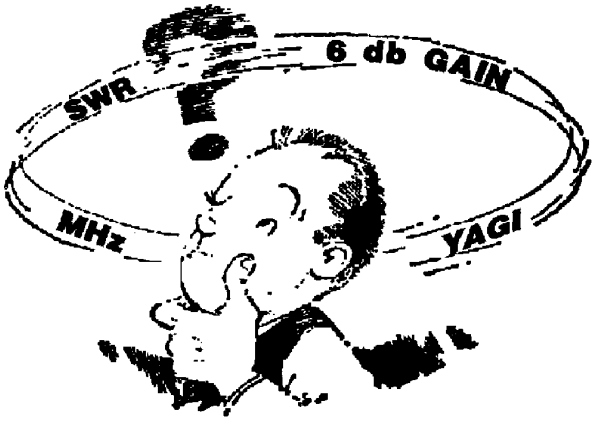
The New Zealand Association of Radio Transmitters Incorporated

# The New Zealand Amateur Radio Examination

# Question-Bank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*Revised June 2018*

# INTRODUCTION

All 600 questions used in the ***New Zealand Amateur Radio Examination*** are here with the ***Syllabus*** and other details.

You will need other books to help you with your studies.

An excellent book for the basics of amateur radio and radio theory is ***The NZART Basic Radio Training Manual.*** Order it from NZART. The latest version is recommended but any edition will help you.

The New Zealand regulatory requirements are explained in the booklet "***The New Rules Explained***", also available from NZART and from the website.

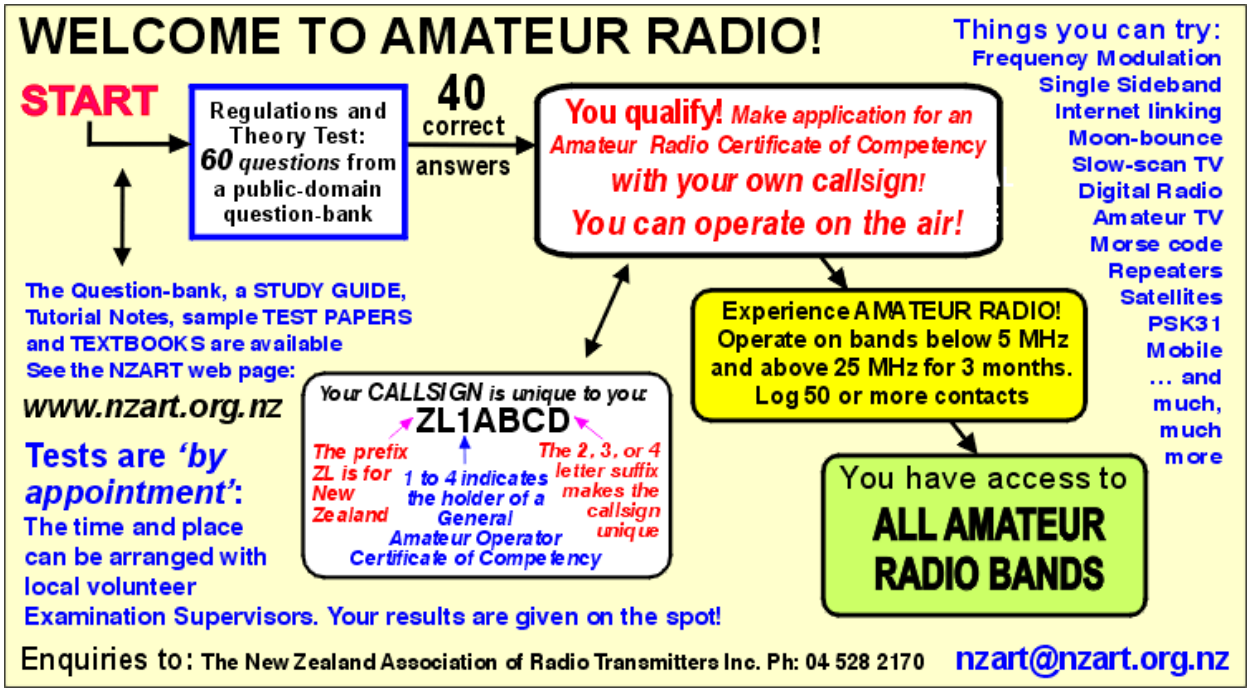
Many overseas books cover the details in the other topics of the Syllabus. Borrow or buy them.

Contact your local NZART Branch when you are ready for the examination. An examination can be arranged for you at a mutually-agreed time and place.

If you have access to a computer, visit the NZART web site at: **http//www.nzart.org.nz** for examination information including a Study Guide for all parts of the syllabus.

This question bank is the intellectual property of NZART and can only be used within NZART systems and procedures to ensure the integrity of the examination process is maintained

Good luck with your studies, we'll ***'see you on the air'***!



# The Amateur Radio Examination Details

## General Amateur Operator's Certificate Prescription

An applicant will demonstrate by way of written examination a theoretical knowledge of:-

- The legal framework of New Zealand radiocommunications
- The methods of radiocommunication, including radiotelephony, radiotelegraphy, data and image
- Radio system theory, including theory relating to transmitters, receivers, antennas, propagation and measurements
- Electromagnetic radiation
- Electromagnetic compatibility
- Avoidance and resolution of radio frequency interference.

## Amateur Examination Procedure and Format

The examination questions are taken from a question-bank of 600 questions. All questions are in the public domain.

There are thirty study topics. Each contains a multiple of ten questions.

One question out of every ten questions is randomly selected from each topic to make up each examination paper. Each examination paper has 60 questions and is unique.

A description of each topic follows in number sequence. The number of questions which will be selected for each examination paper is shown in brackets.

The total number of questions in each topic is ten times the number to be selected from it.

## Syllabus

### A. Regulatory Matters

**1. Regulations: (7 questions)**
The regulatory environment.
The amateur radio licence, who issues them, payment of fees.
Callsigns.
Power permitted.
Limitations on third party and emergency operation.
Ciphers and secret codes.

**2. Frequencies: (2 questions)**
Frequencies and bands allocated for amateur radio operating.
Sharing of bands.

### B. Basic Electrical Theory

**3. Electronics Fundamentals: (2 questions)**
Atoms and sub-atomic particles, electrons, ions.
Insulators, conductors and semiconductors.
Fields produced by currents and magnets.
Units of voltage, current, resistance, impedance.
Types of cells.

**4. Measurement Units: (1 question)**
Units of voltage, current, resistance, impedance, power.

**5. Ohm's Law: (2 questions)**
Calculations involving voltage, current, resistance (using a single resistor).

**6. Resistance: (3 questions)**
Values of resistors in series and parallel (using two resistors and more).
Calculations involving resistor combinations, voltage, current.
Internal resistance of cells.

**7. Power calculations: (2 questions)**
Power calculations given two of voltage, current, resistance.
Power in resistors connected in series and parallel.

**8. Alternating current: (1 question)**
Frequencies, waveforms and units.
Waveform shapes, rms, peak values.

**9. Capacitors, Inductors, Resonance: (2 questions)**
Variation of capacitance with plate size, spacing.
Dielectrics.
Variation of inductance with diameter, length, number of turns (descriptive only).
C and L in series and parallel.
Reactance variation of C, L, with frequency.
Impedance.
Toroidal inductors.
Transformers, turns ratios, voltage transformation.
Series and parallel resonance of L and C.
Q values.

**10. Safety: (1 question)**
Basic procedures for removing persons from live circuits.
Action of a RCD (residual current device), fuse, isolating transformer.
Grounding.
Colour codes and names of mains wiring.
Purpose of the ground lead, how it should be connected.

**11. Semiconductors: (2 questions)**
Basic properties of semiconductor materials.
Basic properties and uses of diodes, zener diodes, transistors.

**12. Device recognition: (1 question)**
Recognition of electrode names of bi-polar transistors, FETs, valves, from diagrams.

**13. Meters and Measuring: (1 question)**
The basic function of voltmeters, ammeters, SWR bridges, power meters, the impedances they present to circuits, how they should be connected.
Peak and rms values.

**14. Decibels, Amplification and Attenuation: (1 question)**
Power, voltage and current ratios expressed in dB.
Gain in dB of systems connected in cascade.

## C. An Amateur Radio Station

**15. HF Station Arrangement: (1 question)**
Understanding the block diagram of a typical HF station, showing how a transceiver is connected to a linear amplifier, low pass filter.
SWR bridge, antenna switch, antenna tuner, dummy load and antenna.
The basic function of each block.

## D. The Radio Receiver

**16. Receiver Block Diagrams: (2 questions)**
Block diagrams of SSB, CW, FM receivers.
Understanding the purpose of each block.

**17. Receiver Operation: (3 questions)**
Sensitivity, selectivity, receiver noise.
Operation of superhet, RF amplifier, IF amplifier, mixer, frequency translation, images, product detector, BFO, AGC, audio amplifier, single and double conversion.

## E. The Radio Transmitter

**18. Transmitter Block Diagrams: (2 questions)**
Block diagrams of SSB, CW, FM transmitters.
Understanding the purpose of each block.
Properties of the signals produced.
Linear and non-linear amplification.

**19. Transmitter Theory: (1 question)**
Meaning of "SSB", "CW", "FM", properties of their signals. Causes of distortion.
Power distribution in transmitters.

**20. Harmonics and Parasitics: (2 questions)**
Harmonic frequencies.
Causes of harmonic and parasitic generation in transmitters, filtering to reduce them.

## F. Power Supplies

**21. Power supplies: (1 question):**
Cells. Mains input DC power supplies.
Purpose of diodes, capacitors, transformers.
Fullwave and halfwave rectification, ripple frequencies.

**22. Regulated Power supplies: (1 question):**
Arrangement of transformer, rectifier, filter, regulator sections.
Recognition and basic purpose of each from a block diagram.
Purpose of fuses, crowbars.
Basic operation of switched mode power supplies, advantages and disadvantages.

## G. Operating an Amateur Radio Station

**23. General Operating Procedures: (1 question)**
Standard calling, answering, conversing procedures and conventions.
Initiating and terminating contacts.
Callsign exchanges**.**

**24. Practical Operating Knowledge: (2 questions)**
Recognition of common terms (pileup, reverse etc).
Repeater procedures, standard New Zealand splits.
Repeater Linking.
Operation of standard controls on transmitters and receivers.

**25. Q signals: (1 question)**
Common Q signals used in Amateur Radio communications.

## H. From Transmitter to Receiver

**26. Transmission lines: (2 questions)**
Construction of coaxial and twin-lead transmission lines.
Balanced and unbalanced lines.
Characteristic impedance.
Line losses. Standing waves, SWR.

**27. Antennas: (4 questions)**
Lengths of dipoles, verticals, for different frequencies.
Impedances, feedpoint position.
Matching.
Antenna bandwidth.
Elements of a yagi antenna, direction of radiation.
E and H fields around antennas.
Polarisation.
Tuning antennas with inductance.
Baluns.
Dummy antenna.
Isotropic antenna.

**28. Propagation: (5 questions)**

Basic phenomena in HF, VHF, UHF propagation.
Layers which refract signals.
D layer absorption.
Skip zones, hops, MUF, LUF, OWF.
Solar cycle.
Sky waves, ground waves.
Sporadic E.
Great circle paths, radiation angles. Fading.
Doppler caused by satellite motion.

## I. Interference and How to Fix it

**29. Interference & filtering: (3 questions)**

Causes and remedying of key-clicks.
Causes and recognition of cross modulation, unwanted harmonics.
Definitions of low-pass, band-pass, band-reject, notch and high-pass filters.
Using filters for interference reduction.
EMC concepts.
Causes and reduction of BCI, TVI.
Gain, impedance, basic properties of operational amplifiers.
Op-amps in active filters.

## J. Digital Systems

**30. Digital Systems: (1 question)**

Basic digital communication principles, names of common digital modes.
Principles of BBS systems.
Modems, TNCs.

# The New Zealand Amateur Radio Examination Question Bank

**Question File: 1. Regulations: (7 questions)**

1. The Amateur Service may be briefly defined as:
a. a private radio service for personal gain and public benefit
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 private radio service intended only for emergency communications
==========
2. The organisation responsible for the International Radio Regulations is the:
a. European Radiocommunications Office
b. United Nations
c. International Telecommunication Union
d. European Telecommunication Standards Institute
==========
3. New Zealand's views on international radio regulatory matters are coordinated by the:
a. New Zealand Association of Radio Transmitters (NZART)
b. Ministry of Business, Innovation and Employment (MBIE)
c. International Amateur Radio Union (IARU)
d. Prime Minister's Office
==========
4. For regulatory purposes the world is divided into regions each with different radio spectrum allocations. New Zealand is in:
a. Region 1
b. Region 2
c. Region 3
d. Region 4
==========
5. The prime document for the administration of the Amateur Service in New Zealand is the:
a. New Zealand Radiocommunications Regulations
b. Broadcasting Act
c. Radio Amateur's Handbook
d. minutes of the International Telecommunication Union meetings
==========
6. The administration of the Amateur Service in New Zealand is by:
a. the Ministry of Business Innovation and Employment Radio Spectrum Management Group
b. the Area Code administrators of New Zealand Post
c. the Radio Communications Division of the Ministry of Police
d. your local council public relations section
==========
7. An Amateur Station is a station:
a. in the public radio service
b. using radiocommunications for a commercial purpose
c. using equipment for training new radiocommunications operators
d. in the Amateur Service
==========
8. A General Amateur Operator’s Certificate of Competency can be inspected by an authorised officer from the Ministry of Business, Innovation and Employment:
a. at any time
b. on any business day
c. before 9 p.m.
d. only on public holidays
==========
9. The fundamental regulations controlling the Amateur Service are to be found in:
a. the International Radio Regulations from the ITU
b. the Radio Amateur's Handbook
c. the NZART Callbook
d. on the packet radio bulletin-board
==========
10. You must have a General Amateur Operator’s Certificate of Competency to:
a. transmit on public-service frequencies
b. retransmit shortwave broadcasts
c. repair radio equipment
d. transmit in bands allocated to the Amateur Service
==========
11. A New Zealand General Amateur Operator’s Certificate of Competency allows you to operate:
a. anywhere in the world
b. anywhere in New Zealand and in any other country that recognises the Certificate
c. within 50 km of your home station location
d. only at your home address
==========
12. With a General Amateur Operator’s Certificate of Competency you may operate transmitters in your station:
a. one at a time
b. one at a time, except for emergency communications
c. any number at one time
d. any number, so long as they are transmitting on different bands
==========
13. You must keep the following document at your amateur station:
a. your General Amateur Operator’s Certificate of Competency
b. a copy of the Rules and Regulations for the Amateur Service
c. a copy of the Radio Amateur's Handbook for instant reference
d. a chart showing the amateur radio bands
==========

14. An Amateur Station is one which is:
a. operated by the holder of a General Amateur Operator's Certificate of Competency on the amateur radio bands
b. owned and operated by a person who is not engaged professionally in radio communications
c. used exclusively to provide two-way communication in connection with activities of amateur sporting organisations
d. used primarily for emergency communications during floods, earthquakes and similar disasters.
==========

15. If the qualified operator of an amateur radio station is absent overseas, the home station may be used by:
a. any member of the immediate family to maintain contact with only the qualified operator
b. any person with an appropriate General Amateur Operator's Certificate of Competency
c. the immediate family to communicate with any amateur radio operator
d. the immediate family if a separate callsign for mobile use has been obtained by the absent operator
==========

16. All amateur stations, regardless of the mode of transmission used, must be equipped with:
a. a reliable means for determining the operating radio frequency
b. a dummy antenna
c. an overmodulation indicating device
d. a dc power meter
==========

17. An amateur station may transmit unidentified signals:
a. when making a brief test not intended for reception by anyone else
b. when conducted on a clear frequency when no interference will be caused
c. when the meaning of transmitted information must be obscured to preserve secrecy
d. never, such transmissions are not permitted
==========

18. You may operate your amateur radio station somewhere in New Zealand for short periods away from the location entered in the administration's database:
a. only during times of emergency
b. only after giving proper notice to the Ministry of Business, Innovation and Employment
c. during an approved emergency practice
d. whenever you want to
==========

19. Before operating an amateur station in a motor vehicle, you must:
a. give the Land Transport Authority the vehicle's licence plate number
b. inform the Ministry of Business, Innovation and Employment
c. hold a current General Amateur Operator's Certificate of Competency
d. obtain an additional callsign
==========

20. An applicant for a New Zealand General Amateur Operator's Certificate of Competency must first qualify by meeting the appropriate examination requirements. Application may then be made by:
a. anyone except a representative of a foreign government
b. only a citizen or permanent resident of New Zealand
c. anyone except an employee of the Ministry of Business, Innovation and Employment
d. anyone
==========

21. An amateur radio operator must have current New Zealand postal and email addresses so the Ministry of Business, Innovation and Employment:
a. has a record of the location of each amateur station
b. can refund overpaid fees
c. can publish a call-sign directory
d. can send mail to the operator
==========

22. If you transmit from another amateur's station, the person responsible for its proper operation is:
a. both of you
b. the other amateur (the station's owner)
c. you, the operator
d. the station owner, unless the station records show that you were the operator at the time
==========

23. Your responsibility as a station operator is that you must:
a. allow another amateur to operate your station upon request
b. be present whenever the station is operated
c. be responsible for the proper operation of the station in accordance with the Radiocommunications Regulations
d. notify the Ministry of Business, Innovation and Employment if another amateur acts as the operator
==========

24. An amateur station must have a qualified operator:
a. only when training another amateur
b. whenever the station receiver is operated
c. whenever the station is used for transmitting
d. when transmitting and receiving
==========

25. A log-book for recording stations worked:
a. is compulsory for every amateur radio operator
b. is recommended for all amateur radio operators
c. must list all messages sent
d. must record time in UTC
==========

26. Unqualified persons in your family cannot transmit using your amateur station if they are alone with your equipment because they must:
a. not use your equipment without your permission
b. hold a General Amateur Operator's Certificate of Competency before they are allowed to be operators
c. first know how to use the right abbreviations and Q signals
d. first know the right frequencies and emissions for transmitting
==========

27. Amateur radio repeater equipment and frequencies in New Zealand are co-ordinated by:
a. the Ministry of Business, Innovation and Employment
b. NZART branches in the main cities
c. repeater trustees
d. the NZART Engineering and Licensing Group.
==========
28. A qualified operator of an amateur radio station may permit anyone to:
a. operate the station under direct supervision
b. send business traffic to any other station.
c. pass brief comments of a personal nature provided no fees or other considerations are requested or accepted
d. use the station for Morse sending practice
==========
29. The minimum age for a person to hold a General Amateur Operator's Certificate of Competency is:
a. 12 years
b. 16 years
c. 21 years
d. there is no age limit
==========
30. Which of the following arrangements allows a NZ citizen holding a General Amateur Operators Certificate of Competency and a call-sign to operate in many European countries:
a. CEPT agreement
b. IARP agreement
c. ITU reciprocal license
d. All of these choices are correct
==========
31. The age when an amateur radio operator is required to surrender the General Amateur Operator's Certificate of Competency is:
a. 65 years
b. 70 years
c. 75 years
d. there is no age limit
==========
32. Peak envelope power (PEP) output is the:
a. average power output at the crest of the modulating cycle
b. total power contained in each sideband
c. carrier power output
d. transmitter power output on key-up condition
==========
33. The maximum power output permitted from an amateur station is:
a. that needed to overcome interference from other stations
b. 30 watt PEP
c. specified in the amateur radio General User Radio Licence
d. 1000 watt mean power or 2000 watt PEP
==========
34. The transmitter power output for amateur stations at all times is:
a. 25 watt PEP minimum output
b. that needed to overcome interference from other stations
c. 1000 watt PEP maximum
d. the minimum power necessary to communicate and within the terms of the amateur radio GURL
==========
35. You identify your amateur station by transmitting your:
a. "handle"
b. callsign
c. first name and your location
d. full name
==========
36. This callsign could be allocated to an amateur radio operator in New Zealand:
a. ZK-CKF
b. ZLC5
c. ZL2HF
d. ZMX4432
==========
37. The callsign of a New Zealand amateur radio station:
a. is listed in the administration's database
b. can be any sequence of characters made-up by the operator
c. can never be changed
d. is changed annually
==========
38. These letters are generally used for the first letters in New Zealand amateur radio callsigns:
a. ZS
b. ZL
c. VK
d. LZ
==========
39. The figures normally used in New Zealand amateur radio callsigns are:
a. any two-digit number, 45 through 99
b. any two-digit number, 22 through 44
c. a single digit, 5 through 9
d. a single digit, 1 through 4
==========
40. Before re-issuing, a relinquished callsign is normally kept for:
a. 1 year
b. 2 years
c. 0 years
d. 5 years
==========
41. A General Amateur Operator's Certificate of Competency authorises the use of:
a. all amateur radio transmitting and receiving apparatus
b. a TV receiver
c. amateur radio transmitting apparatus only
d. marine mobile equipment
==========
42. General Amateur Operator's Certificates of Competency and callsigns are issued pursuant to the Regulations by the:
a. New Zealand Association of Radio Transmitters (NZART)
b. Ministry of Business, Innovation and Employment Approved Radio Examiners
c. Department of Internal Affairs
d. Prime Minister's Office
==========

43. To replace a written copy of your General Amateur Operator's Certificate of Competency you should:
a. Apply to an Approved Radio Examiner to re-sit the examination
b. Download an application form from the Department of Internal Affairs website
c. Download an application form from the Ministry's website (or have an Approved Radio Examiner do this for you)
d. Download and print one from the official database (or have an Approved Radio Examiner do this for you)
==========
44. A General Amateur Operator's Certificate of Competency holder must advise permanent changes to postal and email addresses and update the official database records within:
a. One calendar month
b. 7 days
c. 10 days
d. one year
==========
45. A General Amateur Operator's Certificate of Competency:
a. expires after 6 months
b. contains the unique callsign(s) to be used by that operator
c. is transferable
d. permits the transmission of radio waves
==========
46. A General Amateur Operator Certificate of Competency is normally issued for:
a. 1 year
b. 5 years
c. 10 years
d. life
==========
47. A licence that provides for a given class of radio transmitter to be used without requiring a licence in the owner's own name is known as:
a. a repeater licence
b. a general user radio licence
c. a beacon licence
d. a reciprocal licence
==========
48. The holder of a General Amateur Operator's Certificate of Competency may permit anyone to:
a. use an amateur radio station to communicate with other radio amateurs
b. pass brief messages of a personal nature provided no fees or other consideration are requested or accepted
c. operate the amateur station under the supervision and in the presence of a qualified operator
d. take part in communications only if prior written permission is received from the Ministry of Business, Innovation and Employment.
==========
49. International communications on behalf of third parties may be transmitted by an amateur station only if:
a. prior remuneration has been received
b. such communications have been authorised by the countries concerned
c. the communication is transmitted in secret code
d. English is used to identify the station at the end of each transmission
==========
50. The term "amateur third party communications" refers to:
a. a simultaneous communication between three operators
b. the transmission of commercial or secret messages
c. messages to or on behalf of non-licensed people or organisations
d. none of the above
==========
51. The Morse code signal SOS is sent by a station:
a. with an urgent message
b. in grave and imminent danger and requiring immediate assistance
c. making a report about a shipping hazard
d. sending important weather information
==========
52. If you hear distress traffic and are unable to render assistance, you should:
a. maintain watch until you are certain that assistance is forthcoming
b. enter the details in the log book and take no further action
c. take no action
d. tell all other stations to cease transmitting
==========
53. The transmission of messages in a secret code by the operator of an amateur station is:
a. permitted when communications are transmitted on behalf of a government agency
b. permitted when communications are transmitted on behalf of third parties
c. permitted during amateur radio contests
d. not permitted except for control signals by the licensees of remote beacon or repeater stations
==========
54. Messages from an amateur station in one of the following are expressly forbidden:
a. ASCII
b. International No. 2 code
c. Baudot code
d. secret cipher
==========
55. The term "harmful interference" means:
a. interference which obstructs or repeatedly interrupts radiocommunication services
b. an antenna system which accidentally falls on to a neighbour's property
c. a receiver with the audio volume unacceptably loud
d. interference caused by a station of a secondary service
==========
56. When interference to the reception of radiocommunications is caused by the operation of an amateur station, the station operator:
a. must immediately comply with any action required by the MBIE to prevent the interference
b. may continue to operate with steps taken to reduce the interference when the station operator can afford it
c. may continue to operate without restrictions
d. is not obligated to take any action
==========

57. An amateur radio operator may knowingly interfere with another radio communication or signal:
a. when the operator of another station is acting in an illegal manner
b. when another station begins transmitting on a frequency you already occupy
c. never
d. when the interference is unavoidable because of crowded band conditions
==========
58. After qualifying and gaining a General Amateur Operator's Certificate of Competency you are permitted to:
a. operate on any frequency in the entire radio spectrum
b. first operate for three months on amateur radio bands below 5 MHz and bands above 25 MHz to log fifty or more contacts
c. ignore published bandplans
d. make frequent tune-up transmissions at 10 MHz
==========
59. Morse code is permitted for use by:
a. only operators who have passed a Morse code test
b. those stations with computers to decode it
c. any amateur radio operator
d. only those stations equipped for headphone reception
==========
60. As a New Zealand amateur radio operator you may communicate with:
a. only amateur stations within New Zealand
b. only stations running more than 500w PEP output
c. only stations using the same transmission mode
d. other amateur stations world-wide
==========
61. As a New Zealand amateur radio operator you:
a. must regularly operate using dry batteries
b. should use shortened antennas
c. may train for and support disaster relief activities
d. must always have solar-powered equipment in reserve
==========
62. Your General Amateur Operator's Certificate of Competency permits you to:
a. work citizen band stations
b. establish and operate an earth station in the amateur satellite service
c. service commercial radio equipment over 1 kW output
d. re-wire fixed household electrical supply mains
==========
63. You hear a station using the callsign "VK3XYZ stroke ZL" on your local VHF repeater. This is:
a. a callsign not authorised for use in New Zealand
b. a confused illegal operator
c. the station of an overseas visitor
d. probably an unlicensed person using stolen equipment
==========
64. The abbreviation "HF" refers to the radio spectrum between:
a. 2 MHz and 10 MHz
b. 3 MHz and 30 MHz
c. 20 MHz and 200 MHz
d. 30 MHz and 300 MHz
==========
65. Bandplans showing the transmission modes for New Zealand amateur radio bands are developed and published for the mutual respect and advantage of all operators:
a. to ensure that your operations do not impose problems on other operators and that their operations do not impact on you
b. to keep experimental developments contained
c. to reduce the number of modes in any one band
d. to keep overseas stations separate from local stations
==========
66. The abbreviation "VHF" refers to the radio spectrum between:
a. 2 MHz and 10 MHz
b. 3 MHz and 30 MHz
c. 30 MHz and 300 MHz
d. 200 MHz and 2000 MHz
==========
67. An amateur radio operator must be able to:
a. converse in the languages shown on the Certificate of Competency
b. read Morse code at 12 words-per-minute
c. monitor standard frequency transmissions
d. verify that transmissions are within an authorised frequency band
==========
68. An amateur station may be closed down at any time by:
a. a demand from an irate neighbour experiencing television interference
b. a demand from an authorised official of the Ministry of Business, Innovation and Employment
c. an official from your local council
d. anyone until your aerials are made less unsightly
==========
69. A General Amateur Operator's Certificate of Competency:
a. can never be revoked
b. gives a waiver over copyright
c. does not confer on its holder a monopoly on the use of any frequency or band
d. can be readily transferred
==========
70. A person in distress:
a. must use correct communication procedures
b. may use any means available to attract attention
c. must give position with a grid reference
d. must use allocated safety frequencies
==========

**Question File: 2. Frequencies: (2 questions)**

1. Amateur stations are often regarded as "frequency agile". This means:
a. operation is limited to frequency modulation
b. operators can choose to operate anywhere on a shared band
c. a bandswitch is required on all transceivers
d. on a shared band operators can change frequency to avoid interfering
==========

2. A new amateur radio operator is permitted to:
a. operate on all amateur bands other than VHF at least weekly using a computer for log-keeping
b. operate only on specified amateur bands for 3 months logging at least 50 contacts and retaining the log book for at least one year for possible official inspection
c. operate only on one fixed frequency in the amateur bands between 5 and 25 MHz for 6 months and then present the log book for official inspection
d. operate on amateur bands between 5 and 25 MHz as and when the operator chooses
==========

3. The frequency limits of the "80 metre band" are:
a. 3.50 to 4.0 MHz
b. 3.50 to 3.90 MHz
c. 3.50 to 3.85 MHz
d. 3.6 to 3.9 MHz
==========

4. In New Zealand the frequency limits of the "40 metre band" are:
a. 7.00 to 7.10 MHz
b. 7.00 to 7.15 MHz
c. 7.00 to 7.30 MHz
d. 7.10 to 7.40 MHz
==========

5. The frequency limits of the "20 metre band" are:
a. 14.00 to 14.10 MHz
b. 14.00 to 14.45 MHz
c. 14.00 to 14.50 MHz
d. 14.00 to 14.35 MHz
==========

6. The frequency limits of the "15 metre band" are:
a. 21.00 to 21.35 MHz
b. 21.00 to 21.40 MHz
c. 21.00 to 21.45 MHz
d. 21.00 to 21.50 MHz
==========

7. The frequency limits of the "10 metre band" are:
a. 28.00 to 28.35 MHz
b. 28.00 to 28.40 MHz
c. 28.00 to 29.00 MHz
d. 28.00 to 29.70 MHz
==========

8. The frequency limits of the "2 metre band" are:
a. 144 to 149 MHz
b. 144 to 148 MHz
c. 146 to 148 MHz
d. 144 to 150 MHz
==========

9. The frequency limits of the "70 centimetre band" are:
a. 430 to 440 MHz
b. 430 to 450 MHz
c. 435 to 438 MHz
d. 430 to 460 MHz
==========

10. The published bandplans for the New Zealand amateur bands:
a. are determined by the Ministry of Business, Innovation and Employment
b. change at each equinox
c. limit the operating frequencies of high-power stations
d. were developed by NZART in the interests of all radio amateurs
==========

11. Operation on the 130 to 190 kHz band requires:
a. a vertical half-wave antenna
b. special permission to operate in daylight hours
c. power output limited to 5 watt e.i.r.p. maximum
d. receivers with computers with sound cards
==========

12. Two bands where amateur satellites may operate are
a. 28.0 to 29.7 MHz and 144.0 to 146.0 MHz
b. 21.0 to 21.1 MHz and 146.0 to 148.0 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
==========

13. The amateur service is authorised to share a portion of which of the following bands that are heavily used by non-amateur devices:
a. 2400 to 2500 MHz
b. 1240 to 1300 MHz
c. 144 to 148 MHz
d. 28 to 29.7 MHz
==========

14. The following amateur radio band is shared with other services:
a. 14.0 to 14.35 MHz
b. 7.2 to 7.3 MHz
c. 18.068 to 18.168 MHz
d. 144.0 to 146.0 MHz
==========

15. The frequency band 146 to 148 MHz is:
a. shared with other communication services
b. allocated exclusively for police communications
c. exclusive to repeater operation
d. reserved for emergency communications
==========

16. The following amateur radio band is shared with another service in New Zealand:
a. 51 to 54 MHz
b. 144 to 146 MHz
c. 7.0 to 7.1 MHz
d. 24.89 to 24.99 MHz
==========

17. The published New Zealand amateur radio bandplans are:
a. obligatory for all amateur radio operators to observe
b. recommended, and all amateur radio operators should follow them
c. to show where distant stations can be worked
d. for tests and experimental purposes only
==========

18. The following band is allocated to New Zealand amateur radio operators on a primary basis:
a. 3.5 to 3.9 MHz
b. 10.1 to 10.15 MHz
c. 146 to 148 MHz
d. 21 to 21.45 MHz
==========

19. When the Amateur Service is a secondary user of a band and another service is the primary user, this means:
a. nothing at all, all users have equal rights to operate
b. amateurs may only use the band during emergencies
c. the band may be used by amateurs provided they do not cause harmful interference to primary users
d. you may increase transmitter power to overcome any interference caused by primary users
==========

20. This rule applies if two amateur radio stations want to use the same frequency:
a. the operator with the newer licence must yield the frequency to the more experienced licensee
b. the station with the lower power output must yield the frequency to the station with the higher power output
c. both stations have an equal right to operate on the frequency, the second-comer courteously giving way after checking that the frequency is in use
d. stations in ITU Regions 1 and 2 must yield the frequency to stations in Region 3
==========

**Question File: 3. Electronics Fundamentals: (2 questions)**

1. The element Silicon is:
a. a conductor
b. an insulator
c. a superconductor
d. a semiconductor
==========
2. An element which falls somewhere between being an insulator and a conductor is called a:
a. P-type conductor
b. intrinsic conductor
c. semiconductor
d. N-type conductor
==========
3. In an atom:
a. the protons and the neutrons orbit the nucleus in opposite directions
b. the protons orbit around the neutrons
c. the electrons orbit the nucleus
d. the electrons and the neutrons orbit the nucleus
==========
4. An atom that loses an electron becomes:
a. a positive ion
b. an isotope
c. a negative ion
d. a radioactive atom
==========
5. An electric current passing through a wire will produce around the conductor:
a. an electric field
b. a magnetic field
c. an electrostatic field
d. nothing
==========
6. These magnetic poles repel:
a. unlike
b. like
c. positive
d. negative
==========
7. A common use for a permanent magnet is:
a. A computer speaker
b. An optical mouse
c. A keyboard
d. A magnetic loop antenna
==========
8. The better conductor of electricity is:
a. copper
b. carbon
c. silicon
d. aluminium
==========
9. The term describing opposition to electron flow in a metallic circuit is:
a. current
b. voltage
c. resistance
d. power
==========
10. The substance which will most readily allow an electric current to flow is:
a. an insulator
b. a conductor
c. a resistor
d. a dielectric
==========
11. The plastic coating formed around wire is:
a. an insulator
b. a conductor
c. an inductor
d. a magnet
==========
12. The following is a source of electrical energy:
a. p-channel FET
b. carbon resistor
c. germanium diode
d. lead acid battery
==========
13. An important difference between a common torch battery and a lead acid battery is that only the lead acid battery:
a. has two terminals
b. contains an electrolyte
c. can be re-charged
d. can be effectively discharged
==========
14. As temperature increases, the resistance of a metallic conductor:
a. increases
b. decreases
c. remains constant
d. becomes negative
==========
15. In an n-type semiconductor, the current carriers are:
a. holes
b. electrons
c. positive ions
d. photons
==========
16. In a p-type semiconductor, the current carriers are:
a. photons
b. electrons
c. positive ions
d. holes
==========

17. An electrical insulator:
a. lets electricity flow through it in one direction
b. does not let electricity flow through it
c. lets electricity flow through it when light shines on it
d. lets electricity flow through it
==========
18. Four good electrical insulators are:
a. plastic, rubber, wood, carbon
b. glass, wood, copper, porcelain
c. paper, glass, air, aluminium
d. glass, air, plastic, porcelain
==========
19. Three good electrical conductors are:
a. copper, gold, mica
b. gold, silver, wood
c. gold, silver, aluminium
d. copper, aluminium, paper
==========
20. The name for the flow of electrons in an electric circuit is:
a. voltage
b. resistance
c. capacitance
d. current
==========

**Question File: 4. Measurement Units: (1 question)**

1. The unit of impedance is the:
a. ampere
b. farad
c. henry
d. ohm
==========
2. One kilohm is:
a. 10 ohm
b. 0.01 ohm
c. 0.001 ohm
d. 1000 ohm
==========
3. One kilovolt is equal to:
a. 10 volt
b. 100 volt
c. 1000 volt
d. 10,000 volt
==========
4. One quarter of one ampere may be written as:
a. 250 microampere
b. 0.5 ampere
c. 0.25 milliampere
d. 250 milliampere
==========
5. The watt is the unit of:
a. power
b. magnetic flux
c. electromagnetic field strength
d. breakdown voltage
==========
6. The voltage 'two volt' is also:
a. 2000 mV
b. 2000 kV
c. 2000 uV
d. 2000 MV
==========
7. The unit for potential difference between two points in a circuit is the:
a. ampere
b. volt
c. ohm
d. coulomb
==========
8. Impedance is a combination of:
a. reactance with reluctance
b. resistance with conductance
c. resistance with reactance
d. reactance with radiation
==========
9. One mA is:
a. one millionth of one ampere
b. one thousandth of one ampere
c. one tenth of one ampere
d. one millionth of admittance
==========
10. The unit of resistance is the:
a. farad
b. watt
c. ohm
d. resistor
==========

**Question File: 5. Ohm's Law: (2 questions)**

1. 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]
==========
2. A 10 mA current is measured in a 500 ohm resistor. The voltage across the resistor will be:
a. 5 volt
b. 50 volt
c. 500 volt
d. 5000 volt
==========
3. The value of a resistor to drop 100 volt with a current of 0.8 milliampere is:
a. 125 ohm
b. 125 kilohm
c. 1250 ohm
d. 1.25 kilohm
==========
4. 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
==========
5. The voltage to cause a current of 4.4 ampere in a 50 ohm resistance is:
a. 2220 volt
b. 220 volt
c. 22.0 volt
d. 0.222 volt
==========

6. A current of 2 ampere flows through a 16 ohm resistance. The applied voltage is:
a. 8 volt
b. 14 volt
c. 18 volt
d. 32 volt
==========
7. 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
==========
8. 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
==========
9. 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. reduced to 3 volt
c. held constant
d. reduced to zero
==========
10. 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]
==========
11. When an 8 ohm resistor is connected across a 12 volt supply the current flow is:
a. 12 / 8 amps
b. 8 / 12 amps
c. 12 - 8 amps
d. 12 + 8 amps
==========
12. A circuit has a total resistance of 100 ohm and 50 volt is applied across it. The current flow will be:
a. 50 mA
b. 500 mA
c. 2 ampere
d. 20 ampere
==========
13. 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 / R [resistance equals voltage divided by resistance]
d. R = E / I [resistance equals voltage divided by current]
==========
14. A resistor with 10 volt applied across it and passing a current of 1 mA has a value of:
a. 10 ohm
b. 100 ohm
c. 1 kilohm
d. 10 kilohm
==========
15. If a 3 volt battery causes 300 mA to flow in a circuit, the circuit resistance is:
a. 10 ohm
b. 9 ohm
c. 5 ohm
d. 3 ohm
==========
16. A current of 0.5 ampere flows through a resistor when 12 volt is applied. The value of the resistor is:
a. 6 ohms
b. 12.5 ohms
c. 17 ohms
d. 24 ohms
==========
17. The resistor which gives the greatest opposition to current flow is:
a. 230 ohm
b. 1.2 kilohm
c. 1600 ohm
d. 0.5 megohm
==========
18. The ohm is the unit of:
a. supply voltage
b. electrical pressure
c. current flow
d. electrical resistance
==========
19. 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
==========
20. 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
==========

**Question File: 6. Resistance: (3 questions)**

1. The total resistance in a parallel circuit:
a. is always less than the smallest resistance
b. depends upon the voltage drop across each branch
c. could be equal to the resistance of one branch
d. depends upon the applied voltage
==========
2. 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. 40 milliampere
c. 80 ampere
d. 80 milliampere
==========

3. The total current in a parallel circuit is equal to the:
a. current in any one of the parallel branches
b. sum of the currents through all the parallel branches
c. applied voltage divided by the value of one of the resistive elements
d. source voltage divided by the sum of the resistive elements
==========

4. One way to operate a 3 volt bulb from a 9 volt supply is to connect it in:
a. series with the supply
b. parallel with the supply
c. series with a resistor
d. parallel with a resistor
==========

5. You can operate this number of identical lamps, each drawing a current of 250 mA, from a 5A supply:
a. 50
b. 30
c. 20
d. 5
==========

6. Six identical 2-volt bulbs are connected in series. The supply voltage to cause the bulbs to light normally is:
a. 12 V
b. 1.2 V
c. 6 V
d. 2 V
==========

7. 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. 12 x 240
b. 240 + 12
c. 240 - 12
d. 240 / 12
==========

8. 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
==========

9. Two resistors are connected in parallel. R1 is 75 ohm and R2 is 50 ohm. The total resistance of this parallel circuit is:
a. 10 ohm
b. 70 ohm
c. 30 ohm
d. 40 ohm
==========

10. 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. internal resistance
b. voltage capacity
c. electrolyte becoming dry
d. current capacity
==========

11. A 6 ohm resistor is connected in parallel with a 30 ohm resistor. The total resistance of the combination is:
a. 5 ohm
b. 8 ohm
c. 24 ohm
d. 35 ohm
==========

12. The total resistance of several resistors connected in series is:
a. less than the resistance of any one resistor
b. greater than the resistance of any one resistor
c. equal to the highest resistance present
d. equal to the lowest resistance present
==========

13. Five 10 ohm resistors connected in series give a total resistance of:
a. 1 ohm
b. 5 ohms
c. 10 ohms
d. 50 ohms
==========

14. Resistors of 10, 270, 3900, and 100 ohm are connected in series. The total resistance is:
a. 9 ohm
b. 3900 ohm
c. 4280 ohm
d. 10 ohm
==========

15. This combination of series resistors could replace a single 120 ohm resistor:
a. five 24 ohm
b. six 22 ohm
c. two 62 ohm
d. five 100 ohm
==========

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

17. If ten resistors of equal value R are wired in parallel, the total resistance is:
a. R
b. 10R
c. 10/R
d. R/10
==========

18. The total resistance of four 68 ohm resistors wired in parallel is:
a. 12 ohm
b. 17 ohm
c. 34 ohm
d. 272 ohm
==========

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

20. The following resistor combination can most nearly replace a single 150 ohm resistor:
a. four 47 ohm resistors in parallel
b. five 33 ohm resistors in parallel
c. three 47 ohm resistors in series
d. five 33 ohm resistors in series
==========

21. 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
==========

22. Two resistors are in parallel. Resistor A carries twice the current of resistor B which means that:
a. A has half the resistance of B
b. B has half the resistance of A
c. the voltage across A is twice that across B
d. the voltage across B is twice that across A
==========

23. The smallest resistance that can be made with five 1 k ohm 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
==========

24. The following combination of 28 ohm resistors has a total resistance of 42 ohm:
a. three resistors in series
b. three resistors in parallel
c. a combination of two resistors in parallel, then placed in series with another resistor
d. a combination of two resistors in parallel, then placed in series with another two in parallel
==========

25. Two 100 ohm resistors connected in parallel are wired in series with a 10 ohm resistor. The total resistance of the combination is:
a. 60 ohms
b. 180 ohms
c. 190 ohms
d. 210 ohms
==========

26. 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
==========

27. 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. 2 amperes
c. 3 amperes
d. 4.5 amperes
==========

28. 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. 66 volt
b. 33 volt
c. 3.3 volt
d. 1 volt
==========

29. 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
==========

30. Three 500 ohm resistors are wired in series. Short-circuiting the centre resistor will change the value of the network from:
a. 1500 ohm to 1000 ohm
b. 500 ohm to 1000 ohm
c. 1000 ohm to 500 ohm
d. 1000 ohm to 1500 ohm
==========

**Question File: 7. Power calculations: (2 questions)**

1. A transmitter power amplifier requires 30 mA at 300 volt. The DC input power is:
a. 300 watt
b. 9000 watt
c. 9 watt
d. 6 watt
==========

2. 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
==========

3. When two 500 ohm 1 watt resistors are connected in series, the maximum total power that can be dissipated by both resistors is:
a. 4 watt
b. 2 watt
c. 1 watt
d. 1/2 watt
==========

4. When two 1000 ohm 5 watt resistors are connected in parallel, they can dissipate a maximum total power of:
a. 40 watt
b. 20 watt
c. 10 watt
d. 5 watt
==========

5. The current in a 100 kilohm resistor is 10 mA. The power dissipated is:
a. 1 watt
b. 10 watt
c. 100 watt
d. 10,000 watt
==========

6. A current of 500 milliamp passes through a 1000 ohm resistance. The power dissipated is:
a. 0.25 watt
b. 2.5 watt
c. 25 watt
d. 250 watt
==========
7. A 20 ohm resistor carries a current of 0.25 ampere. The power dissipated is:
a. 1.25 watt
b. 5 watt
c. 2.50 watt
d. 10 watt
==========
8. If 200 volt is applied to a 2000 ohm resistor, the resistor will dissipate:
a. 20 watt
b. 30 watt
c. 10 watt
d. 40 watt
==========
9. 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
==========
10. The unit for power is the:
a. ohm
b. watt
c. ampere
d. volt
==========
11. The following two quantities should be multiplied together to find power:
a. resistance and capacitance
b. voltage and current
c. voltage and inductance
d. inductance and capacitance
==========
12. The following two electrical units multiplied together give the unit "watt":
a. volt and ampere
b. volt and farad
c. farad and henry
d. ampere and henry
==========
13. The power dissipation of a resistor carrying a current of 10 mA with 10 volt across it is:
a. 0.01 watt
b. 0.1 watt
c. 1 watt
d. 10 watt
==========
14. 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
==========
15. 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. 9 ampere
d. 3 ampere
==========
16. 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. 24 watt
d. 36 watt
==========
17. A resistor of 10 kilohm carries a current of 20 mA. The power dissipated in the resistor is:
a. 2 watt
b. 4 watt
c. 20 watt
d. 40 watt
==========
18. 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. resistance
d. power
==========
19. 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. 707 watt
c. 10,000 watt
d. 50,000 watt
==========
20. The voltage applied to two resistors in series is doubled. The total power dissipated will:
a. increase by four times
b. decrease to half
c. double
d. not change
==========

**Question File: 8. Alternating current: (1 question)**

1. An 'alternating current' is so called because:
a. it reverses direction periodically
b. it travels through a circuit using alternate paths
c. its direction of travel is uncertain
d. its direction of travel can be altered by a switch
==========
2. The time for one cycle of a 100 Hz signal is:
a. 1 second
b. 0.01 second
c. 0.0001 second
d. 10 seconds
==========
3. A 50 hertz current in a wire means that:
a. a potential difference of 50 volts exists across the wire
b. the current flowing in the wire is 50 amperes
c. the power dissipated in the wire is 50 watts
d. a cycle is completed 50 times in each second
==========

4. The current in an AC circuit completes a cycle in 0.1 second. So the frequency is:
a. 1 Hz
b. 10 Hz
c. 100 Hz
d. 1000 Hz
==========
5. An impure signal is found to have 2 kHz and 4 kHz components. This 4 kHz signal is:
a. a fundamental of the 2 kHz signal
b. a sub-harmonic of 2 kHz
c. the DC component of the main signal
d. a harmonic of the 2 kHz signal
==========
6. The correct name for the equivalent of 'one cycle per second' is one:
a. henry
b. volt
c. hertz
d. coulomb
==========
7. One megahertz is equal to:
a. 0.0001 Hz
b. 100 kHz
c. 1000 kHz
d. 10 Hz
==========
8. One GHz is equal to:
a. 1000 kHz
b. 10 MHz
c. 100 MHz
d. 1000 MHz
==========
9. The 'rms value' of a sine-wave signal is:
a. half the peak voltage
b. 1.414 times the peak voltage
c. the peak-to-peak voltage
d. 0.707 times the peak voltage
==========
10. A sine-wave alternating current of 10 ampere peak has an rms value of:
a. 5 amp
b. 7.07 amp
c. 14.14 amp
d. 20 amp
==========

**Question File: 9. Capacitors, Inductors, Resonance: (2 questions)**

1. The total capacitance of two or more capacitors in series is:
a. always less than that of the smallest capacitor
b. always greater than that of the largest capacitor
c. found by adding each of the capacitances together
d. found by adding the capacitances together and dividing by their total number
==========
2. Filter capacitors in power supplies are sometimes connected in series to:
a. withstand a greater voltage than a single capacitor can withstand
b. increase the total capacity
c. reduce the ripple voltage further
d. resonate the filter circuit
==========
3. A component is identified as a capacitor if its value is measured in:
a. microvolts
b. millihenrys
c. megohms
d. microfarads
==========
4. Two metal plates separated by air form a 0.001 uF capacitor. Its value may be changed to 0.002 uF by:
a. bringing the metal plates closer together
b. making the plates smaller in size
c. moving the plates apart
d. touching the two plates together
==========
5. The material separating the plates of a capacitor is the:
a. dielectric
b. semiconductor
c. resistor
d. lamination
==========
6. Three 15 picofarad capacitors are wired in parallel. The value of the combination is:
a. 45 picofarad
b. 18 picofarad
c. 12 picofarad
d. 5 picofarad
==========
7. Capacitors and inductors oppose an alternating current. This is known as:
a. resistance
b. resonance
c. conductance
d. reactance
==========
8. The reactance of a capacitor increases as the:
a. frequency increases
b. frequency decreases
c. applied voltage increases
d. applied voltage decreases
==========
9. The reactance of an inductor increases as the:
a. frequency increases
b. frequency decreases
c. applied voltage increases
d. applied voltage decreases
==========
10. Increasing the number of turns on an inductor will make its inductance:
a. decrease
b. increase
c. remain unchanged
d. become resistive
==========
11. The unit of inductance is the:
a. farad
b. henry
c. ohm
d. reactance
==========

12. Two 20 uH inductances are connected in series. The total inductance is:
a. 10 uH
b. 20 uH
c. 40 uH
d. 80 uH
==========

13. Two 20 uH inductances are connected in parallel. The total inductance is:
a. 10 uH
b. 20 uH
c. 40 uH
d. 80 uH
==========

14. A toroidal inductor is one in which the:
a. windings are wound on a closed ring of magnetic material
b. windings are air-spaced
c. windings are wound on a ferrite rod
d. inductor is enclosed in a magnetic shield
==========

15. A transformer with 100 turns on the primary winding and 10 turns on the secondary winding is connected to 230 volt AC mains. The voltage across the secondary is:
a. 10 volt
b. 23 volt
c. 110 volt
d. 2300 volt
==========

16. An inductor and a capacitor are connected in series. At the resonant frequency the resulting impedance is:
a. maximum
b. minimum
c. totally reactive
d. totally inductive
==========

17. An inductor and a capacitor are connected in parallel. At the resonant frequency the resulting impedance is:
a. maximum
b. minimum
c. totally reactive
d. totally inductive
==========

18. 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 half
d. decrease to one quarter
==========

19. 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 four
b. increase by a factor of two
c. decrease by a factor of two
d. decrease by a factor of four
==========

20. A "high Q" resonant circuit is one which:
a. carries a high quiescent current
b. is highly selective
c. has a wide bandwidth
d. uses a high value inductance
==========

**Question File: 10. Safety: (1 question)**

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

2. For your safety, before checking a fault in a mains operated power supply unit, first:
a. short the leads of the filter capacitor
b. turn off the power and remove the power plug
c. check the action of the capacitor bleeder resistance
d. remove and check the fuse in the power supply
==========

3. Wires carrying high voltages in a transmitter should be well insulated to avoid:
a. short circuits
b. overheating
c. over modulation
d. SWR effects
==========

4. 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 phase and neutral currents are not equal
c. removes power to the circuit when the current in the phase wire equals the current in the earth wire
d. limits the power provided to the circuit
==========

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

6. 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 chassis from becoming live in case of an internal short to the chassis
c. prevent the plug from being reversed in the wall outlet
d. prevent short circuits
==========

7. The correct colour coding for the phase wire in a flexible mains lead is:
a. brown
b. blue
c. yellow and green
d. white
==========

8. The correct colour coding for the neutral wire in a flexible mains lead is:
a. brown
b. blue
c. yellow and green
d. white
==========
9. The correct colour coding for the earth wire in a flexible mains lead is:
a. brown
b. blue
c. yellow and green
d. white
==========
10. 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 either output lead and ground
c. ensure that no voltage is developed between the output leads
d. step down the mains voltage to a safe value
==========

**Question File: 11. Semiconductors: (2 questions)**

1. The basic semiconductor amplifying device is a:
a. diode
b. transistor
c. pn-junction
d. silicon gate
==========
2. Zener diodes are normally used as:
a. RF detectors
b. AF detectors
c. current regulators
d. voltage regulators
==========
3. The voltage drop across a germanium signal diode when conducting is about:
a. 0.3V
b. 0.6V
c. 0.7V
d. 1.3V
==========
4. A bipolar transistor has three terminals named:
a. base, emitter and drain
b. collector, base and source
c. emitter, base and collector
d. drain, source and gate
==========
5. The three leads from a PNP transistor are named the:
a. collector, source, drain
b. gate, source, drain
c. drain, base, source
d. collector, emitter, base
==========
6. 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. amplification
b. detection
c. modulation
d. rectification
==========
7. The type of rectifier diode in almost exclusive use in power supplies is:
a. lithium
b. germanium
c. silicon
d. copper-oxide
==========
8. One important application for diodes is recovering information from transmitted signals. This is referred to as:
a. biasing
b. rejuvenation
c. ionisation
d. demodulation
==========
9. In a forward biased pn junction, the electrons:
a. flow from p to n
b. flow from n to p
c. remain in the n region
d. remain in the p region
==========
10. The following material is considered to be a semiconductor:
a. copper
b. sulphur
c. silicon
d. tantalum
==========
11. A varactor diode acts like a variable:
a. resistor
b. voltage regulator
c. capacitor
d. inductor
==========
12. A semiconductor is said to be doped when small quantities of the following are added:
a. electrons
b. protons
c. ions
d. impurities
==========
13. The connections to a semiconductor diode are known as:
a. cathode and drain
b. anode and cathode
c. gate and source
d. collector and base
==========
14. Bipolar transistors usually have:
a. 4 connecting leads
b. 3 connecting leads
c. 2 connecting leads
d. 1 connecting lead
==========
15. A semiconductor is described as a "general purpose audio NPN device". This is a:
a. triode
b. silicon diode
c. bipolar transistor
d. field effect transistor
==========

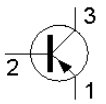
16. Two basic types of bipolar transistors are:
a. p-channel and n-channel types
b. NPN and PNP types
c. diode and triode types
d. varicap and zener types
==========
17. A transistor can be destroyed in a circuit by:
a. excessive light
b. excessive heat
c. saturation
d. cut-off
==========
18. To bias a transistor to cut-off, the base must be:
a. at the collector potential
b. at the emitter potential
c. mid-way between collector and emitter potentials
d. mid-way between the collector and the supply potentials
==========
19. Two basic types of field effect transistors are:
a. n-channel and p-channel
b. NPN and PNP
c. germanium and silicon
d. inductive and capacitive
==========
20. A semiconductor 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
==========

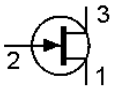
**Question File: 12. Device recognition: (1 question)**

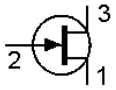
1. In the figure shown, 2 represents the:

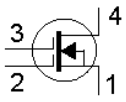

a. collector of a pnp transistor
b. emitter of an npn transistor
c. base of an npn transistor
d. source of a junction FET
==========
2. In the figure shown, 3 represents the:

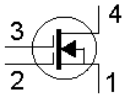

a. drain of a junction FET
b. collector of an npn transistor
c. emitter of a pnp transistor
d. base of an npn transistor
==========
3. In the figure shown, 2 represents the:

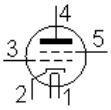

a. base of a pnp transistor
b. drain of a junction FET
c. gate of a junction FET
d. emitter of a pnp transistor
==========
4. In the figure shown, 1 represents the:


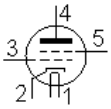
a. collector of a pnp transistor
b. gate of a junction FET
c. source of a MOSFET
d. emitter of a pnp transistor
==========
5. In the figure shown, 2 represents the:


a. drain of a p-channel junction FET
b. collector of an npn transistor
c. gate of an n-channel junction FET
d. base of a pnp transistor
==========
6. In the figure shown, 3 represents the:


a. source of an n-channel junction FET
b. gate of a p-channel junction FET
c. emitter of a pnp transistor
d. drain of an n-channel junction FET
==========
7. In the figure shown, 2 represents the:


a. gate of a MOSFET
b. base of a dual bipolar transistor
c. anode of a silicon controlled rectifier
d. cathode of a dual diode
==========
8. The figure shown represents a:


a. dual bipolar transistor
b. dual diode
c. dual varactor diode
d. dual gate MOSFET
==========
9. In the figure shown, 3 represents the:


a. filament of a tetrode
b. anode of a triode
c. grid of a tetrode
d. screen grid of a pentode
==========
10. In the figure shown, 5 represents the:


a. grid of a tetrode
b. screen grid of a tetrode
c. heater of a pentode
d. grid of a triode
==========

**Question File: 13. Meters and Measuring: (1 question)**

1. 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
==========
2. A VSWR meter switched to the "reverse" position provides an indication of:
a. power output in watts
b. relative reflected voltage
c. relative forward voltage
d. reflected power in dB
==========
3. The correct instrument for measuring the supply current to an amplifier is a:
a. wattmeter
b. voltmeter
c. ammeter
d. ohmmeter
==========
4. 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. a DC ammeter
d. an electrostatic voltmeter
==========

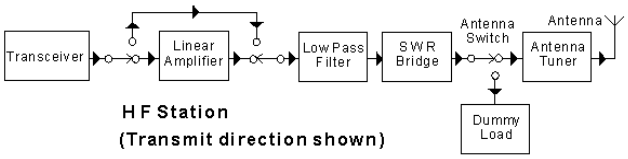
5. When measuring the current drawn by a light bulb from a DC supply, the meter will act in circuit as:
a. an insulator
b. a low value resistance
c. a perfect conductor
d. an extra current drain
==========
6. When measuring the current drawn by a receiver from a power supply, the current meter should 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 both receiver power leads
d. in series with one of the receiver power leads
==========
7. An ammeter should not be connected directly across the terminals of a 12 volt car battery because:
a. the resulting high current will probably destroy the ammeter
b. no current will flow because no other components are in the circuit
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
==========
8. 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. a very low internal resistance
d. an infinite resistance
==========
9. 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
==========
10. 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
==========

**Question File: 14. Decibels, Amplification and Attenuation: (1 question)**

1. The input to an amplifier is 1 volt rms and the output 10 volt rms. This is an increase of:
a. 3 dB
b. 6 dB
c. 10 dB
d. 20 dB
==========
2. The input to an amplifier is 1 volt rms and output 100 volt rms. This is an increase of:
a. 10 dB
b. 20 dB
c. 40 dB
d. 100 dB
==========
3. An amplifier has a gain of 40 dB. The ratio of the rms output voltage to the rms input voltage is:
a. 20
b. 40
c. 100
d. 400
==========
4. 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. 40
d. 100
==========
5. 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 voltage attenuation of the network is:
a. 3 dB
b. 6 dB
c. 50 dB
d. 100 dB
==========
6. 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. 20 dB
d. 40 dB
==========
7. 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
==========
8. 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
==========
9. 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
==========
10. Each stage of a three-stage amplifier provides 5 dB gain. The total amplification is:
a. 10 dB
b. 15 dB
c. 25 dB
d. 125 dB
==========

**Question File: 15. HF Station Arrangement: (1 question)**

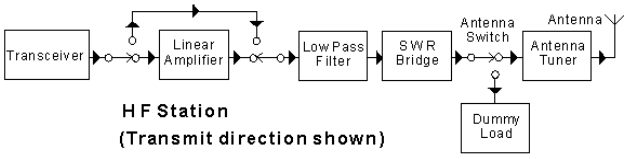
1. In the block diagram shown, the "linear amplifier" is:




a. an amplifier to remove distortion in signals from the transceiver
b. an optional amplifier to be switched in when higher power is required
c. an amplifier with all components arranged in-line
d. a push-pull amplifier to cancel second harmonic distortion

==========

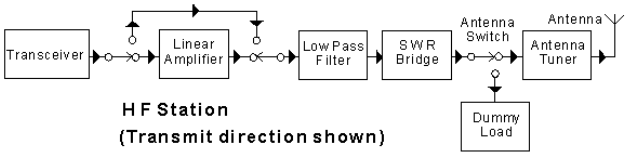
2. In the block diagram shown, the additional signal path above the "linear amplifier" block indicates that:




a. some power is passed around the linear amplifier for stability
b. "feed-forward" correction is being used to increase linearity
c. the linear amplifier input and output terminals may be short-circuited
d. the linear amplifier may be optionally switched out of circuit to reduce output power

==========

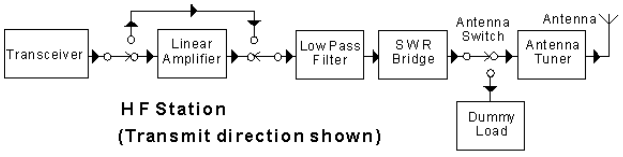
3. In the block diagram shown, the "low pass filter" must be rated to:




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

==========

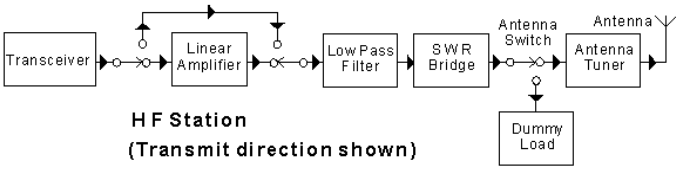
4. In the block diagram shown, the "SWR bridge" is a:




a. switched wave rectifier for monitoring power output
b. static wave reducer to minimize static electricity from the antenna
c. device to monitor the standing-wave-ratio on the antenna feedline
d. short wave rectifier to protect against lightning strikes

==========

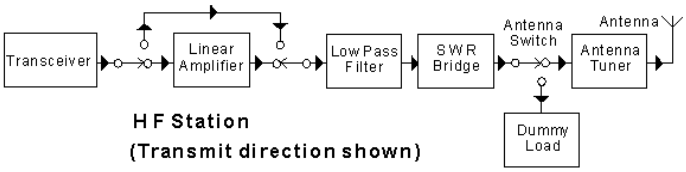
5. In the block diagram shown, the "antenna switch":




a. switches the transmitter output to the dummy load for tune-up purposes
b. switches the antenna from transmit to receive
c. switches the frequency of the antenna for operation on different bands
d. switches surplus output power from the antenna to the dummy load to avoid distortion.

==========

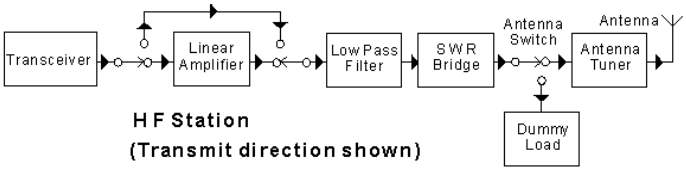
6. In the block diagram shown, the "antenna tuner":




a. adjusts the resonant frequency of the antenna to minimize harmonic radiation
b. adjusts the resonant frequency of the antenna to maximise power output
c. changes the standing-wave-ratio on the transmission line to the antenna
d. adjusts the impedance of the antenna system seen at the transceiver output

==========

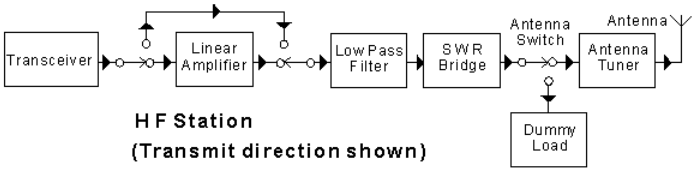
7. In the block diagram shown, the "dummy load" is:




a. used to allow adjustment of the transmitter without causing interference to others
b. a load used to absorb surplus power which is rejected by the antenna system
c. used to absorb high-voltage impulses caused by lightning strikes to the antenna
d. an additional load used to compensate for a badly-tuned antenna system

==========

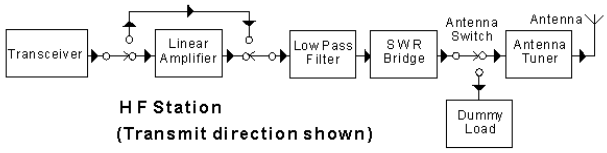
8. In the block diagram shown, the connection between the SWR bridge and the antenna switch is normally a:




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

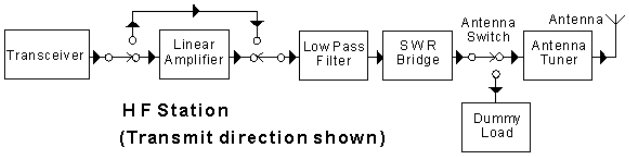
==========

9. In this block diagram, the block designated "antenna tuner" is not normally necessary when:




a. the antenna input impedance is 50 ohms
b. a half wave antenna is used, fed at one end
c. the antenna is very long compared to a wavelength
d. the antenna is very short compared to a wavelength
==========

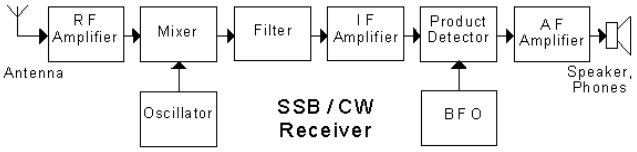
10. In the block diagram shown, the connection between the "antenna tuner" and the "antenna" could be made with:




a. three-wire mains power cable
b. heavy hook-up wire
c. 50 ohm coaxial cable
d. an iron-cored transformer
==========

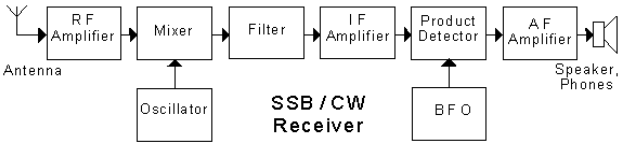
**Question File: 16. Receiver Block Diagrams: (2 questions)**

1. In the block diagram of the receiver shown, the "RF amplifier":



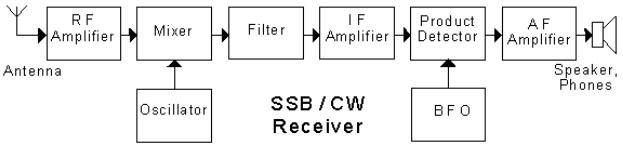

a. decreases random fluctuation noise
b. is a restoring filter amplifier
c. increases the incoming signal level
d. changes the signal frequency
==========

2. In the block diagram of the receiver shown, the "mixer":



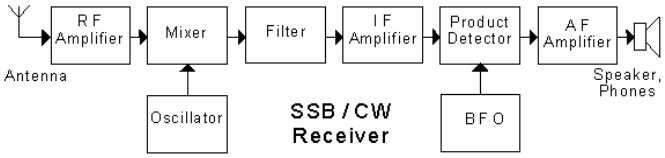

a. combines signals at two different frequencies to produce one at an intermediate frequency
b. combines sidebands to produce a stronger signal
c. discriminates against SSB and AM signals
d. inserts a carrier wave to produce a true FM signal
==========

3. In the block diagram of the receiver shown, the output frequency of the "oscillator" is:



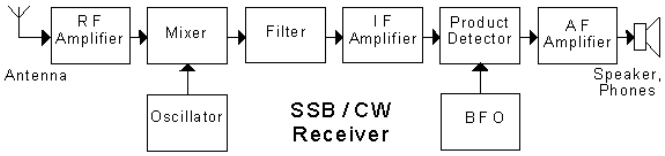

a. the same as that of the incoming received signal
b. the same as that of the IF frequency
c. different from both the incoming signal and IF frequencies
d. at a low audio frequency
==========

4. In the block diagram of the receiver shown, the "filter" rejects:



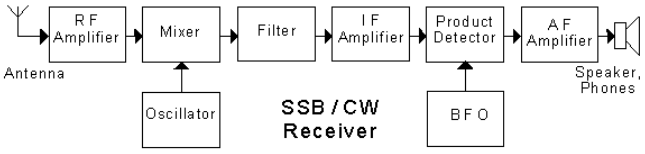

a. AM and RTTY signals
b. unwanted mixer outputs
c. noise bursts
d. broadcast band signals
==========

5. In the block diagram of the receiver shown, the "IF amplifier" is an:



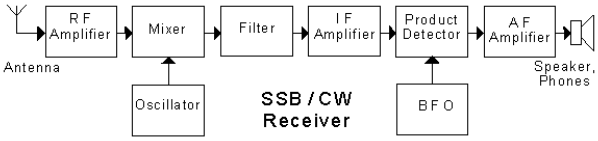

a. isolation frequency amplifier
b. intelligence frequency amplifier
c. indeterminate frequency amplifier
d. intermediate frequency amplifier
==========

6. In the block diagram of the receiver shown, the "product detector":



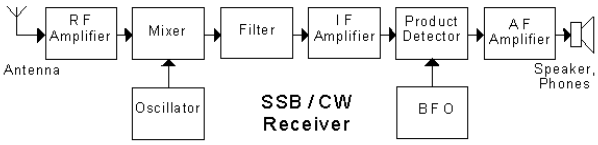

a. produces an 800 Hz beat note
b. separates CW and SSB signals
c. rejects AM signals
d. translates signals to audio frequencies
==========

7. In the block diagram of the receiver shown, the "AF amplifier":



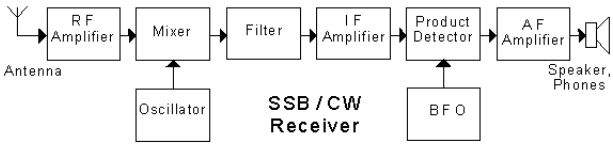

a. rejects AM and RTTY signals
b. amplifies audio frequency signals
c. has a very narrow passband
d. restores ambiance to the audio
==========

8. In the block diagram of the receiver shown, the "BFO" stands for:



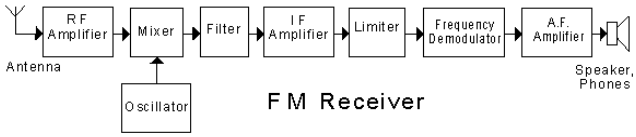

a. bad frequency obscurer
b. basic frequency oscillator
c. beat frequency oscillator
d. band filter oscillator
==========

9. In the block diagram of the receiver shown, most of the receiver gain is in the:



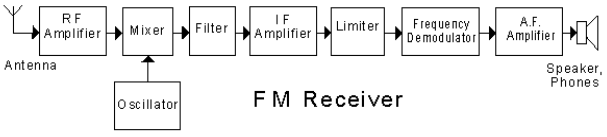

a. RF amplifier
b. IF amplifier
c. AF amplifier
d. mixer
==========

10. In the block diagram of the receiver shown, the "RF amplifier":



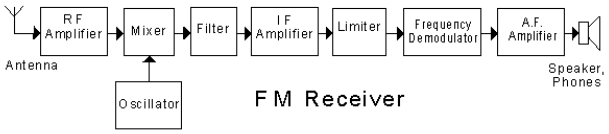

a. decreases random fluctuation noise
b. masks strong noise
c. should produce little internal noise
d. changes the signal frequency
==========

11. In the block diagram of the receiver shown, the "mixer":



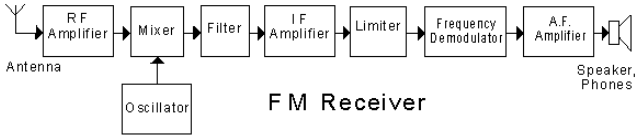

a. changes the signal frequency
b. rejects SSB and CW signals
c. protects against receiver overload
d. limits the noise on the signal
==========

12. In the receiver shown, when receiving a signal, the output frequency of the "oscillator" is:



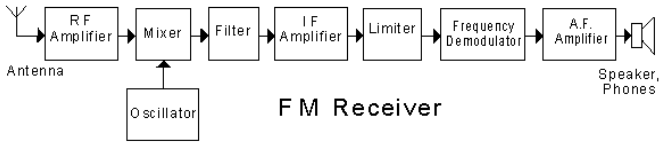

a. the same as that of the signal
b. the same as that of the IF amplifier
c. of constant amplitude and frequency
d. passed through the following filter
==========

13. In the block diagram of the receiver shown, the "limiter":



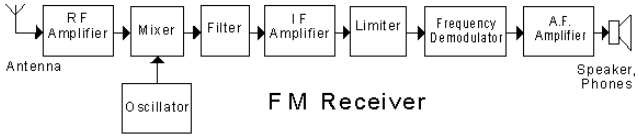

a. limits the signal to a constant amplitude
b. rejects SSB and CW signals
c. limits the frequency shift of the signal
d. limits the phase shift of the signal
==========

14. In the block diagram of the receiver shown, the "frequency demodulator" could be implemented with a:



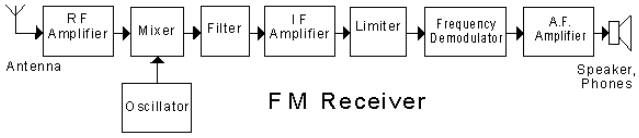

a. product detector
b. phase-locked loop
c. full-wave rectifier
d. low-pass filter
==========

15 In the block diagram of the receiver shown, the "AF amplifier":



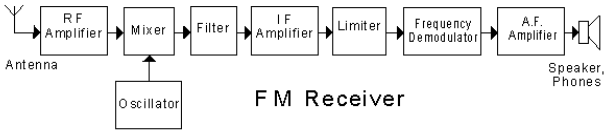

a. amplifies stereo signals
b. amplifies speech frequencies
c. is an all frequency amplifier
d. must be fitted with a tone control
==========

16. In this receiver, an audio frequency gain control would be associated with the block labelled:



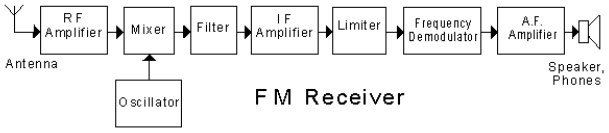

a. AF amplifier
b. frequency demodulator
c. speaker, phones
d. IF amplifier
==========

17. In the block diagram of the receiver shown, the selectivity would be set by the:



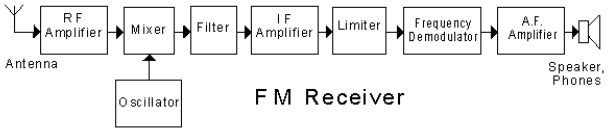

a. AF amplifier
b. mixer
c. limiter
d. filter
==========

18. In the FM communications receiver shown in the block diagram, the "filter" bandwidth is typically:



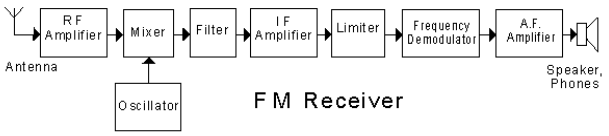

a. 3 kHz
b. 10 kHz
c. 64 kHz
d. 128 kHz
==========

19. In the block diagram of the receiver shown, an automatic gain control (AGC) circuit would be associated with the:




a. speaker
b. IF amplifier
c. RF filter
d. oscillator
==========

20. In the block diagram of the receiver shown, the waveform produced by the "oscillator" would ideally be a:




a. square wave
b. pulsed wave
c. sinewave
d. hybrid frequency wave
==========

**Question File: 17. Receiver Operation: (3 questions)**

1. The frequency stability of a receiver is its ability to:
a. stay tuned to the desired signal
b. track the incoming signal as it drifts
c. provide a frequency standard
d. provide a digital readout
==========

2. The sensitivity of a receiver specifies:
a. the bandwidth of the RF preamplifier
b. the stability of the oscillator
c. its ability to receive weak signals
d. its ability to reject strong signals
==========

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

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

5. 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
==========

6. The ability of a receiver to separate signals close in frequency is called its:
a. noise figure
b. sensitivity
c. bandwidth
d. selectivity
==========

7. A receiver with high selectivity has a:
a. wide bandwidth
b. wide tuning range
c. narrow bandwidth
d. narrow tuning range
==========

8. The BFO in a superhet receiver operates on a frequency nearest to that of its:
a. RF amplifier
b. audio amplifier
c. local oscillator
d. IF amplifier
==========

9. To receive Morse code signals, a BFO is employed in a superhet receiver to:
a. produce IF signals
b. beat with the local oscillator signal to produce sidebands
c. produce an audio tone to beat with the IF signal
d. beat with the IF signal to produce an audio tone
==========

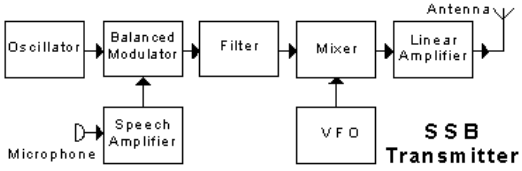
10. The following transmission mode is usually demodulated by a product detector:
a. pulse modulation
b. double sideband full carrier modulation
c. frequency modulation
d. single sideband suppressed carrier modulation
==========

11. A superhet receiver for SSB reception has an insertion oscillator to:
a. replace the suppressed carrier for detection
b. phase out the unwanted sideband signal
c. reduce the passband of the IF stages
d. beat with the received carrier to produce the other sideband
==========
12. 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
==========
13. 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. makes it possible to receive SSB signals
d. increases the sensitivity of the receiver
==========
14. 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 receiver sensitivity
c. improve the reception of different types of signal
d. increase the noise received
==========
15. The stage in a superhet receiver with a tuneable input and fixed tuned output is the:
a. RF amplifier
b. mixer stage
c. IF amplifier
d. local oscillator
==========
16. The mixer stage of a superhet receiver:
a. produces spurious signals
b. produces an intermediate frequency signal
c. acts as a buffer stage
d. demodulates SSB signals
==========
17. 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
==========
18. Selectivity in a superhet receiver is achieved primarily in the:
a. RF amplifier
b. Mixer
c. IF amplifier
d. Audio stage
==========
19. The abbreviation AGC means:
a. attenuating gain capacitor
b. automatic gain control
c. anode-grid capacitor
d. amplified grid conductance
==========
20. The AGC circuit in a receiver usually controls the:
a. audio stage
b. mixer stage
c. power supply
d. RF and IF stages
==========
21. The tuning control of a superhet receiver changes the tuned frequency of the:
a. audio amplifier
b. IF amplifier
c. local oscillator
d. post-detector amplifier
==========
22. A superhet receiver, with an IF at 500 kHz, is receiving a 14 MHz signal. The local oscillator frequency is:
a. 14.5 MHz
b. 19 MHz
c. 500 kHz
d. 28 MHz
==========
23. An audio amplifier in an AM receiver is necessary in a receiver because:
a. signals leaving the detector are weak
b. the carrier frequency must be replaced
c. the signal requires demodulation
d. RF signals are not heard by the human ear
==========
24. The audio output transformer in a receiver is required to:
a. step up the audio gain
b. protect the loudspeaker from high currents
c. improve the audio tone
d. match the output impedance of the audio amplifier to the speaker
==========
25. 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
==========
26. 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
==========
27. 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. 455 kHz
b. 3540 kHz
c. 3995 kHz
d. 7435 kHz
==========

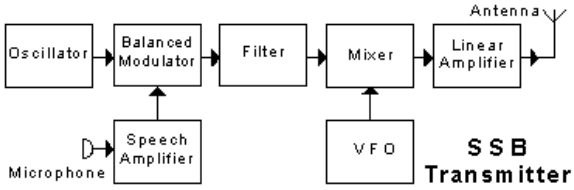
28. A double conversion receiver designed for SSB reception has a carrier insertion oscillator and:
a. one IF stage and one local oscillator
b. two IF stages and one local oscillator
c. two IF stages and two local oscillators
d. two IF stages and three local oscillators
==========
29. An advantage of a double conversion receiver is th
a. does not drift off frequency
b. produces a louder audio signal
c. has improved image rejection characteristics
d. is a more sensitive receiver
==========
30. 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
==========

**Question File: 18. Transmitter Block Diagrams questions)**

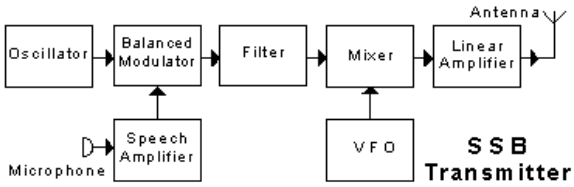
1. In the transmitter block diagram shown, the "oscillat



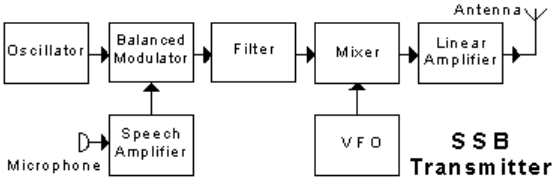

a. is variable in frequency
b. generates an audio frequency tone during tests
c. uses a crystal for good frequency stability
d. may have a calibrated dial
==========
2. In the transmitter block diagram shown, the "balanced modulator":



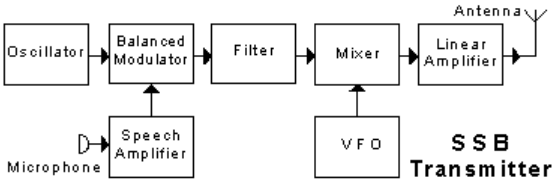

a. balances the high and low frequencies in the audio signa
b. performs double sideband suppressed carrier modulation
c. acts as a tone control
d. balances the standing wave ratio
==========
3. In the transmitter block diagram shown, the "filter":



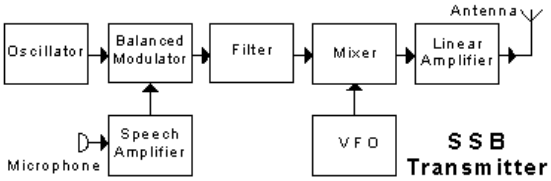

a. removes mains hum from the audio signal
b. suppresses unwanted harmonics of the RF signal
c. removes one sideband from the modulated signal
d. removes the carrier component from the modulated signal
==========
4. In the transmitter block diagram shown, the "mixer":



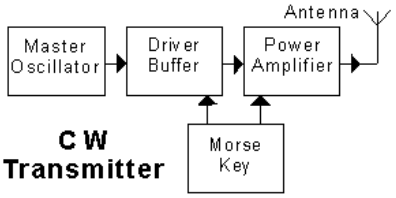

a. adds the correct proportion of carrier to the SSB signal
b. mixes the audio and RF signals in the correct proportions
c. translates the SSB signal to the required frequency
d. mixes the two sidebands in the correct proportions
==========
5. In the transmitter block diagram shown, the "linear amplifier":




a. has all components arranged in-line
b. amplifies the modulated signal with no distortion
c. aligns the two sidebands correctly
d. removes any unwanted amplitude modulation from the signal
==========
6. In the transmitter block diagram shown, the "VFO" is:

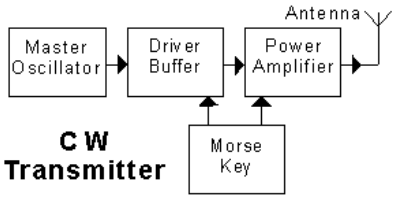



a. a voice frequency oscillator
b. a varactor fixed oscillator
c. a virtual faze oscillator
d. a variable frequency oscillator
==========
7. In the transmitter block diagram shown, the "master oscillator" produces:




a. a steady signal at the required carrier frequency
b. a pulsating signal at the required carrier frequency
c. a 800 Hz signal to modulate the carrier
d. a modulated CW signal
==========

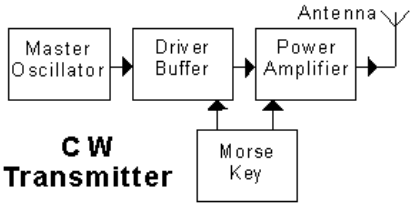
8. In the transmitter block diagram shown, the "driver buffer":




a. filters any sharp edges from the input signal
b. drives the power amplifier into saturation
c. provides isolation between the oscillator and power amplifier
d. changes the frequency of the master oscillator signal

==========

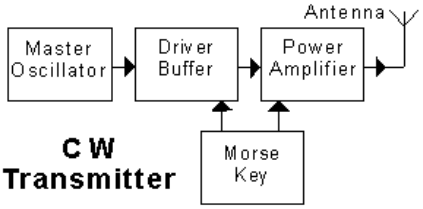
9. In the transmitter block diagram shown, the "Morse key'




a. turns the DC power to the transmitter on and off
b. allows the oscillator signal to pass only when the key is depressed
c. changes the frequency of the transmitted signal when the key is depressed
d. adds an 800 Hz audio tone to the signal when the key is depressed

==========

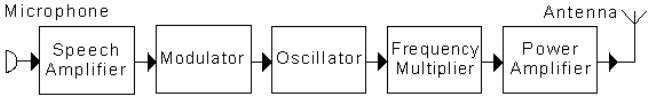
10. In the transmitter block diagram shown, the "power amplifier":




a. need not have linear characteristics
b. amplifies the bandwidth of its input signal
c. must be adjusted during key-up conditions
d. should be water-cooled

==========

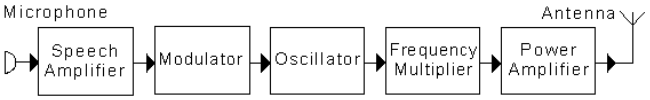
11. In the transmitter block diagram shown, the "speech amplifier":




a. amplifies the audio signal from the microphone
b. is a spectral equalization entropy changer
c. amplifies only speech, while discriminating against background noises
d. shifts the frequency spectrum of the audio signal into the RF region

==========

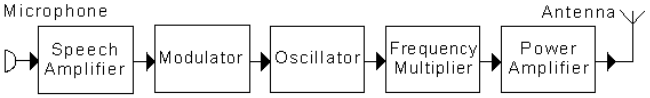
12. In the transmitter block diagram shown, the "modulator":




a. is an amplitude modulator with feedback
b. is an SSB modulator with feedback
c. causes the speech waveform to gate the oscillator on and off
d. causes the speech waveform to shift the frequency of the oscillator

==========

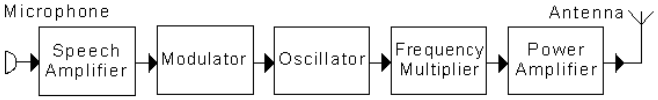
13. In the transmitter block diagram shown, the "oscillator" is:




a. an audio frequency oscillator
b. a variable frequency RF oscillator
c. a beat frequency oscillator
d. a variable frequency audio oscillator

==========

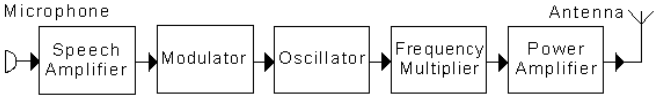
14. In the transmitter block diagram shown, the "frequency multiplier":




a. translates the frequency of the modulated signal into the RF spectrum
b. changes the frequency of the speech signal
c. produces a harmonic of the oscillator signal
d. multiplies the oscillator signal by the speech signal

==========

15. In the transmitter block diagram shown, the "power amplifier":




a. increases the voltage of the mains to drive the antenna
b. amplifies the audio frequency component of the signal
c. amplifies the selected sideband to a suitable level
d. amplifies the RF signal to a suitable level

==========

16. The signal from an amplitude modulated transmitter consists of:

a. a carrier and two sidebands
b. a carrier and one sideband
c. no carrier and two sidebands
d. no carrier and one sideband

==========

17. The signal from a frequency modulated transmitter has:
a. an amplitude which varies with the modulating waveform
b. a frequency which varies with the modulating waveform
c. a single sideband which follows the modulating waveform
d. no sideband structure
==========
18. The signal from a balanced modulator consists of:
a. a carrier and two sidebands
b. a carrier and one sideband
c. no carrier and two sidebands
d. no carrier and one sideband
==========
19. The signal from a CW transmitter consists of:
a. a continuous, unmodulated RF waveform
b. a continuous RF waveform modulated with an 800 Hz Morse signal
c. an RF waveform which is keyed on and off to form Morse characters
d. a continuous RF waveform which changes frequency in synchronism with an applied Morse signal
==========
20. The following signal can be amplified using a non-linear amplifier:
a. SSB
b. FM
c. AM
d. DSBSC
==========

**Question File: 19. Transmitter Theory: (1 question)**

1. Morse code is usually transmitted by radio as:
a. an interrupted carrier
b. a voice modulated carrier
c. a continuous carrier
d. a series of clicks
==========
2. To obtain high frequency stability in a transmitter, the VFO should be:
a. run from a non-regulated AC supply
b. in a plastic box
c. powered from a regulated DC supply
d. able to change frequency with temperature
==========
3. SSB transmissions:
a. occupy about twice the bandwidth of AM transmissions
b. contain more information than AM transmissions
c. occupy about half the bandwidth of AM transmissions
d. are compatible with FM transmissions
==========
4. The purpose of a balanced modulator in a SSB transmitter is to:
a. make sure that the carrier and both sidebands are in phase
b. make sure that the carrier and both sidebands are 180 degrees out of phase
c. ensure that the percentage of modulation is kept constant
d. suppress the carrier while producing two sidebands
==========
5. 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
==========
6. The driver stage of a transmitter is located:
a. before the power amplifier
b. between oscillator and buffer
c. with the frequency multiplier
d. after the output low-pass filter circuit
==========
7. The purpose of the final amplifier in a transmitter is to:
a. increase the frequency of a signal
b. isolate the multiplier and later stages
c. produce a stable radio frequency
d. increase the power fed to the antenna
==========
8. The difference between DC input power and RF power output of a transmitter RF amplifier:
a. radiates from the antenna
b. is dissipated as heat
c. is lost in the feedline
d. is due to oscillating current
==========
9. The process of modulation allows:
a. information to be impressed on to a carrier
b. information to be removed from a carrier
c. voice and Morse code to be combined
d. none of these
==========
10. The output power rating of a linear amplifier in a SSB transmitter is specified by the:
a. peak DC input power
b. mean AC input power
c. peak envelope power
d. unmodulated carrier power
==========

**Question File: 20. Harmonics and Parasitics: (2 questions)**

1. A harmonic of a signal transmitted at 3525 kHz would be expected to occur at:
a. 3573 kHz
b. 7050 kHz
c. 14025 kHz
d. 21050 kHz
==========
2. The third harmonic of 7 MHz is:
a. 10 MHz
b. 14 MHz
c. 21 MHz
d. 28 MHz
==========
3. The fifth harmonic of 7 MHz is:
a. 12 MHz
b. 19 MHz
c. 28 MHz
d. 35 MHz
==========

4. Excessive harmonic output may be produced in a transmitter by:
a. a linear amplifier
b. a low SWR
c. resonant circuits
d. overdriven amplifier stages
==========
5. Harmonics may be produced in the RF power amplifier of a transmitter if:
a. the modulation level is too low
b. the modulation level is too high
c. the oscillator frequency is unstable
d. modulation is applied to more than one stage
==========
6. 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 FET power amplifiers
c. using tuned circuit coupling between stages
d. using larger value coupling capacitors
==========
7. 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
==========
8. Harmonic frequencies are:
a. always lower in frequency than the fundamental frequency
b. at multiples of the fundamental frequency
c. any unwanted frequency above the fundamental frequency
d. any frequency causing TVI
==========
9. 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
==========
10. To minimise the radiation of one particular harmonic, one can use a:
a. wave trap in the transmitter output
b. resistor
c. high pass filter in the transmitter output
d. filter in the receiver lead
==========
11. A low-pass filter is used in the antenna lead from a transmitter:
a. to reduce key clicks developed in a CW transmitter
b. to increase harmonic radiation
c. to eliminate chirp in CW transmissions
d. to reduce radiation of harmonics
==========
12. The following is installed in the transmission line as close as possible to a HF transmitter to reduce harmonic output:
a. a middle-pass filter
b. a low-pass filter
c. a high-pass filter
d. a band-reject filter
==========
13. A low pass filter will:
a. suppress sub-harmonics
b. reduce harmonics
c. always eliminate interference
d. improve harmonic radiation
==========
14. A spurious transmission from a transmitter is:
a. an unwanted emission unrelated to the output signal frequency
b. an unwanted emission that is harmonically related to the modulating audio frequency
c. generated at 50 Hz
d. the main part of the modulated carrier
==========
15. A parasitic oscillation:
a. is an unwanted signal developed in a transmitter
b. is generated by parasitic elements of a Yagi beam
c. does not cause any radio interference
d. is produced in a transmitter oscillator stage
==========
16. Parasitic oscillations in a RF power amplifier can be suppressed by:
a. pulsing the supply voltage
b. placing suitable chokes, ferrite beads or resistors within the amplifier
c. screening all input leads
d. using split-stator tuning capacitors
==========
17. 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 frequencies only
d. at high or low frequencies
==========
18. Transmitter power amplifiers can generate parasitic oscillations on:
a. the transmitter's output frequency
b. harmonics of the transmitter's output frequency
c. frequencies unrelated to the transmitter's output frequency
d. VHF frequencies only
==========
19. Parasitic oscillations tend to occur in:
a. high voltage rectifiers
b. high gain amplifier stages
c. antenna matching circuits
d. SWR bridges
==========
20. Parasitic oscillations can cause interference. They are:
a. always the same frequency as the mains supply
b. always twice the operating frequency
c. not related to the operating frequency
d. three times the operating frequency
==========

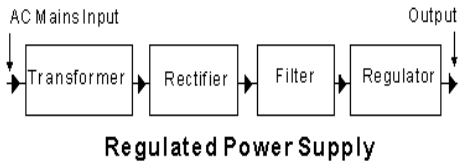
**Question File: 21. Power supplies: (1 question):**

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

2. The following unit in a DC power supply performs a rectifying operation:
a. an electrolytic capacitor
b. a fuse
c. a crowbar
d. a full-wave diode bridge
==========
3. The following unit in a DC power supply performs a smoothing operation:
a. an electrolytic capacitor
b. a fuse
c. a crowbar
d. a full-wave diode bridge
==========
4. 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.
==========
5. A fullwave DC power supply operates from the New Zealand AC mains. The ripple frequency is:
a. 25 Hz
b. 50 Hz
c. 70 Hz
d. 100 Hz
==========
6. The capacitor value best suited for smoothing the out of a 12 volt 1 amp DC power supply is:
a. 100 pF
b. 10 nF
c. 100 nF
d. 10,000 uF
==========
7. The following should always be included as a standard protection device in any power supply:
a. a saturating transformer
b. a fuse in the mains lead
c. a zener diode bridge limiter
d. a fuse in the filter capacitor negative lead
==========
8. A halfwave DC power supply operates from the New Zealand AC mains. The ripple frequency will be:
a. 25 Hz
b. 50 Hz
c. 70 Hz
d. 100 Hz
==========
9. 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.
==========
10. Electrolytic capacitors are used in power supplies because:
a. they are tuned to operate at 50 Hz
b. they have very low losses compared to other types
c. they radiate less RF noise than other types
d. they can be obtained in larger values than other types
==========

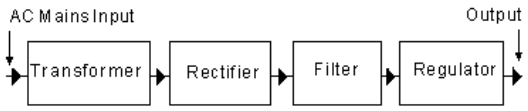
**Question File: 22. Regulated Power supplies: (1 question):**

1. The block marked 'Filter' in the diagram is to:



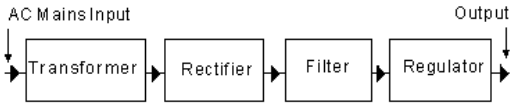
Regulated Power Supply

a. filter RF radiation from the output of the power supply
b. smooth the rectified waveform from the rectifier
c. act as a 50 Hz tuned circuit
d. restore voltage variations
==========
2. The block marked 'Regulator' in the diagram is to:



Regulated Power Supply

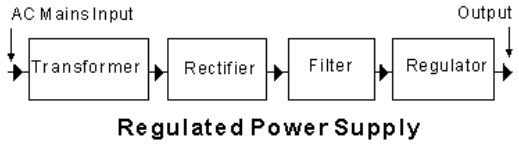
a. regulate the incoming mains voltage to a constant value
b. ensure that the output voltage never exceeds a dangerous value
c. keep the incoming frequency constant at 50 Hz
d. keep the output voltage at a constant value
==========
3. The block marked 'Transformer' in the diagram is to:



Regulated Power Supply

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
==========

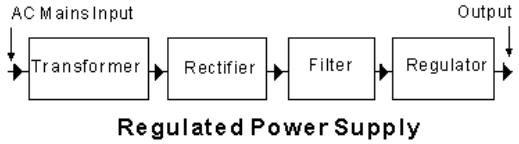
4. The block marked 'Rectifier' in the diagram is to:




a. turn the AC voltage from the transformer into a fluctuating DC voltage
b. rectify any waveform errors introduced by the transformer
c. turn the sinewave output of the rectifier into a square wave
d. smooth the DC waveform

==========

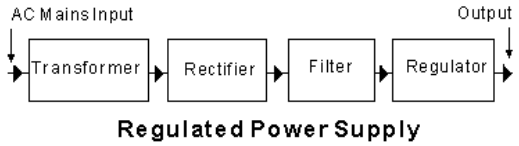
5. The block marked 'Regulator' in the diagram could consist of:




a. four silicon power diodes in a regulator configuration
b. two silicon power diodes and a centre-tapped transformer
c. a three-terminal regulator chip
d. a single silicon power diode connected as a half-wave rectifier

==========

6. In the block marked regulator below, a diode may be placed reverse across the regulator. Its job is to:




a. Block negative voltages from appearing at the output
b. Blow a fuse if high voltages occur at the output
c. Blow a fuse if negative currents occur at the output
d. Bypass the regulator if higher voltages occur on the output of the regulator compared with the input

==========

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

==========

8. In a regulated power supply, the 'crowbar' is a:
a. means to lever up the output voltage
b. circuit for testing mains fuses
c. last-ditch protection against failure of the regulator in the supply
d. convenient means to move such a heavy supply unit

==========

9. In a regulated power supply, 'current limiting' is sometimes used to:
a. prevent transformer core saturation
b. protect the mains fuse
c. minimise short-circuit current passing through the regulator
d. eliminate earth-leakage effects

==========

10. The purpose of a series pass transistor in a regulated power supply is to:
a. suppress voltage spikes across the transformer secondary winding
b. work as a surge multiplier to speed up regulation
c. amplify output voltage errors to assist regulation
d. allow for a higher current to be supplied than the regulator would otherwise allow

==========

**Question File: 23. General Operating Procedures: (1 question)**

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

==========

2. The following phonetic code is correct for the callsign "ZL1AN":
a. zanzibar london one america norway
b. zulu lima one alpha november
c. zulu lima one able nancy
d. zulu lima one able niner

==========

3. The accepted way to call "CQ" with a SSB transceiver is:
a. "CQ CQ CQ this is ZL1XXX ZL1XXX ZL1XXX"
b. "This is ZL1XXX calling CQ CQ CQ"
c. "CQ to anyone, CQ to anyone, I am ZL1XXX"
d. "CQ CQ CQ CQ CQ this is New Zealand"

==========

4. A signal report of "5 and 1" indicates:
a. very low intelligibility but good signal strength
b. perfect intelligibility but very low signal strength
c. perfect intelligibility, high signal strength
d. medium intelligibilty and signal strength

==========

5. The correct phonetic code for the callsign VK5ZX is:
a. victor kilowatt five zulu xray
b. victor kilo five zulu xray
c. victor kilo five zanzibar xray
d. victoria kilo five zulu xray

==========

6. The accepted way to announce that you are listening to a VHF repeater is:
a. "hello 6695, this is ZL2ZZZ listening"
b. "calling 6695, 6695, 6695 from ZL2ZZZ"
c. "6695 from ZL2ZZZ"
d. "ZL2ZZZ listening on 6695"

==========

7. A rare DX station calling CQ on CW and repeating "up 2" at the end of the call means the station:
a. will be listening for replies 2 kHz higher in frequency
b. will reply only to stations sending at greater than 20 wpm
c. is about to shift his calling frequency 2 kHz higher
d. will wait more than 2 seconds before replying to his call
==========
8. When conversing via a VHF or UHF repeater you should pause between overs for about:
a. half a second
b. 3 seconds
c. 30 seconds
d. several minutes
==========
9. Before calling CQ on the HF bands, you should:
a. listen first, then ask if the frequency is in use
b. request that other operators clear the frequency
c. request a signal report from any station listening
d. use a frequency where many stations are already calling
==========
10. 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.
==========

**Question File: 24. Practical Operating Knowledge: (2 questions)**

1. 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 signal does not have enough strength to operate the repeater
c. your voice is too low-pitched to be understood
d. you are not speaking loudly enough
==========
2. A "pileup" is:
a. an old, worn-out radio
b. another name for a junkbox
c. a large group of stations all calling the same DX station
d. a type of selenium rectifier
==========
3. "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
==========
4. A repeater operating with a "positive 600 kHz split":
a. listens on a frequency 600 kHz higher than its designated frequency
b. transmits 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
==========
5. The standard frequency offset (split) for 2 metre repeaters in New Zealand is:
a. plus 600 kHz above 147 MHz, minus 600 kHz on or below 147 MHz
b. plus 600 kHz below 147 MHz, minus 600 kHz on or above 147 MHz
c. minus 5 MHz below 147 MHz, plus 5 MHz kHz on or above 147 MHz
d. plus 5 MHz below 147 MHz, minus 5 MHz kHz on or above 147 MHz
==========
6. The standard frequency offset (split) for 70 cm repeaters in New Zealand is plus or minus:
a. 600 kHz
b. 1 MHz
c. 2 MHZ
d. 5 MHz
==========
7. 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
==========
8. The "squelch" or "muting" circuitry on a VHF receiver:
a. inhibits the audio output unless a station is being received
b. compresses incoming voice signals to make them more intelligible
c. reduces audio burst noise due to lightning emissions
d. reduces the noise on incoming signals
==========
9. 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
==========
10. The "National System" is:
a. the legal licensing standard of Amateur operation in New Zealand
b. a series of nationwide amateur radio linked repeaters in the 70 cm band
c. the official New Zealand repeater band plan
d. A nationwide emergency communications procedure
==========
11. 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.
==========
12. The purpose of a VOX unit in a transceiver is to:
a. change from receiving to transmitting using the sound of the operator's voice
b. check the transmitting frequency using the voice operated crystal
c. enable a volume operated extension speaker for remote listening
d. enable the variable oscillator crystal
==========

13. "VOX" stands for:
a. volume operated extension speaker
b. voice operated transmit
c. variable oscillator transmitter
d. voice operated expander
==========
14. "RIT" stands for:
a. receiver interference transmuter
b. range independent transmission
c. receiver incremental tuning
d. random interference tester
==========
15. 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 transmitting and receiver frequencies by the same amount
d. changes the frequency of the receiver section without affecting the frequency of the transmitter section
==========
16. The "split frequency" function on a transceiver allows the operator to:
a. transmit on one frequency and receive on another
b. monitor two frequencies simultaneously using a single loudspeaker
c. monitor two frequencies simultaneously using two loudspeakers
d. receive CW and SSB signals simultaneously on the same frequency
==========
17. The term "ALC" stands for:
a. audio limiter control
b. automatic level control
c. automatic loudness control
d. automatic listening control
==========
18. The AGC circuit is to:
a. expand the audio gain
b. limit the extent of amplitude generation
c. minimise the adjustments needed to the receiver gain control knobs
d. amplitude limit the crystal oscillator output
==========
19. 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 receiver's "real" and "absolute" frequencies independently
d. vary the gain of the radio frequency and audio frequency amplifier stages independently
==========
20. The term "PTT" means:
a. push to talk
b. piezo-electric transducer transmitter
c. phase testing terminal
d. phased transmission transponder
==========

**Question File: 25. Q signals: (1 question)**

1. The signal "QRM" means:
a. your signals are fading
b. I am troubled by static
c. your transmission is being interfered with
d. is my transmission being interfered with?
==========
2. The signal "QRN" means:
a. I am busy
b. I am troubled by static
c. are you troubled by static?
d. I am being interfered with
==========
3. The "Q signal" requesting the other station to send slower is:
a. QRL
b. QRN
c. QRM
d. QRS
==========
4. The question "Who is calling me?" is asked by:
a. QRT?
b. QRM?
c. QRP?
d. QRZ?
==========
5. The "Q" signal "what is your location?" is:
a. QTH?
b. QTC?
c. QRL?
d. QRZ?
==========
6. The "Q" signal "are you busy?" is:
a. QRM?
b. QRL?
c. QRT?
d. QRZ?
==========
7. The "Q" signal "shall I decrease transmitter power?" is:
a. QRP?
b. QRZ?
c. QRN?
d. QRL?
==========
8. The "Q" signal "your signals are fading" is:
a. QSO
b. QSB
c. QSL
d. QRX
==========
9. The signal "QSY?" means:
a. shall I change to transmission on another frequency?
b. shall I increase transmitter power?
c. shall I relay to .... ?
d. is my signal fading?
==========
10. The "Q" signal which means "send faster" is:
a. QRP
b. QRQ
c. QRS
d. QRN
==========

**Question File: 26. Transmission lines: (2 questions)**

1. 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. terminating the line in its characteristic impedance
d. increasing the standing wave ratio above unity
==========

2. The characteristic impedance of a transmission line is determined by the:
a. length of the line
b. load placed on the line
c. physical dimensions and relative positions of the conductors
d. frequency at which the line is operated
==========

3. 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. 39 ohm
d. 52 ohm
==========

4. 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
==========

5. The designed output impedance of the antenna socket of most modern transmitters is nominally:
a. 25 ohm
b. 50 ohm
c. 75 ohm
d. 100 ohm
==========

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

7. A 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
==========

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

9. 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. excessive heat being produced in the transmitter output stage
d. loss of modulation in the transmitted signal
==========

10. 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
==========

11. Losses occurring on a transmission line between a transmitter and antenna result in:
a. less RF power being radiated
b. a SWR of 1:1
c. reflections occurring in the line
d. improved transfer of RF energy to the antenna
==========

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

13. 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. reduced transfer of RF energy to the antenna
d. lack of radiation from the transmission line
==========

14. 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. zero
b. 5 ohm
c. 150 ohm
d. infinite
==========

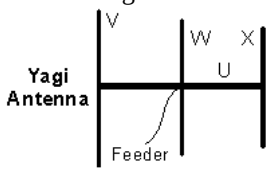
15. A switching system to use a single antenna for a separate transmitter and receiver should also:
a. disable the unit not being used
b. disconnect the antenna tuner
c. ground the antenna on receive
d. switch between power supplies
==========

16. An instrument to check whether RF power in the transmission line is transferred to the antenna is:
a. a standing wave ratio meter
b. an antenna tuner
c. a dummy load
d. a keying monitor
==========

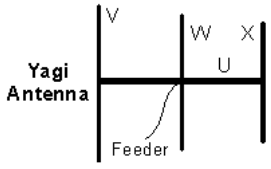
17. This type of transmission line will exhibit the lowest loss:
a. twisted flex
b. coaxial cable
c. open-wire feeder
d. mains cable
==========
18. The velocity factor of a coaxial cable with solid polythene dielectric is about:
a. 0.66
b. 0.1
c. 0.8
d. 1.0
==========
19. This commonly available antenna feedline can be buried directly in the ground for some distance without adverse effects:
a. 75 ohm twinlead
b. 300 ohm twinlead
c. 600 ohm open-wire
d. coaxial cable
==========
20. If an antenna feedline must pass near grounded metal objects, the following type should be used:
a. 75 ohm twinlead
b. 300 ohm twinlead
c. 600 ohm open-wire
d. coaxial cable
==========

**Question File: 27. Antennas: (4 questions)**

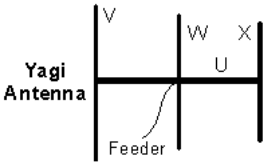
1. In this diagram the item U corresponds to the:



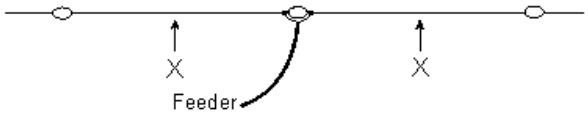

a. boom
b. reflector
c. driven element
d. director
==========
2. In this diagram the item V corresponds to the:



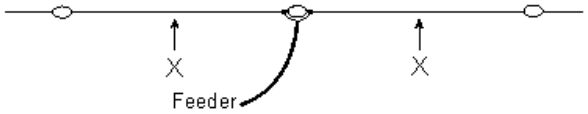

a. boom
b. reflector
c. driven element
d. director
==========
3. In this diagram the item X corresponds to the:



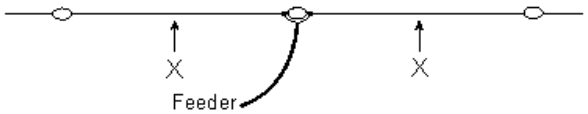

a. boom
b. reflector
c. director
d. driven element
==========
4. The antenna in this diagram has two equal lengths of wire shown as 'X' forming a dipole between insulators. The optimum operating frequency will be when the:




a. length X+X equals the signal wavelength
b. dimensions are changed with one leg doubled in length
c. length X+X is a little shorter than one-half of the signal wavelength
d. antenna has one end grounded
==========
5. The antenna in this diagram can be made to operate on several bands if the following item is installed at the points shown at 'X' in each wire:




a. a capacitor
b. an inductor
c. a fuse
d. a parallel-tuned trap
==========
6. The physical length of the antenna shown in this diagram can be shortened and the electrical length maintained, if one of the following items is added at the points shown at 'X' in each wire:




a. an inductor
b. a capacitor
c. an insulator
d. a resistor
==========
7. 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
==========

8. The wavelength for a frequency of 25 MHz is:
a. 15 metres
b. 32 metres
c. 4 metres
d. 12 metres
==========

9. Magnetic and electric fields about an antenna are:
a. parallel to each other
b. determined by the type of antenna used
c. perpendicular to each other
d. variable with the time of day
==========

10. Radio wave polarisation is defined by the orientation of the radiated:
a. magnetic field
b. electric field
c. inductive field
d. capacitive field
==========

11. A half wave dipole antenna is normally fed at the point of:
a. maximum voltage
b. maximum current
c. maximum resistance
d. resonance
==========

12. 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. time of the year
c. height of the antenna
d. mode of propagation
==========

13. An antenna which transmits equally well in all compass directions is a:
a. dipole with a reflector only
b. quarterwave grounded vertical
c. dipole with director only
d. half-wave horizontal dipole
==========

14. A groundplane antenna emits a:
a. horizontally polarised wave
b. elliptically polarised wave
c. axially polarised wave
d. vertically polarised wave
==========

15. The impedance at the feed point of a folded dipole antenna is approximately:
a. 300 ohm
b. 150 ohm
c. 200 ohm
d. 100 ohm
==========

16. 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
==========

17. 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
==========

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

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

20. A half-wave antenna resonant at 7100 kHz is approximately this long:
a. 20 metres
b. 40 metres
c. 80 metres
d. 160 metres
==========

21. An antenna with 20 metres of wire each side of a centre insulator will be resonant at approximately:
a. 3600 kHz
b. 3900 kHz
c. 7050 kHz
d. 7200 kHz
==========

22. A half wave antenna cut for 7 MHz can be used on this band without change:
a. 10 metre
b. 15 metre
c. 20 metre
d. 80 metre
==========

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

24. The resonant frequency of an antenna may be increased by:
a. shortening the radiating element
b. lengthening the radiating element
c. increasing the height of the radiating element
d. lowering the radiating element
==========

25. Insulators are used at the end of suspended antenna wires to:
a. increase the effective antenna length
b. limit the electrical length of the antenna
c. make the antenna look more attractive
d. prevent any loss of radio waves by the antenna
==========

26. 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
==========
27. A half-wave antenna is often called a:
a. bi-polar
b. Yagi
c. dipole
d. beam
==========
28. 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
==========
29. A transmitting antenna for 28 MHz for mounting on the roof of a car could be a:
a. vertical long wire
b. quarter wave vertical
c. horizontal dipole
d. full wave centre fed horizontal
==========
30. A vertical antenna which uses a flat conductive surface at its base is the:
a. vertical dipole
b. quarter wave ground plane
c. rhombic
d. long wire
==========
31. 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
==========
32. 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
==========
33. An antenna type commonly used on HF is the:
a. parabolic dish
b. cubical quad
c. 13-element Yagi
d. helical Yagi
==========
34. A Yagi antenna is said to have a power gain over a dipole antenna for the same frequency band because:
a. it radiates more power than a dipole
b. more powerful transmitters can use it
c. it concentrates the radiation in one direction
d. it can be used for more than one band
==========
35. The maximum radiation from a three element Yagi antenna is:
a. in the direction of the reflector end of the boom
b. in the direction of the director end of the boom
c. at right angles to the boom
d. parallel to the line of the coaxial feeder
==========
36. The reflector and director(s) in a Yagi antenna are called:
a. oscillators
b. tuning stubs
c. parasitic elements
d. matching units
==========
37. An isotropic antenna is a:
a. half wave reference dipole
b. infinitely long piece of wire
c. dummy load
d. hypothetical point source
==========
38. The main reason why many VHF base and mobile antennas in amateur use are 5/8 of a wavelength long is that:
a. it is easy to match the antenna to the transmitter
b. it is a convenient length on VHF
c. the angle of radiation is high giving excellent local coverage
d. most of the energy is radiated at a low angle
==========
39. A more important consideration when selecting an antenna for working stations at great distances is:
a. sunspot activity
b. angle of radiation
c. impedance
d. bandwidth
==========
40. 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 ionosphere can change the polarisation of the signal from moment to moment
b. the ground wave and the sky wave continually shift the polarisation
c. anomalies in the earth's magnetic field profoundly affect HF polarisation
d. improved selectivity in HF receivers makes changes in polarisation redundant
==========

**Question File: 28. Propagation: (5 questions)**

1. A 'skip zone' is:
a. the distance between the antenna and where the refracted wave first returns to earth
b. the distance between the far end of the ground wave and where the refracted wave first returns to earth
c. the distance between any two refracted waves
d. a zone caused by lost sky waves
==========

2. The medium which reflects high frequency radio waves back to the earth's surface is called the:
a. biosphere
b. stratosphere
c. ionosphere
d. troposphere
==========
3. The highest frequency that will be reflected back to the earth at any given time is known as the:
a. UHF
b. MUF
c. OWF
d. LUF
==========
4. All communications frequencies throughout the spectrum are affected in varying degrees by the:
a. atmospheric conditions
b. ionosphere
c. aurora borealis
d. sun
==========
5. Solar cycles have an average length of:
a. 1 year
b. 3 years
c. 6 years
d. 11 years
==========
6. The 'skywave' is another name for the:
a. ionospheric wave
b. tropospheric wave
c. ground wave
d. inverted wave
==========
7. The polarisation of an electromagnetic wave is defined by the direction of:
a. the H field
b. propagation
c. the E field
d. the receiving antenna
==========
8. That portion of HF radiation which is directly affected by the surface of the earth is called:
a. ionospheric wave
b. local field wave
c. ground wave
d. inverted wave
==========
9. Radio wave energy on frequencies below 4 MHz during daylight hours is almost completely absorbed by this ionospheric layer:
a. C
b. D
c. E
d. F
==========
10. Because of high absorption levels at frequencies below 4 MHz during daylight hours, only high angle signals are normally reflected back by this layer:
a. C
b. D
c. E
d. F
==========
11. Scattered patches of high ionisation developed seasonally at the height of one of the layers is called:
a. sporadic-E
b. patchy
c. random reflectors
d. trans-equatorial ionisation
==========
12. For long distance propagation, the radiation angle of energy from the antenna should be:
a. less than 30 degrees
b. more than 30 degrees but less than forty-five
c. more than 45 degrees but less than ninety
d. 90 degrees
==========
13. 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. straight line
d. bent path via the ionosphere
==========
14. 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. absorption
b. baffling
c. fading
d. skip
==========
15. The distance from the far end of the ground wave to the nearest point where the sky wave returns to the earth is called the:
a. skip distance
b. radiation distance
c. skip angle
d. skip zone
==========
16. High Frequency long-distance propagation is most dependent on:
a. ionospheric reflection
b. tropospheric reflection
c. ground reflection
d. inverted reflection
==========
17. The layer of the ionosphere mainly responsible for long distance communication is:
a. C
b. D
c. E
d. F
==========
18. The ionisation level of the ionosphere reaches its minimum:
a. just after sunset
b. just before sunrise
c. at noon
d. at midnight
==========

19. One of the ionospheric layers splits into two parts during the day called:
a. A & B
b. D1 & D2
c. E1 & E2
d. F1 & F2
==========
20. Signal fadeouts resulting from an 'ionospheric storm' or 'sudden ionospheric disturbance' are usually attributed to:
a. heating of the ionised layers
b. over-use of the signal path
c. insufficient transmitted power
d. solar flare activity
==========
21. The 80 metre band is useful for working:
a. in the summer at midday during high sunspot activity
b. long distance during daylight hours when absorption is not significant
c. all points on the earth's surface
d. up to several thousand kilometres in darkness but atmospheric and man-made noises tend to be high
==========
22. 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. only the angle of radiation from the antenna
d. both the height of the ionosphere and the angle of radiation from the antenna
==========
23. Three recognised layers of the ionosphere that affect radio propagation are:
a. A, E, F
b. B, D, E
c. C, E, F
d. D, E, F
==========
24. Propagation on 80 metres during the summer daylight hours is limited to relatively short distances because of
a. high absorption in the D layer
b. the disappearance of the E layer
c. poor refraction by the F layer
d. pollution in the T layer
==========
25. 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 distance
d. skip zone
==========
26. A variation in received signal strength caused by slowly changing differences in path lengths is called:
a. absorption
b. fading
c. fluctuation
d. path loss
==========
27. VHF and UHF bands are frequently used for satellite communication because:
a. waves at these frequencies travel to and from the satellite relatively unaffected by the ionosphere
b. the Doppler frequency change caused by satellite motion is much less than at HF
c. satellites move too fast for HF waves to follow
d. the Doppler effect would cause HF waves to be shifted into the VHF and UHF bands.
==========
28. The 'critical frequency' is defined as the:
a. highest frequency to which your transmitter can be tuned
b. lowest frequency which is reflected back to earth at vertical incidence
c. minimum usable frequency
d. highest frequency which will be reflected back to earth at vertical incidence
==========
29. 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
==========
30. The MUF for a given radio path is the:
a. mean of the maximum and minimum usable frequencies
b. maximum usable frequency
c. minimum usable frequency
d. mandatory usable frequency
==========
31. The position of the E layer in the ionosphere is:
a. above the F layer
b. below the F layer
c. below the D layer
d. sporadic
==========
32. 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. selective fading
c. a sudden ionospheric disturbance
d. front end overload
==========
33. Skip distance is a term associated with signals through the ionosphere. Skip effects are due to:
a. reflection and refraction from the ionosphere
b. selective fading of local signals
c. high gain antennas being used
d. local cloud cover
==========
34. The type of atmospheric layers which will best return signals to earth are:
a. oxidised layers
b. heavy cloud layers
c. ionised layers
d. sun spot layers
==========

35. The ionosphere:
a. is a magnetised belt around the earth
b. consists of magnetised particles around the earth
c. is formed from layers of ionised gases around the earth
d. is a spherical belt of solar radiation around the earth
==========
36. 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
==========
37. If the height of the reflecting layer of the ionosphere increases, the skip distance of a high frequency transmission:
a. stays the same
b. decreases
c. varies regularly
d. becomes greater
==========
38. If the frequency of a transmitted signal is so high that we no longer receive a reflection from the ionosphere, the signal frequency is above the:
a. speed of light
b. sun spot frequency
c. skip distance
d. maximum usable frequency
==========
39. A 'line of sight' transmission between two stations uses mainly the:
a. ionosphere
b. troposphere
c. sky wave
d. ground wave
==========
40. The distance travelled by ground waves in air:
a. is the same for all frequencies
b. is less at higher frequencies
c. is more at higher frequencies
d. depends on the maximum usable frequency
==========
41. The radio wave from the transmitter to the ionosphere and back to earth is correctly known as the:
a. sky wave
b. skip wave
c. surface wave
d. F layer
==========
42. Reception of high frequency radio waves beyond 4000 km normally occurs by the:
a. ground wave
b. skip wave
c. surface wave
d. sky wave
==========
43. A 28 MHz radio signal is more likely to be heard over great distances:
a. if the transmitter power is reduced
b. during daylight hours
c. only during the night
d. at full moon
==========
44. The number of high frequency bands open to long distance communication at any time depends on:
a. the highest frequency at which ionospheric reflection can occur
b. the number of frequencies the receiver can tune
c. the power being radiated by the transmitting station
d. the height of the transmitting antenna
==========
45. Regular changes in the ionosphere occur approximately every 11:
a. days
b. months
c. years
d. centuries
==========
46. When a HF transmitted radio signal reaches a receiver, small changes in the ionosphere can cause:
a. consistently stronger signals
b. a change in the ground wave signal
c. variations in signal strength
d. consistently weaker signals
==========
47. The usual effect of ionospheric storms is to:
a. increase the maximum usable frequency
b. cause a fade-out of sky-wave signals
c. produce extreme weather changes
d. prevent communications by ground wave
==========
48. Changes in received signal strength when sky wave propagation is used are called:
a. ground wave losses
b. modulation losses
c. fading
d. sunspots
==========
49. Although high frequency signals may be received from a distant station by a sky wave at a certain time, it may not be possible to hear them an hour later. This may be due to:
a. changes in the ionosphere
b. shading of the earth by clouds
c. changes in atmospheric temperature
d. absorption of the ground wave signal
==========
50. 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
==========

**Question File: 29. Interference & filtering: (3 questions)**

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

2. 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. a remote radar station
c. radiation from a nearby TV line oscillator
d. none of these
==========

3. Narrow-band interference can be caused by:
a. transmitter harmonics
b. a neon sign
c. a shaver motor
d. lightning flashes
==========

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

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

6. 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. write a letter to the MBIE
c. make sure that there is no interference on your own domestic equipment
d. ignore all complaints and take no action
==========

7. 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
==========

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

9. When someone in the neighbourhood complains of TVI it is wise to:
a. deny all responsibility
b. immediately blame the other equipment
c. inform all the other neighbours
d. check your log to see if it coincides with your transmissions
==========

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

11. When the signal from a transmitter overloads the audio stages of a broadcast receiver, the transmitted signal:
a. can be heard irrespective of where the receiver is tuned
b. appears only when a broadcast station is received
c. is distorted on voice peaks
d. appears on only one frequency
==========

12. Cross-modulation of a broadcast receiver by a nearby transmitter would be noticed in the receiver as:
a. a lack of signals being received
b. the undesired signal in the background of the desired signal
c. interference only when a broadcast signal is received
d. distortion on transmitted voice peaks
==========

13. Unwanted signals from a radio transmitter which cause harmful interference to other users are known as:
a. rectified signals
b. re-radiation signals
c. reflected signals
d. harmonic and other spurious signals
==========

14. 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
==========

15. 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. high-pass filter
d. band reject filter
==========

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

17. 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
==========

18. A band-stop filter will:
a. pass frequencies each side of a band
b. stop frequencies each side of a band
c. only allow one spot frequency through
d. pass frequencies below 100 MHz
==========

19. A low-pass filter for a high frequency transmitter output would:
a. attenuate frequencies above 30 MHz
b. pass audio frequencies below 3 kHz
c. attenuate frequencies below 30 MHz
d. pass audio frequencies above 3 kHz
==========

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

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

22. 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 high-pass filter in the transmitter output
c. a low-pass filter in the transmitter output
d. a band-pass filter to the speech amplifier
==========

23. A high-pass filter can be used to:
a. prevent interference to a telephone
b. prevent overmodulation in a transmitter
c. prevent interference to a TV receiver
d. pass a band of speech frequencies in a modulator
==========

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

25. A high-pass filter attenuates:
a. a band of frequencies in the VHF region
b. all except a band of VHF frequencies
c. high frequencies but not low frequencies
d. low frequencies but not high frequencies
==========

26. 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
==========

27. The voltage gain of an operational amplifier at low frequencies is:
a. very high but purposely reduced using circuit components
b. very low but purposely increased using circuit components
c. less than one
d. undefined
==========

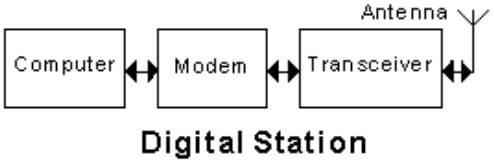
28. The input impedance of an operational amplifier is generally:
a. very high
b. very low
c. capacitive
d. inductive
==========

29. 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
==========

30. 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 high-pass filter
c. a low-pass filter
d. a notch filter
==========

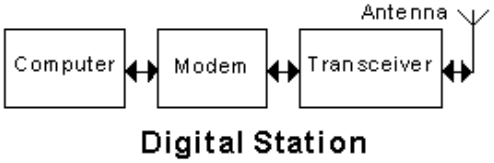
**Question File: 30. Digital Systems: (1 question)**

1. In the block diagram shown, the block designated "modem" is a:




a. modulator/demodulator
b. modulation emphasis unit
c. Morse demodulator
d. MOSFET de-emphasis unit
==========

2. In the block diagram shown, the "modem":




a. monitors the demodulated signals
b. de-emphasises the modulated data
c. translates digital signals to and from audio signals
d. determines the modulation protocol
==========

3. The following can be adapted for use as a modem:
a. an electronic keyer
b. a spare transceiver
c. a spare receiver
d. a computer sound-card
==========

4. The following are three digital communication modes:
a. DSBSC, PACTOR, NBFM
b. AGC, FSK, Clover
c. PSK31, AFC, PSSN
d. AMTOR, PACTOR, PSK31
==========

5. In digital communications, FSK stands for:
a. phase selection keying
b. final section keying
c. frequency shift keying
d. final signal keying
==========
6. 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
==========
7. When your HF digital transmission is received with errors due to multi-path conditions, you should:
a. increase transmitter power
b. reduce transmitted baud rate
c. reduce transmitter power
d. change frequency slightly
==========
8. The letters BBS stand for:
a. binary baud system
b. bulletin board system
c. basic binary selector
d. broadcast band stopper
==========
9. APRS is an adaption of packet radio. APRS Stands for:
a. Automatic Packet Reporting System
b. Amateur Position Reporting System
c. Automatic Packet Relay System
d. Amateur Position Relay System
==========
10. The following communication mode is generally used for connecting to a VHF packet radio bulletin board:
a. SSB
b. AM
c. FM
d. DSB
==========