1 When operating by voice in a network, 'net', on 5.363MHz the station must be identified

1A2, 1A5

A as frequently as practicable.
B from time to time.
C at least every 15 minutes.
D On joining and when leaving it.

2 The requirement for a Foundation training course to be formally recognised is that

1B1, 1B2

A the successful completion will lead to an Examination Pass Certificate.
B the course has been registered with the RSGB examination department.
C the examination has been conducted by a named and Approved Invigilator.
D the practical assessments have been signed off by a Registered Assessor.

3 What precautions must you take in re-transmitting a message which you have received via amateur radio and recorded?

1C1, 1C2

A You must re-transmit the entire incoming transmission exactly as received.
B You must contact the intended recipient and agree the message can be sent.
C You must remove the callsign of the original sender and replace with your own.
D You must ensure that it is clear which station is re-transmitting the message.

4 The Amateur Radio Licence requires the holder to ensure that his Radio Equipment does not cause undue interference to any

1D1

A other electronic device.
B domestic appliance.
C wireless telegraphy.
D audio or music equipment.

5 When operating a remote station by means of a radio link in an amateur band the link must be

1E2

A suitably encrypted to prevent others accessing the remote transmitter.
B on a frequency in an amateur band which is above 30MHz.
C limited to a maximum transmit power of 500mW pep e.r.p.
D compliant with the licence schedule for the band concerned.

6 If you are operating in another CEPT country, which of the following Licence conditions apply?

1F1, 1F2

A Those of the host country.
B Those of the relevant IARU Region.
C Those in the UK Full Licence Schedule.
D Those in the CEPT Licence Schedule.

7 1G1, 1G2

The 472kHz band is not available to amateurs worldwide because

A the Americas use the band for military communications.

B not all countries are members of the International Telecommunications Union.

C some countries use the band for maritime and aeronautical services.

D the far-east uses the band 470-480kHz for security tags and stock control.

8 2B1

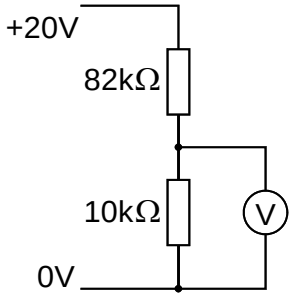
In the potential divider shown, the potential difference across the 10kΩ resistor is about

A 2V

B 10V

C 20V

D 82V



9 2D1, 2D2, 2D3

Two capacitors have identical construction except that one capacitor has an air dielectric and the other a polythene dielectric with a relative permittivity of two. They are connected in series to a voltage source so both capacitors are charged. Which statement about the capacitors is correct?

A The voltage across the two capacitors will be the same.

B The air spaced capacitor will have the higher voltage.

C The air spaced capacitor will have the lower voltage.

D The voltage depends of the distribution of the charge.

10 2D4

The instructions for a transmitter project say that ferrite type 43 should be used. What is the relevance of specifying the type?

A Different types of ferrite are most efficient at different frequencies.

B A different type will require a different capacitance for resonance but are equally suitable.

C The amount of magnetic screening required depends on the nature of the ferrite.

D The required DC biasing is set by the type and size of the ferrite core.

11 2D7

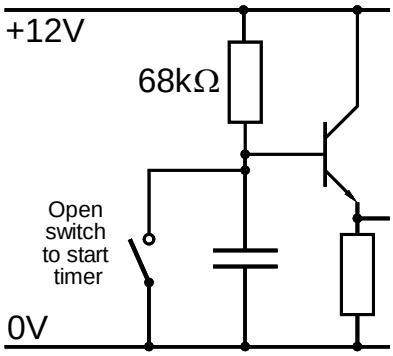
The transistor shown is designed to turn on when its base reaches about 8V. Approximately what value of capacitor will be suitable for a 10 second delay?

A 150µF

B 15µF

C 6.8µF

D 68µF



12
2E3, 2E4, 2E5, 2E6

An audio signal generator has an output of 3V and is feeding a capacitor. The frequency is doubled. What happens to the current through to capacitor?

A The current halves.
B The current reduces by a factor of √2.
C The current doubles.
D The current increases by a factor of √2.

13
2F1, 2F2

An audio signal is sampled 9000 times per second. Which is the highest frequency shown below that will be correctly represented in a digital signal processor?

A 3000Hz
B 4000Hz
C 6000Hz
D 9000Hz

14
2G1

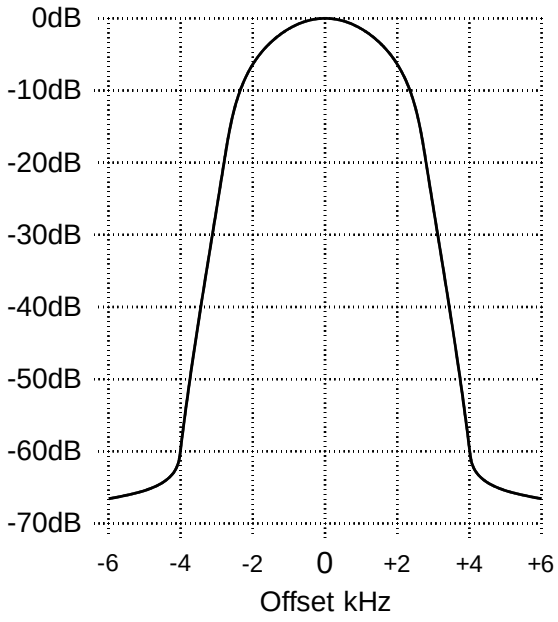
The primary winding of a transformer has 80 turns and the secondary has 40 turns. If the input impedance is 250Ω, what is the impedance across the secondary terminals?

A 62.5Ω
B 125Ω
C 176Ω
D 500Ω

15
2H1, 2H2, 2H4, 2H5

The graph shows the frequency response of a filter. If the centre frequency is 10.7MHz, what is the approximate Q-factor of the filter?

A 3.5
B 1300
C 3700
D 6000



16
2I1, 2I3

When a bi-polar transistor is conducting, the emitter-base junction is

A reverse biased.
B open circuit.
C short circuit.
D forward biased.

17 2I6

The input resistance of a common-emitter amplifier stage is about

A 5Ω.

B 50Ω.

C 1kΩ.

D 200kΩ.

18 2J2, 2J3, 2J4

Which one of the following would be most likely be used to maintain a steady output voltage in a mains to 12V DC power supply suitable for an amateur transceiver?

A a pass transistor and a Zener diode.

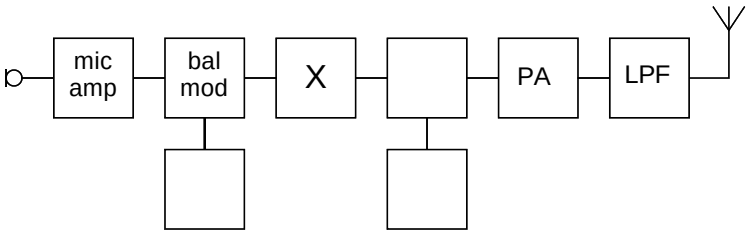
B a step down transformer and a bridge rectifier.

C a large value reservoir capacitor and a rectifier diode.

D a bridge rectifier and a large value reservoir capacitor.

19 3A1, 3B1

In the block diagram of an HF transmitter, what is the box marked X?



A the main mixer.

B a sideband filter.

C a crystal oscillator.

D the variable frequency oscillator.

20 3C1

A good way of preventing thermal drift in a VFO is to

A allow the radio to warm up before use.

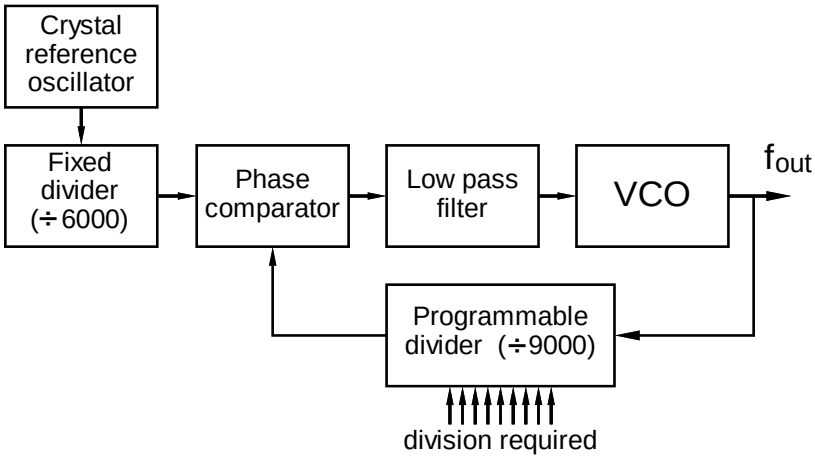
B keep the shack heated at all times.

C ensure all oscillator components have a positive temperature coefficient.

D design circuits with a balance of components with positive and negative temperature coefficients.

21 3C2, 3C3

In the block diagram shown the crystal oscillator is operating at 6.80MHz. What is the output frequency?



A 10.2MHz.

B 4.53MHz.

C 1.13MHz.

D 1.13kHz.

22
3D1, 3E1, 3E2

A 13cm transmitter is operating at 2320.905MHz and uses two stages of multiplication from a crystal oscillator. A likely frequency for the crystal is

A 95.464820MHz.
B 96.704375MHz.
C 97.013692MHz.
D 98.746832MHz.

23
3F2, 3F3, 3F4, 3F5

A particular modulation scheme involves transmitting any two out of eight audio tones. These tones are fed to a well-designed balanced modulator with a good filter selecting the upper sideband. The current design of the power amplifier is still non-linear. If the two audio tones are 800Hz and 1350Hz and the nominal carrier is on 144.600MHz what unwanted frequency might be present at the output of the transmitter?

A 144.60190MHz.
B 144.60020MHz.
C 144.58650MHz.
D 144.60210MHz.

24
3G1, 3G2, 3G3, 3G4, 3G5

The chance of producing harmonics from an HF transmitter would NOT be reduced by

A using a push-pull final amplifier stage.
B fitting a high-pass filter in the transmitter output.
C using the minimum drive levels necessary.
D coupling the amplifier stage via suitable inductive transformers.

25
3H3, 3I1

Which of the following terms describes the ratio of the minimum discernible signal a receiver can detect and the maximum signal that will not be distorted?

A sensitivity.
B selectivity.
C dynamic range.
D signal to noise performance.

26
3I2, 3I3, 3I4, 3I5

In a double conversion superheterodyne receiver the frequency difference between the wanted radio frequency signal and the image frequency is

A twice the wanted radio frequency.
B twice the first intermediate frequency
C twice the second intermediate frequency.
D the sum of the first and second intermediate frequencies.

27
3J1

It is decided to try moving a 23cm pre-amplifier from the input to the receiver and connect it between the antenna and the feeder to the shack. Doing this

A will have little or no effect.
B increase the sensitivity by the gain of the pre-amp.
C increase the sensitivity by the loss in the feeder.
D reduce the level at which the receiver is overloaded.

28 3K1, 3L1

Which of the following modes of transmission requires a carrier insertion oscillator for demodulation?

A AM.
B FM.
C CW.
D SSB.

29 3M1, 3M2

An SDR receiver has two outputs derived from mixing the incoming signal with two separate local oscillator signals which are ninety degrees offset in phase. The key merit of this approach is that

A it allows polarisation diversity to better combat HF fading.
B each sideband can be independently demodulated for better signal to noise performance.
C the need for automatic level control (ALC) is eliminated.
D any type of modulation can be subsequently demodulated by the same processing.

30 3N1, 3N2

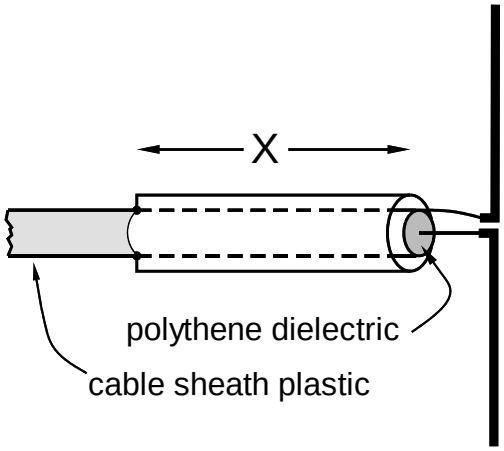
In order to receive amateur signals on 433MHz using a 28MHz receiver a down-converter must be used. The frequency of the oscillator in the converter will need to be set to

A 28MHz.
B 433MHz.
C 461MHz.
D 489MHz.

31 4A3, 4B1

The drawing shows a metal sleeve balun suitable to connect a coaxial cable to a centre-fed half-wave dipole. The distance marked 'X' should be

A λ/2 allowing for the permittivity of polythene.
B λ/2 allowing for the permittivity of plastic.
C λ/4 allowing for the permittivity of polythene.
D λ/4 allowing for the permittivity of plastic.



32 4D1, 4D2

The length of a half-wave dipole for 7.10MHz in a normal domestic setting is about

A 42.25m.
B 21.13m.
C 20.07m.
D 19.01m.

33 If an antenna/feeder system has a return loss of 25dB and the feeder has a loss of 2.5dB, what is the return loss of the antenna itself?

4E1, 4E2, 4E3

A 20dB.
B 22.5dB.
C 27.5dB.
D 30dB.

34 A device used to tune out reactance at the feed-point of the antenna systems is known as

4F1, 4F2

A an antenna reactance analyser.
B an antenna matching unit.
C a return loss bridge.
D an SWR meter.

35 Which of the following reduces by the inverse square of the distance from the antenna?

5A1, 5A4

A SWR.
B Field Strength.
C Power Flux Density.
D Angle of radiation.

36 A likely effect of a solar flare is

5B1, 5B2, 5B3, 5B4

A an increased probability of sporadic-E.
B increased absorption in the D-layer.
C enhanced propagation in the F-layer.
D a reduction in the critical frequency.

37 Auroral flutter is a phenomenon normally

5C3, 5D1, 5D2

A experienced in equatorial regions.
B particularly quiet solar activity.
C associated with vertical curtains in the ionosphere.
D propagation along the day/night terminator or ‘grey line’.

38 Which feature is most likely to affect the immunity of a well-made television receiver?

6A2

A use of 50Ω rather than 75Ω coax between the antenna and the TV.
B a break in the coax screen continuity close to the TV.
C reversing the connections of the dipole element to the built in balun.
D using a higher gain antenna than the signal strength would indicate.

39 A home made transceiver should be made so it complies with

6A4

A Interface Requirement IR2027.
B the European EMC Directive.
C the conditions of the Amateur Licence.
D the British Standard for domestic white goods.

40 Which sort of modulation is most likely to be associated with blocking in a victim receiver?

6B1, 6B2,

A FM.

B AM.

C SSB.

D CW.

41 Breakthrough is occurring to a neighbour's home entertainment system in his lounge which includes both TV and sound radio. The system has a single common aerial input with two suitable aerials and a combiner in the attic. The system also has a second set of speakers in the dining room. It is easy to disconnect the system's antenna lead at the socket on the lounge wall but doing so has little effect. A reasonable next step in diagnosing the cause of the problem is to

6C1, 6C2

A power the system from a mains socket in the dining room using an extension cable.

B unsolder the connection to the second set of speakers from the back of the switch inside the system.

C try transmitting on a known problem frequency but using a dummy load instead of your antenna.

D disconnect the dining room speakers at the speaker end of the lead where they are easily accessible.

42 A personal music device worn with headphones responds to amateur SSB transmissions with voice like noises. It is recognised the headphone lead may act as an aerial but the device does not have a radio receiver. What is the probable interference mechanism?

6C3, 6C4

A Sufficient signal is picked up on the headphone lead to drive the headphones which follow the amplitude variations.

B The RF signal is being rectified in the device electronics which can then amplify the resulting audio frequency variations.

C Modern electronic components intended for audio purposes can nonetheless work perfectly well at radio frequencies.

D The inductance of the headphone mini-loudspeaker coil and lead capacitance form a resonant circuit often within the HF bands.

43 Which one of the following filters should be fitted into a TV downlead in order to attenuate 145MHz signals?

6D2

A low-pass filter.

B high-pass filter.

C band-stop filter at the TV frequency.

D band-pass filter at 145MHz.

44 What is the field strength 20m away from an antenna radiating 400W ERP?

6E1

A 2.6V/m.

B 7V/m.

C 12V/m.

D 140V/m.

45 6E2, 6E3

Which of the following dipole antenna feed arrangements is likely to produce least EMC problems when the transmitter is located under one end of the antenna?

A The shortest length of coaxial feed possible.

B The shortest length of balanced feeder possible.

C Balanced feeder falling away at right angles from the antenna and buried in the ground leading back to the shack.

D Balun with coaxial feeder falling away at right angles from the antenna and buried in the ground leading back to the shack.

46 6F1, 6F2

Guidance on installing a transceiver in a vehicle is available from the

A Code of Practice 1362 from the Federation of Communication Services.

B Code of Practice 1362 from the RSGB.

C Automobile Association (AA) or Royal Automobile Club (RAC)

D Vehicle Certification Agency.

47 6G1

If you receive a complaint of causing interference, your first action should be to

A close your station down.

B send a report to the local Ofcom office.

C seek confirmation of the problem in writing.

D seek confirmation of dates and times of the problem.

48 7A1

What is the purpose of listening a few kHz away from the frequency you are transmitting on?

A To allow a full duplex contact where you have simultaneous two-way communication.

B To avoid listening to local noise, normally from non-radio sources but maintain communication.

C To spread out the large number of callers if you are in a sought after location for example.

D To allow full break-in on CW contacts so you are aware of a reply between the very short gaps in sending.

49 7B1, 7B2, 7H1

Which part of the 5362kHz band is recommended for contacts between two UK amateurs?

A 5362.0 – 5374.5kHz.

B 5351.5 – 5366.5kHz.

C 5362.0 – 5366.5kHz.

D 5366.5 – 5374.5kHz.

50 8A1, 8A2, 8A6

A specific point about a Protective Multiple Earth (PME) supply is that

A each premises must provide its own earth rod.

B the house Earth wire is connected to the company Neutral.

C the house earth is carefully isolated from the company Earth.

D the company Earth wire is earthed at many points along the street.

51 8D1, 8E1

Advice of the safe RF field strength levels for human exposure can be found from the

A RoSPA.

B NHS.

C ICNIRP.

D RSGB.

52 8F4, 8F5

You intend to set up a temporary HF station at your local Scout campsite. Before doing so it is important to check

A there is no risk of thunderstorms during the event.

B there is a clear take off from the roof to ensure good line of sight contacts.

C the mains supply will deliver sufficient current for the equipment involved.

D the RSGB propagation forecast to ensure good international contacts.

53 8F6, 8F7

The factors that must be covered in a risk assessment are

A nature of risk, probability of occurrence, severity of outcome, mitigating and remedial measures.

B nature of risk, people at risk, insurance cover, reporting chain.

C number of safety staff, location of safety staff, public to staff ratio.

D training requirements, first aid facilities, casualty transport, location of accident and emergency centres.

54 9A1, 9A3

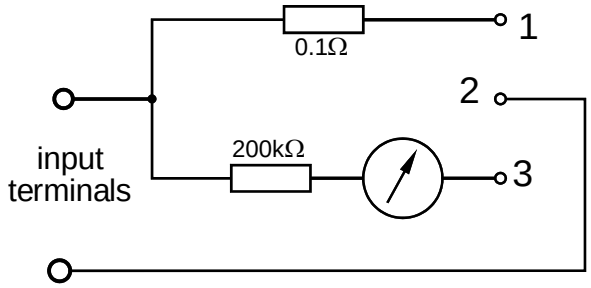
In the circuit shown, which connections should be made to allow the meter to act as a voltmeter?

A 1 to 2.

B 1 to 3.

C 2 to 3.

D 1 to 2 to 3.



55 9A4, 9A5

An amateur holding a Full licence is checking the PEP of a transmitter for use by a Foundation licensee. A good RF rms voltmeter is being used to measure a steady CW signal into a matched dummy load and the signal viewed on an uncalibrated oscilloscope. The Foundation transmitter is then set to transmit SSB into the dummy load and adjusted to so the peaks are the same level as previously displayed by the CW signal. For 10W pep, what reading should be set on the RF voltmeter during the CW phase?

A 11V.

B 16V.

C 22V.

D 32V.

56 9A6, 9A7, 9A8, 9A9

To increase the height of a small AC waveform viewed on an oscilloscope display you would need to adjust the setting of the

A X axis to give less time per division.

B X axis to give more time per division.

C Y axis to give less volts per division.

D Y axis to give more volts per division.

57 9B1

A signal generator has a calibrated 50Ω source impedance and is delivering 10μV to a high impedance microvolt meter. It is then connected to a calibrated 50Ω dummy load. What power will be dissipated in the dummy load?

A -100dBW.

B -93dBm.

C -57dBm.

D -87dBm.

58 2A1, 9C1

A 6MHz crystal oscillator is used to drive a multiplier chain to produce a 144MHz carrier which will be used for a beacon transmitter. The crystal is specified as 0.5ppm (parts per million) when supplied, aging at a rate of 0.3ppm per year. The project is completed exactly one year later. How far out might the 144MHz transmission be?

A 3.0Hz.

B 4.8Hz.

C 72Hz.

D 115Hz.

Answer keys

1	2	3	4	5	6	7	8	9
D	A	D	C	D	A	C	A	B
10	11	12	13	14	15	16	17	18
A	A	C	B	A	C	D	C	A
19	20	21	22	23	24	25	26	27
B	D	A	B	A	B	C	B	C
28	29	30	31	32	33	34	35	36
D	D	C	D	C	A	B	C	B
37	38	39	40	41	42	43	44	45
C	B	C	A	C	B	B	B	D
46	47	48	49	50	51	52	53	54
A	D	C	D	B	C	C	A	C
55	56	57	58					
C	C	B	D					