
c high pass filter in the transmitter output
d filter in the receiver lead

41 Harmonics and Parasitics 2:

41-0-(d)
Harmonics are to be avoided because they:
a cause damage to amateur equipment
b make your signal unreadable at other stations on that band
c cause possible interference to other users of that band
d cause possible interference to services using other bands

41-1-(a)
Parasitic oscillations are to be avoided because:
a they cause possible interference to other users of the radio frequency spectrum
b they do not radiate very far
c some cannot be adequately controlled
d they do not always follow your modulation

41-2-(c)
A low pass filter will:
a suppress sub-harmonics
b always eliminate interference
c reduce harmonics
d improve harmonic radiation

41-3-(b)
A spurious transmission from a transmitter is:
a an unwanted emission that is harmonically related to the modulating audio frequency
b an unwanted emission unrelated to the output signal frequency
c generated at 50 Hz
d the main part of the modulated carrier

41-4-(d)
A parasitic oscillation:
a is generated by parasitic elements of a Yagi beam
b does not cause any radio interference
c is produced in a transmitter oscillator stage
d is an unwanted signal developed in a transmitter

41-5-(a)
Parasitic oscillations in a RF power amplifier can be suppressed by:
a placing suitable chokes, ferrite beads or resistors within the amplifier
b pulsing the supply voltage
c screening all input leads
d using split-stator tuning capacitors

41-6-(c)
Parasitic oscillations in the RF power amplifier stage of a transmitter may occur:
a at low frequencies only
b on harmonic frequencies
c at high or low frequencies
d at high frequencies only

41-7-(b)
Transmitter power amplifiers can generate parasitic oscillations on:
a the transmitter's output frequency
b frequencies unrelated to the transmitter's output frequency
c harmonics of the transmitter's output frequency
d VHF frequencies only

41-8-(d)
Parasitic oscillations tend to occur in:
a high voltage rectifiers
b antenna matching circuits
c SWR bridges
d high gain amplifier stages

41-9-(a)
Parasitic oscillations can cause interference. They are:
a not related to the operating frequency
b always the same frequency as the mains supply
c always twice the operating frequency
d three times the operating frequency

42 Power Supplies 1:

42-0-(c)
A mains operated DC power supply:
a converts DC from the mains into AC of the same voltage
b is a diode-capacitor device for measuring mains power
c converts energy from the mains into DC for operating electronic equipment
d is a diode-choked device for measuring inductance power

42-1-(b)
The following unit in a DC power supply performs a rectifying operation:
a an electrolytic capacitor
b a full-wave diode bridge
c a fuse
d a crowbar

42-2-(d)
The following unit in a DC power supply performs a smoothing operation:
a a fuse
b a crowbar
c a full-wave diode bridge
d an electrolytic capacitor

42-3-(a)
The following could power a solid-state 10 watt VHF transceiver:
a a 12 volt car battery
b 6 penlite cells in series
c a 12 volt, 500 mA plug-pack
d a 6 volt 10 amp-hour gel cell

42-4-(c)
A full-wave DC power supply operates from the New Zealand AC mains. The ripple frequency is:
a 25 Hz
b 50 Hz
c 100 Hz
d 70 Hz

42-5-(b)
The capacitor value best suited for filtering the output of a 12 volt 1 amp DC power supply is:
a 100 pF
b 10,000 uF
c 10 nF
d 100 nF

42-6-(d)
The following should always be included as a standard protection device in any power supply:
a a saturating transformer
b a zener diode bridge limiter
c a fuse in the filter capacitor negative lead
d a fuse in the mains lead

42-7-(a)
A half-wave DC power supply operates from the New Zealand AC mains. The ripple frequency will be:
a 50 Hz
b 25 Hz
c 70 Hz
d 100 Hz

42-8-(c)
The output voltage of a DC power supply decreases when current is drawn from it because:
a drawing output current causes the input mains voltage to decrease
b drawing output current causes the input mains frequency to decrease
c all power supplies have some internal resistance
d some power is reflected back into the mains

42-9-(b)
Electrolytic capacitors are used in power supplies because:
a they are tuned to operate at 50 Hz
b they can be obtained in larger values than other types
c they have very low losses compared to other types
d they radiate less RF noise than other types

43 Power Supplies 2:

43-0-(d)
A filter is used in a power supply to:
a filter RF radiation from the output of the power supply
b restore voltage variations
c act as a 50 Hz tuned circuit
d smooth the rectified waveform from the rectifier

43-1-(a)
A regulator device is used in a power supply to:
a keep the output voltage at a constant value
b ensure that the output voltage never exceeds a dangerous value
c keep the incoming frequency constant at 50 Hz
d regulate the incoming mains voltage to a constant rms value

43-2-(c)
A transformer is used in a power supply to:
a transform the incoming mains AC voltage to a DC voltage
b ensure that any RF radiation cannot get into the power supply
c transform the mains AC voltage to a more convenient AC voltage
d transform the mains AC waveform into a higher frequency waveform

43-3-(b)
A rectifier is used in a power supply to:
a rectify any waveform errors introduced by the transformer
b turn the AC voltage from the transformer into a fluctuating DC voltage
c remove any AC components from the output of the transformer
d turn the sinewave output of the rectifier into a square wave

43-4-(d)
The regulator device in a power supply could consist of:
a four silicon power diodes in a regulator configuration
b two silicon power diodes and a centre-tapped transformer
c a single silicon power diode connected as a half-wave rectifier
d 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:
a 30 - 60 amp
b 6 - 8 amp
c 20 - 25 amp
d 1 - 5 amp

43-6-(c)
A power supply is to power a solid-state transceiver. A suitable over-voltage protection device is a:
a 100 uF capacitor across the transformer output
b fuse in parallel with the regulator output
c crowbar across the regulator output
d zener diode in series with the regulator

43-7-(b)
In a regulated power supply, the "crowbar" is a:
a means to lever up the output voltage
b last-ditch protection against over-voltage resulting from failure of the regulator in the supply
c convenient means to move such a heavy supply unit
d circuit for testing mains fuses

43-8-(d)
In a regulated power supply, "current limiting" is sometimes used to:
a prevent transformer core saturation
b protect the mains fuse
c eliminate earth-leakage effects
d 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:
a maintain the output voltage at a constant value
b work as a surge multiplier to speed up regulation
c amplify output voltage errors to assist regulation
d suppress voltage spikes across the transformer secondary winding

44 General Operating Procedures 1:

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

44-1-(b)
The following phonetic code is correct for the callsign "ZL2KMJ":
a zulu lima two kilowatt mac jamboree
b zulu lima two kilo mike juliet
c zanzibar london two kilo mike japan
d zulu lima two kilowatt montreal japan

44-2-(d)
The accepted way to call "CQ" with a SSB transceiver is:
a "This is ZL1XXX calling CQ CQ CQ"
b "CQ to anyone, CQ to anyone, I am ZL1XXX"
c "CQ CQ CQ CQ CQ, this is New Zealand"
d "CQ CQ CQ, this is ZL1XXX ZL1XXX ZL1XXX"

44-3-(a)
A signal report of "5 and 1" indicates:
a perfect intelligibility, but very low signal strength
b very low intelligibility, but good signal strength
c perfect intelligibility, high signal strength
d medium intelligibility and signal strength

44-4-(c)
The correct phonetic code for the callsign VK5ZX is:
a victor kilowatt five zulu xray
b victor kilo five zanzibar xray
c victor kilo five zulu xray
d victoria kilo five zulu xray

44-5-(b)
The accepted way to announce that you are listening to a VHF repeater is:
a "hello 7225, this is ZL2ZZZ listening"
b "ZL2ZZZ listening on 7225"
c "calling 7225, 7225, 7225 from ZL2ZZZ"
d "7225 from ZL2ZZZ"

44-6-(d)
A rare DX station calling CQ on CW and repeating "up 2" at the end of the call means the station:
a will reply only to stations sending at greater than 20 wpm
b is about to shift his calling frequency 2 kHz higher
c will wait more than 2 seconds before replying to his call
d 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:
a 3 seconds
b half a second
c 30 seconds
d several minutes

44-8-(c)
Before calling CQ on the HF bands, you should:
a request that other operators clear the frequency
b request a signal report from any station listening
c listen first, then ask if the frequency is in use
d use a frequency where many stations are already calling

44-9-(b)
The phrase "you are fully quieting the repeater" means:
a your signal is too weak for the repeater to reproduce correctly
b your signal into the repeater is strong enough to be noise-free on the output frequency
c your modulation level is too low
d you are speaking too quietly into the microphone

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:
a your signal is drifting lower in frequency
b your voice is too low-pitched to be understood
c you are not speaking loudly enough
d 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:
a not change your main frequency dial to tune in the signal, but use the RIT instead
b tune your main frequency dial to that signal
c immediately announce that the calling station is off-frequency
d ignore that station and keep calling CQ

45-2-(c)
"Break-in keying" means:
a unauthorised entry has resulted in station equipment disappearing
b temporary emergency operating
c key-down changes the station to transmit, key-up to receive
d the other station's keying is erratic

45-3-(b)
A repeater operating with a "positive 600 kHz split":
a transmits on a frequency 600 kHz higher than its designated frequency
b listens on a frequency 600 kHz higher than its designated frequency
c transmits simultaneously on its designated frequency and one 600 kHz higher
d uses positive modulation with a bandwidth of 600 kHz

45-4-(d)
The standard frequency offset (split) for 2 metre repeaters in New Zealand is:
a plus 600 kHz below 147 MHz, minus 600 kHz on or above 147 MHz
b minus 5 MHz below 147 MHz, plus 5 MHz kHz on or above 147 MHz
c plus 5 MHz below 147 MHz, minus 5 MHz kHz on or above 147 MHz
d 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:
a 5 MHz
b 600 kHz
c 1 MHz
d 2 MHz

45-6-(c)
You are adjusting an antenna matching unit using an SWR bridge. You should adjust for:
a maximum reflected power
b equal reflected and transmitted power
c minimum reflected power
d minimum transmitted power

45-7-(b)
The "squelch" or "muting" circuitry on a VHF receiver:
a compresses incoming voice signals to make them more intelligible
b inhibits the audio output unless a station is being received
c reduces audio burst noise due to lightning emissions
d reduces the noise on incoming signals

45-8-(d)
The "S meter" on a receiver:
a indicates where the squelch control should be set
b indicates the standing wave ratio
c indicates the state of the battery voltage
d indicates relative incoming signal strengths

45-9-(a)
The "National System" is:
a a series of nationwide amateur radio linked repeaters in the 70 cm band
b the legal licensing standard of Amateur operation in New Zealand
c the official New Zealand repeater band plan
d a nationwide emergency communications procedure

46 Practical Operating Knowledge 2:

46-0-(c)
A noise blanker on a receiver is most effective to reduce:
a 50 Hz power supply hum
b noise originating from the mixer stage of the receiver
c ignition noise
d noise originating from the RF stage of the receiver

46-1-(b)
The purpose of a VOX unit in a transceiver is to:
a check the transmitting frequency using the voice operated crystal
b change from receiving to transmitting using the sound of the operator's voice
c enable a volume operated extension speaker for remote listening
d enable the variable oscillator crystal

46-2-(b)
"VOX" stands for:
a volume operated extension speaker
b voice operated transmit
c variable oscillator transmitter
d voice operated expander

46-3-(a)
"RIT" stands for:
a receiver incremental tuning
b receiver interference transmuter
c range independent transmission
d random interference tester

46-4-(c)
The "RIT" control on a transceiver:
a reduces interference on the transmission
b changes the frequency of the transmitter section without affecting the frequency of the receiver section
c changes the frequency of the receiver section without affecting the frequency of the transmitter section
d changes the transmitting and receiver frequencies by the same amount

46-5-(b)
The "split frequency" function on a transceiver allows the operator to:
a monitor two frequencies simultaneously using a single loudspeaker
b transmit on one frequency and receive on another
c monitor two frequencies simultaneously using two loudspeakers
d receive CW and SSB signals simultaneously on the same frequency

46-6-(d)
The term "ALC" stands for:
a audio limiter control
b automatic loudness control
c automatic listening control
d automatic level control

46-7-(a)
The "AGC" circuit is to:
a minimise the adjustments needed to the receiver gain control knobs
b expand the audio gain
c limit the extent of amplitude generation
d amplitude limit the crystal oscillator output

46-8-(c)
Many receivers have both RF and AF gain controls. These allow the operator to:
a vary the receiver frequency and AM transmitter frequency independently
b vary the low and high frequency audio gain independently
c vary the gain of the radio frequency and audio frequency amplifier stages independently
d vary the receiver's "real" and "absolute" frequencies independently

46-9-(b)
The term "PTT" means:
a piezo-electric transducer transmitter
b push to talk
c phase testing terminal
d phased transmission transponder

47 The Q-code 1:

47-0-(c)
The signal "QRM?" means:
a your signals are fading
b are you troubled by static?
c is my transmission being interfered with?
d your transmission is being interfered with

47-1-(b)
The signal "QRN" means:
a I am busy
b I am being troubled with static
c are you being troubled by static?
d I am being interfered with

47-2-(d)
The "Q" signal requesting the other station to send slower Morse code is:
a QRL
b QRN
c QRM
d QRS

47-3-(a)
The question "who is calling me?" is asked by:
a QRZ?
b QRM?
c QRP?
d QRT?

47-4-(c)
The "Q" signal "what is your location?" is:
a QRZ?
b QTC?
c QTH?
d QRL?

47-5-(b)
The "Q" signal "are you busy?" is:
a QRM?
b QRL?
c QRT?
d QRZ?

47-6-(d)
The "Q" signal "shall I decrease transmitter power?" is:
a QRL?
b QRZ?
c QRN?
d QRP?

47-7-(a)
The "Q" signal "your signals are fading" is:
a QSB
b QSO
c QSL
d QRX

47-8-(c)
The signal "QSY?" means:
a shall I relay to .... ?
b shall I increase transmitter power?
c shall I transmit on another frequency?
d is my signal fading?

47-9-(b)
The "Q" signal which means "when will you call me again?" is:
a QRP?
b QRX?
c QRS?
d QRN?

48 Transmission lines 1:

48-0-(d)
Any length of transmission line may be made to appear as an infinitely long line by:
a shorting the line at the end
b leaving the line open at the end
c increasing the standing wave ratio above unity
d terminating the line in its characteristic i mpedance

48-1-(a)
The characteristic impedance of a transmission line is determined by the:
a physical dimensions and relative positions of the conductors
b length of the line
c load placed on the line
d frequency at which the line is operated

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:
a 13 ohm
b 26 ohm
c 52 ohm
d 39 ohm

48-3-(b)
The following feeder is the best match to the base of a quarter-wave ground plane antenna:
a 300 ohm balanced feedline
b 50 ohm coaxial cable
c 75 ohm balanced feedline
d 300 ohm coaxial cable

48-4-(d)
The designed output impedance of the antenna socket of most modern transmitters is nominally:
a 25 ohm
b 75 ohm
c 100 ohm
d 50 ohm

48-5-(a)
To obtain efficient transfer of power from a transmitter to an antenna, it is important that there is a:
a correct impedance match between transmitter and antenna
b high load impedance
c low load impedance
d high standing wave ratio

48-6-(c)
An HF coaxial feedline is constructed from:
a a single conductor
b two parallel conductors separated by spacers
c braid and insulation around a central conductor
d braid and insulation twisted together

48-7-(b)
An RF transmission line should be matched at the transmitter end to:
a prevent frequency drift
b transfer maximum power to the antenna
c overcome fading of the transmitted signal
d ensure that the radiated signal has the intended polarisation

48-8-(d)
A damaged antenna or feedline attached to the output of a transmitter will present an incorrect load resulting in:
a the driver stage not delivering power to the final
b the output tuned circuit breaking down
c loss of modulation in the transmitted signal
d 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:
a reduced antenna radiation
b radiation of key clicks
c lower modulation percentage
d smaller DC current drain

49 Transmission lines 2:

49-0-(c)
Losses occurring on a transmission line between a transmitter and the antenna result in:
a a SWR of 1:1
b reflections occurring in the line
c less RF power being radiated
d improved transfer of RF energy to the antenna

49-1-(b)
If the characteristic impedance of a feedline does not match the antenna input impedance then:
a heat is produced at the junction
b standing waves are produced in the feedline
c the SWR drops to 1:1
d the antenna will not radiate any signal

49-2-(d)
A result of standing waves on a non-resonant transmission line is:
a maximum transfer of energy to the antenna from the transmitter
b perfect impedance match between transmitter and feedline
c lack of radiation from the transmission line
d 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:
a infinite
b zero
c 50 ohm
d 150 ohm

49-4-(c)
A switching system to use a single antenna for a separate transmitter and receiver should also:
a disconnect the antenna tuner
b ground the antenna on receive
c disable the unit not being used
d switch between power supplies

49-5-(b)
An instrument to check whether RF power in the transmission line is transferred to the antenna is:
a an antenna tuner
b a standing wave ratio meter
c a dummy load
d a keying monitor

49-6-(d)
This type of transmission line will exhibit the lowest loss:
a twisted flex
b coaxial cable
c mains cable
d open-wire feeder

49-7-(a)
The velocity factor of a coaxial cable with solid polythene dielectric is about:
a 0.66
b 0.1
c 0.8
d 1.0

49-8-(c)
This commonly available antenna feedline can be buried directly in the ground for some distance, without adverse effects:
a 75 ohm twinlead
b 300 ohm twinlead
c coaxial cable
d 600 ohm open-wire

49-9-(b)
If an antenna feedline must pass near grounded metal objects, the following type should be used:
a 75 ohm twinlead
b coaxial cable
c 300 ohm twinlead
d 600 ohm open-wire

50 Antennas 1:

50-0-(d)
The support member for the elements of a Yagi antenna is known as the:
a reflector
b driven element
c director
d boom

50-1-(a)
The longest "active" element of a Yagi antenna is the:
a reflector
b boom
c driven element
d director(s)

50-2-(c)
The shortest "active" element of a Yagi antenna is the:
a boom
b reflector
c director(s)
d driven element

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:
a length X+X equals the signal wavelength
b length X+X is a little shorter than one half of the signal wavelength
c dimensions are changed with one leg doubled in length
d antenna has one end grounded

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 a capacitor
b an inductor
c a fuse
d 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:
a an inductor
b a capacitor
c an insulator
d a resistor

50-6-(c)
The approximate physical length of a half-wave antenna for a frequency of 1000 kHz is:
a 300 metres
b 600 metres
c 150 metres
d 30 metres

50-7-(b)
The wavelength for a frequency of 25 MHz is:
a 15 metres
b 12 metres
c 32 metres
d 4 metres

50-8-(d)
Magnetic and electric fields about an antenna are:
a parallel to each other
b determined by the type of antenna used
c variable with the time of day
d perpendicular to each other

50-9-(a)
Radio wave polarisation is defined by the orientation of the radiated:
a electric field
b magnetic field
c inductive field
d capacitive field

51 Antennas 2:

51-0-(c)
A half-wave dipole antenna is normally fed at the point of:
a maximum voltage
b maximum resistance
c maximum current
d resonance

51-1-(b)
An important factor to consider when high angle radiation is desired from a horizontal half-wave antenna is the:
a size of the antenna wire
b height of the antenna
c time of the year
d mode of propagation

51-2-(d)
An antenna which transmits equally well in all compass directions is a:
a dipole with a reflector only
b dipole with director only
c half-wave horizontal dipole
d quarter-wave grounded vertical

51-3-(a)
A groundplane antenna emits a:
a vertically polarised wave
b horizontally polarised wave
c elliptically polarised wave
d axially polarised wave

51-4-(c)
The impedance at the feed point of a folded dipole antenna is approximately:
a 150 ohm
b 200 ohm
c 300 ohm
d 100 ohm

51-5-(b)
The centre impedance of a half-wave dipole in "free space" is approximately:
a 52 ohm
b 73 ohm
c 100 ohm
d 150 ohm

51-6-(d)
The effect of adding a series inductance to an antenna is to:
a increase the resonant frequency
b have no change on the resonant frequency
c have little effect
d decrease the resonant frequency

51-7-(a)
The purpose of a balun in a transmitting antenna system is to:
a match unbalanced and balanced transmission lines
b balance harmonic radiation
c reduce unbalanced standing waves
d protect the antenna system from lightning strikes

51-8-(c)
A dummy antenna:
a attenuates a signal generator to a desirable level
b provides more selectivity when a transmitter is being tuned
c duplicates the characteristics of an antenna without radiating signals
d matches an AF generator to the receiver

51-9-(b)
A half-wave antenna resonant at 7100 kHz is approximately this long:
a 40 metres
b 20 metres
c 80 metres
d 160 metres

52 Antennas 3:

52-0-(d)
A radio wave with a frequency of 3.8 MHz has a wavelength of:
a 78.94cm
b 7894m
c 789.4m
d 78.94m

52-1-(a)
A half-wave antenna cut for 7 MHz can be used on this band without change:
a 15 metre
b 10 metre
c 20 metre
d 80 metre

52-2-(c)
This property of an antenna broadly defines the range of frequencies to which it will be effective:
a front-to-back ratio
b impedance
c bandwidth
d polarisation

52-3-(b)
The resonant frequency of an antenna may be increased by:
a lengthening the radiating element
b shortening the radiating element
c increasing the height of the radiating element
d lowering the radiating element

52-4-(d)
Insulators are used at the end of suspended antenna wires to:
a increase the effective antenna length
b make the antenna look more attractive
c prevent any loss of radio waves by the antenna
d limit the electrical length of the antenna

52-5-(a)
To lower the resonant frequency of an antenna, the operator should:
a lengthen the antenna
b centre feed the antenna with TV ribbon
c shorten the antenna
d ground one end

52-6-(c)
A half-wave antenna is often called a:
a bi-polar
b Yagi
c dipole
d beam

52-7-(b)
The resonant frequency of a dipole antenna is mainly determined by:
a its height above the ground
b its length
c the output power of the transmitter used
d the length of the transmission line

52-8-(d)
A transmitting antenna for 28 MHz for mounting on the roof of a car could be a:
a vertical long wire
b horizontal dipole
c full-wave centre fed horizontal
d quarter-wave vertical

52-9-(a)
A vertical antenna which uses a flat conductive surface at its base is the:
a quarter-wave ground plane
b vertical dipole
c rhombic
d long wire

53 Antennas 4:

53-0-(c)
The main characteristic of a vertical antenna is that it:
a requires few insulators
b is very sensitive to signals coming from horizontal aerials
c receives signals from all points around it equally well
d is easy to feed with TV ribbon feeder

53-1-(b)
At the ends of a half-wave dipole the:
a voltage and current are both high
b voltage is high and current is low
c voltage and current are both low
d voltage low and current is high

53-2-(d)
An antenna type commonly used on HF is the:
a parabolic dish
b 13-element Yagi
c helical Yagi
d 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:
a it concentrates the radiation in one direction
b it radiates more power than a dipole
c more powerful transmitters can use it
d it can be used for more than one band

53-4-(c)
The maximum radiation from a three element Yagi antenna is:
a in the direction of the reflector end of the boom
b at right angles to the boom
c in the direction of the director end of the boom
d parallel to the line of the coaxial feeder

53-5-(b)
The reflector and director(s) in a Yagi antenna are called:
a oscillators
b parasitic elements
c tuning stubs
d matching units

53-6-(d)
An isotropic antenna is a:
a half-wave reference dipole
b infinitely long piece of wire
c dummy load
d 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:
a most of the energy is radiated at a low angle
b it is easy to match the antenna to the transmitter
c it is a convenient length on VHF
d the angle of radiation is high giving excellent local coverage

53-8-(c)
A more important consideration when selecting an antenna for working stations at great distances is:
a sunspot activity
b impedance
c angle of radiation
d bandwidth

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:
a the ground wave and the sky wave continually shift the polarisation
b the ionosphere can change the polarisation of the signal from moment to moment
c anomalies in the earth's magnetic field profoundly affect HF polarisation
d improved selectivity in HF receivers makes changes in polarisation redundant

54 Propagation 1:

54-0-(d)
A "skip zone" is:
a the distance between the antenna and where the reflected wave first returns to earth
b the distance between any two reflected waves
c a zone caused by lost sky waves
d the distance between the far end of the ground wave and where the reflected 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:
a ionosphere
b stratosphere
c biosphere
d troposphere

54-2-(c)
The highest frequency that will be reflected back to the earth at any given time is known as the:
a UHF
b OWF
c MUF
d LUF

54-3-(b)
Solar cycles have an average length of:
a 1 year
b 11 years
c 6 years
d 3 years

54-4-(d)
The electric field of an electromagnetic wave is:
a circular in its motion
b out of phase with the magnetic field
c maximum in the direction of motion
d 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:
a ground wave
b local field wave
c inverted wave
d ionospheric wave

54-6-(c)
Scattered patches of high ionisation, which develop seasonally at the height of one of the layers, are called:
a patchy
b random reflectors
c sporadic-E
d trans-equatorial ionisation

54-7-(b)
For long distance propagation, the radiation angle of energy from the antenna should be:
a more than 30 degrees but less than forty-five
b less than 30 degrees
c more than 45 degrees but less than ninety
d 90 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:
a circular path going north or south from the transmitter
b great circle path
c bent path via the ionosphere
d 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:
a fading
b absorption
c baffling
d skip

55 Propagation 2:

55-0-(c)
High frequency, long-distance propagation is most dependent on:
a tropospheric reflection
b ground reflection
c ionospheric reflection
d inverted reflection

55-1-(b)
The layer of the ionosphere mainly responsible for long distance communication is:
a C
b F
c D
d E

55-2-(d)
One of the ionospheric layers splits into two parts during the day and are called the:
a A & B
b D1 & D2
c E1 & E2
d F1 & F2

55-3-(a)
Signal fadeouts resulting from an "ionospheric storm" or "sudden ionospheric disturbance" are usually attributed to:
a solar flare activity
b heating of the ionised layers
c over-use of the signal path
d insufficient transmitted power

55-4-(c)
The skip distance of radio signals is determined by the:
a type of transmitting antenna used
b power fed to the final amplifier of the transmitter
c both the height of the ionosphere and the angle of radiation from the antenna
d only 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:
a the disappearance of the E layer
b high absorption in the D layer
c poor refraction by the F layer
d pollution in the T layer

55-6-(d)
The distance from the transmitter to the nearest point where the sky wave returns to the earth is called the:
a angle of radiation
b maximum usable frequency
c skip zone
d skip distance

55-7-(a)
A variation in received signal strength caused by slowly changing differences in path lengths is called:
a fading
b absorption
c fluctuation
d path loss

55-8-(c)
VHF and UHF bands are frequently used for satellite communication because:
a the Doppler frequency change caused by satellite motion is much less than at HF
b satellites move too fast for HF waves to follow
c waves at these frequencies travel to and from the satellite relatively unaffected by the ionosphere
d the Doppler effect would cause HF waves to be shifted into the VHF and UHF bands

55-9-(b)
The "critical frequency" is defined as the:
a highest frequency to which your transmitter can be tuned
b highest frequency which will be reflected back to earth at vertical incidence
c lowest frequency which is reflected back to earth at vertical incidence
d minimum usable frequency

56 Propagation 3:

56-0-(b)
The speed of a radio wave:
a varies indirectly to the frequency
b is the same as the speed of light
c is infinite in space
d is always less than half the speed of light

56-1-(a)
The MUF for a given radio path is the:
a maximum usable frequency
b mean of the maximum and minimum usable frequencies
c minimum usable frequency
d mandatory 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:
a transmitter malfunction
b a sudden ionospheric disturbance
c selective fading
d front end overload

56-3-(b)
Skip distance is a term associated with signals through the ionosphere. Skip effects are due to:
a selective fading of local signals
b reflection and refraction from the ionosphere
c high gain antennas being used
d local cloud cover

56-4-(d)
The type of atmospheric layers which will best return signals to earth are:
a oxidised layers
b heavy cloud layers
c sun spot layers
d ionised layers

56-5-(a)
The ionosphere:
a is formed from layers of ionised gases around the earth
b is a magnetised belt around the earth
c consists of magnetised particles around the earth
d is a spherical belt of solar radiation around the earth

56-6-(c)
The skip distance of a sky wave will be greatest when the:
a ionosphere is most densely ionised
b signal given out is strongest
c angle of radiation is smallest
d polarisation is vertical

56-7-(b)
VHF or UHF signals transmitted towards a tall building are often received at a more distant point in another direction, because:
a these waves are easily bent by the ionosphere
b these waves are easily reflected by objects in their path
c you can never tell in which direction a wave is travelling
d tall buildings have elevators

56-8-(d)
A "line of sight" transmission between two stations uses mainly the:
a ionosphere
b troposphere
c sky wave
d ground wave

56-9-(a)
Regular changes in the ionosphere occur approximately every 11:
a years
b days
c months
d centuries

57 Interference and Filtering 1:

57-0-(c)
Electromagnetic compatibility is:
a two antennas facing each other
b more than one relay solenoid operating simultaneously
c the ability of equipment to function satisfactorily in its own environment, without introducing intolerable electromagnetic disturbances
d the inability of equipment to function satisfactorily together and produce tolerable electromagnetic disturbances

57-1-(b)
On an amateur receiver, unwanted signals are found at every 15.625 kHz. This is probably due to:
a a low-frequency government station
b radiation from a nearby TV line oscillator
c a remote radar station
d none of these

57-2-(d)
Narrow-band interference can be caused by:
a a neon sign
b a shaver motor
c lightning flashes
d transmitter harmonics

57-3-(a)
Which of the following is most likely to cause broad-band continuous interference:
a poor commutation in an electric motor
b an electric blanket switch
c a refrigerator thermostat
d a microwave transmitter

57-4-(c)
If broadband noise interference varies when it rains, the most likely cause could be from:
a underground power cables
b car ignitions
c outside overhead power lines
d your antenna connection

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:
a disconnect all your equipment from their power sources
b make sure that there is no interference on your own domestic equipment
c ignore all complaints and take no action
d write a letter to the MED

57-6-(d)
A neighbour's stereo system is suffering RF break-through. One possible cure is to:
a put a ferrite bead on the transmitter output lead
b put a capacitor across the transmitter output
c use open-wire feeders to the antenna
d use screened wire for the loudspeaker leads

57-7-(a)
When living in a densely-populated area, it is wise to:
a use the minimum transmitter output power necessary
b always use maximum transmitter output power
c only transmit during popular television programme times
d point the beam at the maximum number of television antennas

57-8-(c)
When someone in the neighbourhood complains of TVI, it is wise to:
a deny all responsibility
b immediately blame the other equipment
c check your log to see if it coincides with your transmissions
d inform all the other neighbours

57-9-(b)
Cross-modulation is usually caused by:
a key-clicks generated at the transmitter
b rectification of strong signals in overloaded stages
c improper filtering in the transmitter
d lack of receiver sensitivity and selectivity

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:
a appears only when a broadcast station is received
b is distorted on voice peaks
c appears on only one frequency
d 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:
a the undesired signal in the background of the desired signal
b a lack of signals being received
c interference only when a broadcast signal is received
d distortion on transmitted voice peaks

58-2-(c)
Unwanted signals from a radio transmitter, which cause harmful interference to other users, are known as:
a rectified signals
b re-radiation signals
c harmonic and other spurious signals
d reflected 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:
a wave trap
b low-pass filter
c high-pass filter
d band reject 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:
a active filter
b low-pass filter
c band reject filter
d high-pass filter

58-5-(a)
A low-pass filter, used to eliminate the radiation of unwanted signals, is connected to the:
a output of the amateur transmitter
b output of the balanced modulator
c input of the stereo system
d input of the mixer stage of your SSB transmitter

58-6-(c)
A band-pass filter will:
a pass frequencies each side of a band
b attenuate low frequencies but not high frequencies
c attenuate frequencies each side of a band
d attenuate high frequencies but not low frequencies

58-7-(b)
A band-stop filter will:
a stop frequencies each side of a band
b pass frequencies each side of a band
c only allow one spot frequency through
d pass frequencies below 100 MHz

58-8-(d)
A low-pass filter for a high frequency transmitter output would:
a pass audio frequencies below 3 kHz
b attenuate frequencies below 30 MHz
c pass audio frequencies above 3 kHz
d attenuate frequencies above 30 MHz

58-9-(a)
Installing a low-pass filter between the transmitter and transmission line will:
a permit lower frequency signals to pass to the antenna
b permit higher frequency signals to pass to the antenna
c ensure an SWR not exceeding 2:1
d reduce the power output back to the legal maximum

59 Interference and Filtering 3:

59-0-(c)
A low-pass filter may be used in an amateur radio installation:
a to attenuate signals lower in frequency than the ransmission
b to boost the output power of the lower frequency transmissions
c to attenuate signals higher in frequency than the transmission
d to boost the power of higher frequency transmissions

59-1-(b)
Television interference caused by harmonics radiated from an amateur transmitter could be eliminated by fitting:
a a low-pass filter in the TV receiver antenna input
b a low-pass filter in the transmitter output
c a high-pass filter in the transmitter output
d a band-pass filter to the speech amplifier

59-2-(d)
A high-pass filter can be used to:
a prevent interference to a telephone
b pass a band of speech frequencies in a modulator
c prevent overmodulation in a transmitter
d prevent interference to a TV receiver

59-3-(a)
A high-pass RF filter would normally be fitted:
a at the antenna terminals of a TV receiver
b between transmitter output and feedline
c at the Morse key or keying relay in a transmitter
d between microphone and speech amplifier

59-4-(c)
A high-pass filter attenuates:
a a band of frequencies in the VHF region
b all except a band of VHF frequencies
c low frequencies but not high frequencies
d high frequencies but not low frequencies

59-5-(b)
An operational amplifier connected as a filter always utilises:
a positive feedback to reduce oscillation
b negative feedback
c random feedback
d inductors and resistor circuits only

59-6-(d)
The voltage gain of an operational amplifier at low frequencies is:
a very low but purposely increased using circuit components
b less than one
c undefined
d very high but purposely reduced using circuit components

59-7-(a)
The input impedance of an operational amplifier is generally:
a very high
b very low
c capacitive
d inductive

59-8-(c)
An active audio low-pass filter could be constructed using:
a zener diodes and resistors
b electrolytic capacitors and resistors
c an operational amplifier, resistors and capacitors
d a transformer 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 a band-pass filter
b a notch filter
c a high-pass filter
d a low-pass filter

60 Digital Systems 1:

60-0-(d)
A "modem" is a:
a modulation de-emphasis unit
b Morse demodulator
c MOSFET de-emphasis unit
d modulator/demodulator

60-1-(a)
In the amateur radio service, a "modem":
a translates digital signals to and from audio signals
b monitors the demodulated signals
c de-emphasises the modulated data
d determines the modulation protocol

60-2-(c)
The following can be adapted for use as a modem:
a an electronic keyer
b a spare transceiver
c a computer sound-card
d a spare receiver

60-3-(b)
The following are three digital communication modes:
a DSBSC, PACTOR, NBFM
b AMTOR, PACTOR, PSK31
c AGC, FSK, Clover
d PSK31, AFC, PSSN

60-4-(d)
In digital communications, FSK stands for:
a phase selection keying
b final section keying
c final signal keying
d frequency shift keying

60-5-(a)
In digital communications, BPSK stands for:
a binary phase shift keying
b baseband polarity shift keying
c band pass selective keying
d burst pulse signal keying

60-6-(c)
When your HF digital transmission is received with errors due to multi-path conditions, you should:
a increase transmitter power
b reduce transmitter power
c reduce transmitted baud rate
d change frequency slightly

60-7-(b)
The letters BBS stand for:
a binary baud system
b bulletin board system
c basic binary selector
d broadcast band stopper

60-8-(d)
"ITA2" is:
a Morse code sent such that the baud speed is equal to the dot speed
b a coding system identifying modulation types
c an error correction code
d 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:
a FM
b SSB
c AM
d DSB
