



UK Full Licence Mock Exam - 2 - Dated 20/12/2020

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These questions are designed to represent a question style that you may get in the exam AND/OR designed to ensure a specific learning point is covered.

Q1. As M1AQS/M and pass over the border into Wales you

- A. Must stop transmitting as Wales is not covered by Ofcom licences.
- B. Continue to sign M1AQS/M but explain that you are in wales.
- C. Must transmit MW1AQS with optional /M as your regional locator has changed.
- D. Can transmit MW1AQS/M as your regional locator has changed.

Q2. You are training a new person in the world of amateur radio and you decide to let them have a go of the controls when having a QSO,

- A. You cannot do this as you must be in control of all the functions when supervising a non-licensed person.
- B. You can do this, provided the person is on a course which will result with a radio amateurs' examination pass certificate.
- C. You can do this as the person is on a course which will result with a M7 licence being issued.
- D. You cannot do this as the person does not hold a valid UK amateur radio licence or overseas amateur radio licence.

Q3. When on air you

- A. Can transmit whatever you want, provided it is not business related, as you have the right to freedom of speech.
- B. Must ensure your transmissions content do not breach the Radio Transmissions regulations 1988.
- C. Must ensure that your content does not breach the Communications Act 2003.
- D. Can transmit whatever you want due to the cultural differences worldwide, your content will not breach foreign laws.

Q4. You are transmitting on 14.024MHz using CW (Morse code)

- A. You must have the ability to receive this band, if you are transmitting on this band in order to comply with your licence conditions.
- B. You must have the ability to receive on this band and mode in order to comply with your licence conditions.
- C. You do not need to have the facility to receive on the band or mode, to comply with your licence conditions.
- D. You must only use a transceiver at your station so that you can transmit and receive on the same band and mode, to comply with your licence conditions.

Q5. In relation to the install and use of a remote control operational link which of the following is true?

- A. The frequencies used in the link must be above the 30MHz range.
- B. The frequency link must be encrypted.
- C. A full licence holder must only use the link once the NOV has been granted.
- D. A full licence holder must only remain within the terms of their licence.

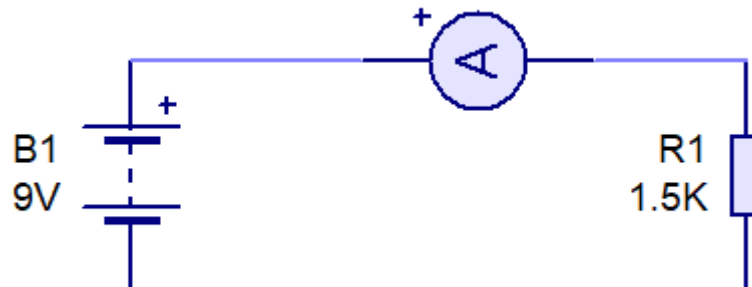
Q6. You are M0ABC and you decide to move abroad to Spain

- A. If you want to use an amateur radio station you must sit a Spanish exam and address any other requirements made by the Spanish regulator.
- B. If you want to use an amateur radio station you can exchange your UK Full licence for a Spanish one and address any other requirements made by the Spanish regulator.
- C. If you want to use an amateur radio station you just simply sign EA/M0ABC as you already have a Full licence with CEPT TR61-01 agreement.
- D. If you want to use an amateur radio station you can obtain a Spanish licence using the Harmonised Amateur Radio examination Certificate (HAREC) as the UK and Spain are a signatory to the CEPT TR61-02.

Q7. At the frequency of 0.1359MHz the status of allocation in UK to the Amateur Service is?

- A. Secondary. Available on the basis of non-interference to other services inside or outside the UK
- B. Not allocated
- C. Secondary. Users must accept interference from Industrial, Scientific and Medical users.
- D. Primary

Q8.



What will the power rating, being dissipated as heat by the resistor be?

- A. 54mW
- B. 0.006W
- C. 60mW
- D. 6W

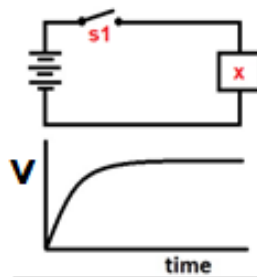
Q9. Coulomb is the quantity of electricity (Q) where charge on a capacitor is

- A. Given by Q equals current \times time.
- B. Given by Q equals voltage \times capacitance.
- C. Given by Q equals time \times capacitance.
- D. Given by Q equals current \times voltage.

Q10. Back EMF is created when a current changes, which is due to

- A. The increase in voltage as current charges a capacitor.
- B. Voltage across a reverse biased diode in a half wave circuit.
- C. The inductance in a coil of wire carrying the current.
- D. The increase in voltage as a secondary cell is charged.

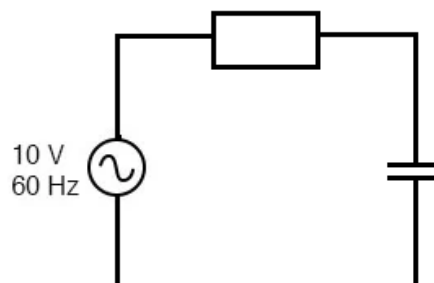
Q11.



Looking at the graph and circuit above, when switch 1 is closed the voltage rises and steady's out as per the above graph. Given this information which of the following would be in point X to give these results?

- A. Capacitor
- B. Capacitor and resistor in series.
- C. Inductor and resistor in series.
- D. Inductor

Q12.



This circuit is supplied with 10V at a rate of 60Hz. In the circuit the capacitor has a reactance value of 1500Ω and a resistor which has a value of 100Ω , what is the impedance value of this circuit?

- A. $1.6k\Omega$
- B. $1.401k\Omega$
- C. $1.503k\Omega$
- D. 40Ω

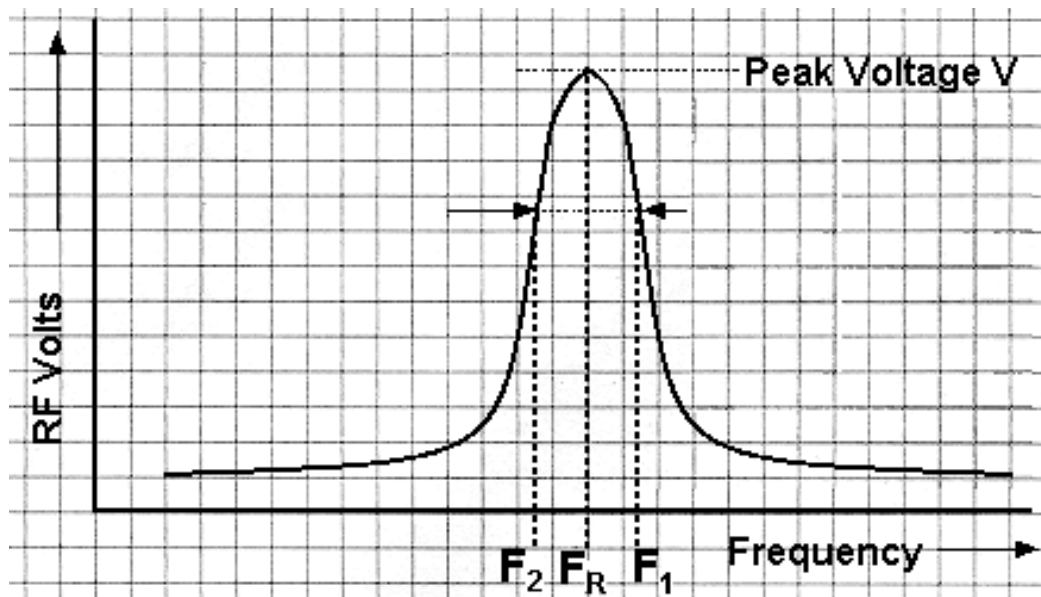
Q13. Signals from the time domain can be depicted in the frequency domain, this is known as the

- A. Aliases.
- B. Nyquist harmonics.
- C. Fourier Transform.
- D. 2nd form of Nyquist rate.

Q14. You have a transformer which has 400 turns on the primary winding and 100 turns on the secondary winding. The current in the secondary must not exceed 20 amps, what would the primary current be for the secondary to reach its maximum current rating?

- A. 10A
- B. 5A
- C. 2A
- D. 20A

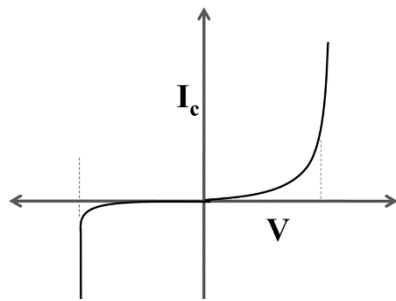
Q15.



Looking at the response curve above, F_R is 10MHz with a band width of 200 kHz what will the Q factor value be?

- A. 50
- B. 25
- C. 75
- D. 100

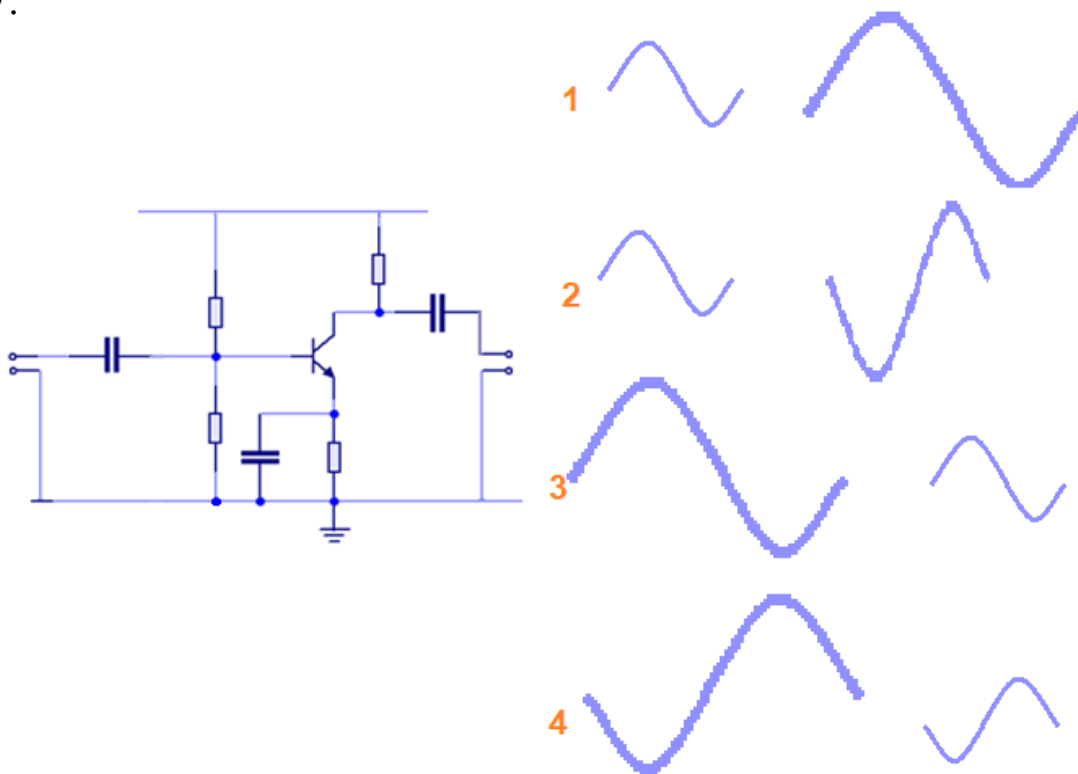
Q16



The above shows a response curve of a

- A. FET
- B. Zener diode
- C. Capacitor
- D. Inductor

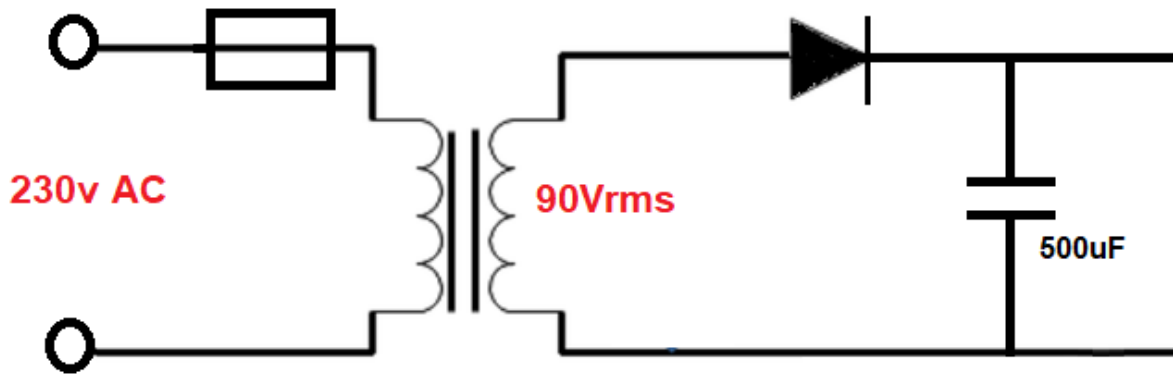
Q17.



You will see various sine wave orientations above, the sine wave to the left is the input, to the above circuit and the sine wave to the right is the output. Please select which number, of sine wave pairs that this circuit is likely to produce.

- A. 1
- B. 2
- C. 3
- D. 4

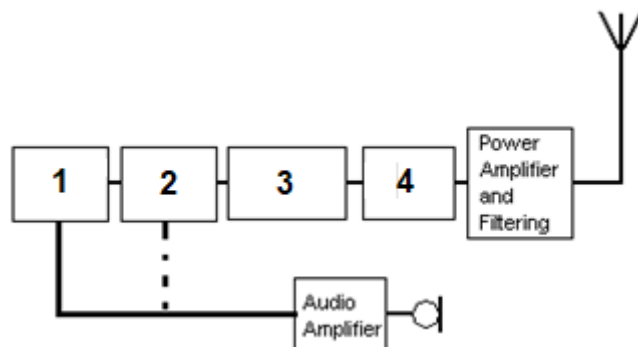
Q18.



The above circuit can be found in a power supply, given the use of a diode in this circuit, you would need to select a diode which has a reverse voltage rating of at least

- A. 90V
- B. 230V
- C. 260V
- D. 100V

Q19.



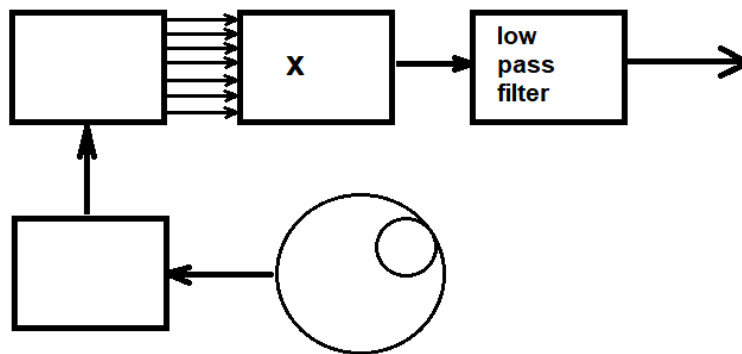
Which block number, multiplies the signal up to the output frequency range?

- A. 1
- B. 2
- C. 3
- D. 4

Q20. What would likely be the most serious consequence, in the use of an unstable carrier?

- A. The receiving station would have difficulty receiving the signal of the transmitting station.
- B. The transmission could interfere with nearby television receivers causing TVI.
- C. The transmission could move outside the authorised band.
- D. The transmission could interfere with other nearby amateur stations.

Q21.



The purpose of the box marked with an X is to

- A. Convert digital signals to analogue.
- B. Select the digital signal for use.
- C. Provide a table of digital signals.
- D. Remove any harmonic signals.

Q22. Which of the following stages contain, a circuit which is, a non-linear process that distorts the input signal and consequently generates harmonics?

- A. Low pass filter.
- B. Frequency Multiplier.
- C. A crystal oscillator.
- D. Phase comparator.

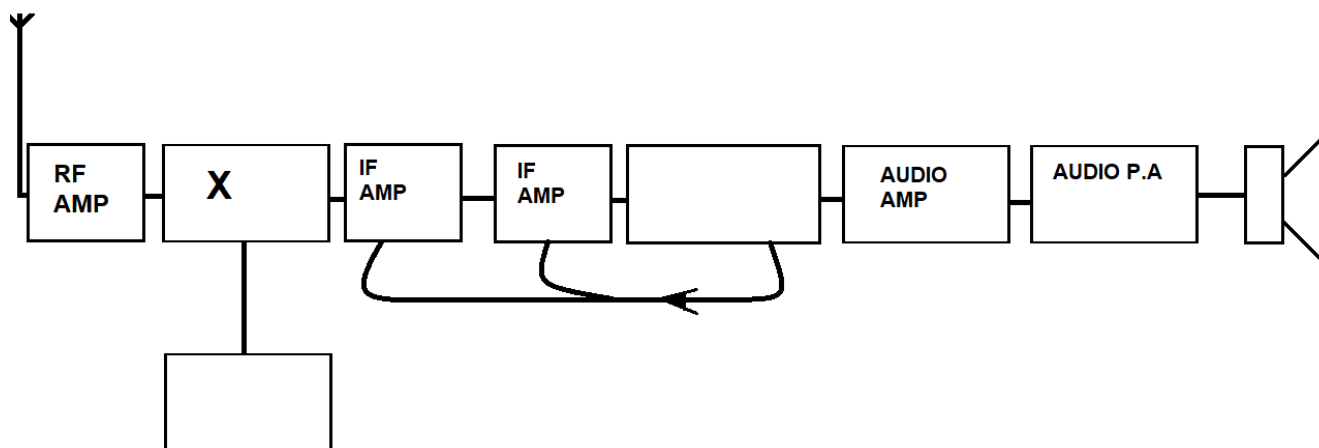
Q23. Feeding an SSB voice transmission into an external power amplifier operating in class C will produce

- A. Frequency modulation of the carrier.
- B. A clean signal of higher power.
- C. Considerable splatter over the adjacent frequencies.
- D. A clear audio signal at the distant receiver.

Q24. What would happen if an amplitude modulated emission had a wider bandwidth than necessary?

- A. It would produce distorted signals at the receiver stray coupling in a power amplifier.
- B. It would cause adjacent channel interference.
- C. It would cause second channel interference in superheterodyne receiver
- D. It would be seriously under-modulated.

Q25.



The purpose for the box marked with an X is to

- A. Detect what type of modulated signal is present.
- B. Mix the received frequencies with that of the local oscillator.
- C. Convert the audio signal into an audible tone.
- D. Amplify the intermediate signal.

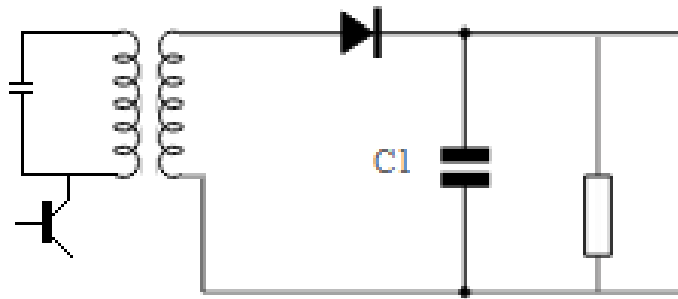
Q26. A superhet receiver is set to receive a frequency of 1.820MHz and the Local Oscillator is running at a frequency of 1.355MHz. An alternative frequency for the LO is

- A. 1.820MHz
- B. 470kHz
- C. 2.285MHz
- D. 2.710MHz

Q27. It is proposed to fit a pre-amplifier to an existing receiver. Which combination is likely to show the greatest overall improvement?

- A. A pre-amplifier with a high internal noise and a receiver with high internal noise.
- B. A pre-amplifier with a low internal noise and a receiver with high internal noise.
- C. A pre-amplifier with a high internal noise and a receiver with a low internal noise.
- D. A pre-amplifier with a low internal noise and a receiver with a low internal noise.

Q28.



The above circuit

- A. Will amplify a CW signal for use in a loud speaker.
- B. Will detect an AM signal and remove half of the wave form.
- C. Will generate a DC signal for use in a power supply.
- D. Will detect an FM signal and remove the RF carrier.

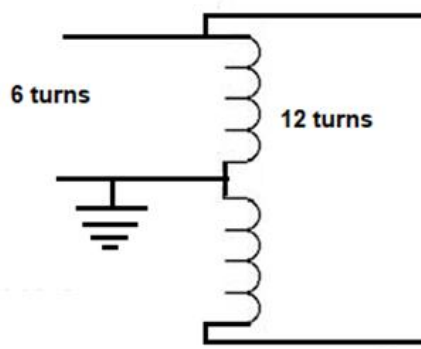
Q29. All forms of modulation can be demodulated by a mathematical equation using a PC or similar device when

- A. Mixing AF with one local oscillator to produce an "I" and "Q" components.
- B. Mixing the RF signal with two local oscillators, 45 degrees out of phase to produce "I" and "Q" components.
- C. Mixing AF with one local oscillator, 45 degrees out of phase to produce an "I" and "Q" components.
- D. Mixing the IF signal with two local oscillators, 90 degrees out of phase to produce "I" and "Q" components.

Q30. The RIT feature on a transceiver is

- A. Known as Receiver Incremental Tuning and is the ability to shift the receive frequency a small amount away from the transmit frequency.
- B. Known as Radio Interface Transmission which is the transmission made by the use of an interface to a PC.
- C. Known as Receiver Instability Tone and senses the received signal and automatically selects the correct CW tone for audible understanding.
- D. Known as the Radio Inverse Transmission, as is the transceivers ability to inverse a sine wave for the purpose of phase shift keying.

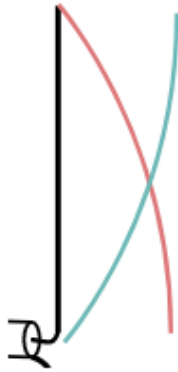
Q31.



The diagram shown is a

- A. 4:1 balun
- B. 1:1 balun
- C. 9:1 balun
- D. 2:1 balun

Q32.



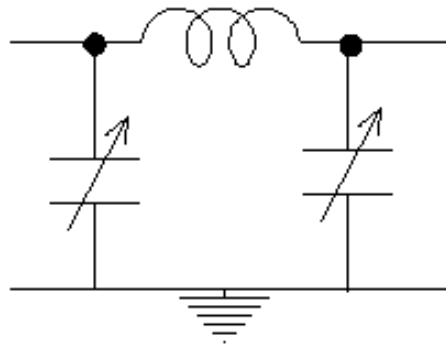
In relation to the above drawing it shows

- A. $\frac{1}{4}$ wave vertical antenna where the blue curve is that of the current and the red is voltage
- B. $\frac{1}{4}$ wave vertical antenna where the red curve is that of the current and the blue is voltage
- C. $\frac{5}{8}$ th wave vertical antenna where the red curve is that of the current and the blue is voltage
- D. $\frac{1}{4}$ wave vertical antenna where the red curve is that of the current and the blue is impedance

Q33. Return loss is

- A. The ratio of forward signal power to the return of signal power usually expressed in dB.
- B. The value of coaxial cable loss usually expressed in dBi.
- C. The value of the receiver's ability to detect weak signals from strong signals.
- D. Is purely a theoretical equation which has not practical value to antenna system construction.

Q34.



The above circuit can be found within a AMU and is commonly known as a

- A. T match
- B. L match
- C. PI match
- D. C match

Q35. Electromagnetic waves comprise of

- A. An Electrical (E) and Magnetic (H) field in phase at 90 degrees to each other and at 90 degrees to the direction of travel.
- B. An Electrical (E) and Magnetic (M) field in phase at 90 degrees to each other and at 120 degrees to the direction of travel.
- C. An Electric (E) and Magnetic (M) field out of phase at 90 degrees to each other and at 90 degrees to the direction of travel.
- D. An Electric (E) and Magnetic (M) field out of phase at 90 degrees to each other and at 120 degrees to the direction of travel.

Q36. Which of the following band are you most likely to use a Near Vertical Incidence Sky wave?

- A. 5MHz
- B. 70MHz
- C. 28MHz
- D. 10MHz

Q37. Random noise originating outside the earth's atmosphere is known as

- A. Solar flare activity
- B. Galactic noise
- C. EME noise
- D. Aurora curtains

Q38. Your neighbour has installed his on T.V, down lead and antenna system. You have a look at the install and identify a few issues with the system, which of the following is most likely to affect the immunity?

- A. Fitting an amplifier to the back of the T.V which has a built in high pass filter.
- B. The poor / loose fitting of the connector on the down lead at the amplifier and at the antenna.
- C. The use of shielded 75 ohm coax.
- D. The use of a Yagi rather than dipole antenna.

Q39. When on the 40m band SSB you notice that a neighbours PIR light activates, stays on for 3 minutes and goes off. Thereafter continues in this manner for your duration of transmission.

- A. You must stop transmitting as you are causing undue interference.
- B. You must stop transmitting and purchase a new garden PIR light as it appears faulty.
- C. You can continue to transmit as the PIR light fails to meet the EMC standards and is not immune.
- D. You must stop transmitting as your equipment does not meet the relevant standard and is exceeding the PIR light's immune levels.

Q40. You turn your transceiver on where you are noticing that on occasions, received signals are being impeded and that your transmissions contain spurious signals.

- A. This is normal operation and merely shows that you have a loose PL259 plug on your connection at the transceiver.
- B. This is not normal and is likely to a fault on your brand new transceiver.
- C. This is likely to be overdriving of the power amplifier stage of your transceiver and can be fixed by ensuring the ALC limits are met.
- D. This is likely to be passive intermodulation and a result of a corroded metallic connection on the antenna system.

Q41. Your neighbour is planning to install a new television aerial on the extension to his bungalow that he has just built himself. He seeks your advice in selecting a pre-amplifier. How should he reduce the likelihood of suffering cross modulation and overload from your amateur transmissions?

- A. Locate an amplifier that will amplify television and broadcast radio close to the television.
- B. Choose a high gain, wide band amplifier and locate it next to the antenna.
- C. Choose a low gain wide band amplifier and locate it next to the television.
- D. Locate an amplifier that only amplifies the television broadcast signal close to the antenna.

Q42. While you are operating on 1.8MHz a neighbour complains of interference to his medium wave broadcast reception. Which of the following is the most likely cause?

- A. A harmonic from your transmitter.
- B. Breakthrough of your signal into the medium wave receivers IF stage.
- C. Second channel (image frequency) interference.
- D. A transmission on top band is not likely to interfere with a medium wave receiver

Q43. Which of the following could be used to attenuate a specific unwanted frequency?

- A. A very narrow band pass filter
- B. A very broad band pass filter
- C. An open circuit quarter wave coaxial stub
- D. An open circuit half wave coaxial stub

Q44. You transmit 75W from your transceiver. The coax to the antenna has 3dB loss. The antenna has a gain of 6dB at a distance of 10m what would the field strength reading be?

- A. 85W/m
- B. 12V/m
- C. 8.5V/m
- D. 12W/m

Q45. Which of the following, for feeding a balanced half wave dipole antenna, is LEAST likely to cause EMC problems?

- A. Using a balanced feeder with the feeder leaving the antenna parallel to the antenna elements using a plastic spacer.
- B. Using coaxial feeder with the feeder leaving the antenna parallel to the antenna elements using a plastic spacer.
- C. Using a balanced feeder with the feeder leaving the antenna at 90 degrees to the antenna elements.
- D. Using a coaxial feeder with the feeder leaving the antenna at 90 degrees to the antenna elements, thereafter buried underground.

Q46. Which of the following would be an option in order to reduce RFI issues within your vehicle?

- A. Ensure that the coax from the transmitter to the antenna runs parallel and is in the same wiring loom as the car electrical wiring harness.
- B. Ensure that the coax is as short as possible and does not take the same route as the vehicles wiring harness.
- C. Ensure the vehicles antenna is located as close as possible to the vehicles CPU unit.
- D. Ensure that the transceivers coax, dc wiring and vehicles wiring are connected together and using the vehicles same wiring route.

Q47. Jim Smith, your neighbour complains that since you put up a different antenna, he is suffering interference to his hard wired telephone. Which of the following would you do?

- A. Tell him that his overhead telephone wires are too close to your aerial system.
- B. Tell him that his phone is not immune and to use wireless phones.
- C. Ask him if he also suffers interference with television reception.
- D. Ask him when he suffered the interference and check your log to see if you were operating at the time.

Q48. Which of the following is a proportionate reason for operating SPLIT mode on a transceiver?

- A. So that the transceiver can share the band pass filter circuitry.
- B. To take into consideration different countries frequency allocation.
- C. To hold as much of the band allocation as possible to prevent nearby stations using adjacent frequencies
- D. To allow the operation of 2 antennas.

Q49. Looking at the 60m band plan provided by the IARU which frequency segments can AM be transmitted?

- A. 5.4035 - 5.4065 MHz
- B. 5378.0 - 5382.0 kHz
- C. 5.313 - 5.323MHz
- D. 5228.5 - 5292kHz

Q50. You are working on a switch mode power supply that has developed a fault.

- A. You must ensure that you only use one hand, to prevent a complete circuit using your body, when working on the power supply which is unplugged and not connected to the mains supply.
- B. You must be careful as large capacitors inside the power supply may still contain voltage and the circuit may still be live.
- C. You must ensure that a rubber mat is used for standing on to prevent a shock from the power supply which is not connected to the mains supply.
- D. You must ensure that you replace the fuse with a piece of wire to prevent the power supply tripping when working on it connected to the mains supply.

Q51. Amateur radio masts and antennas in exposed high locations need to be protected against

- A. Bird strikes.
- B. Low flying aircraft and must have beacons installed.
- C. Corrosion from exposure to ultra-violet radiation.
- D. Static build up during thunderstorms.

Q52. You plan a DX-Pedition to Luxembourg where you intend on utilising your radio equipment which you use daily in the UK.

- A. You must check that the radio equipment meets all EU EMC standards prior to use.
- B. You must ensure that items such as power supplies can operate at EU mains supply voltage and can be connected to EU plugs safely and properly.
- C. You must check that you have obtained a transceiver licence from Ofcom before importing the transceiver into Luxembourg.
- D. You must ensure that all antennas are properly RF earthed for portable operating.

Q53. When operating portable a risk assessment should be conducted. A risk assessment is NOT;

- A. Important and recognised by law and required for insurance purposes.
- B. Something that needs to consider the likelihood of harm and the severity of that harm.
- C. To be expressed in simple, understandable terms for all.
- D. To provide a method of contributing blame to an organisation or party during an incident or accident.

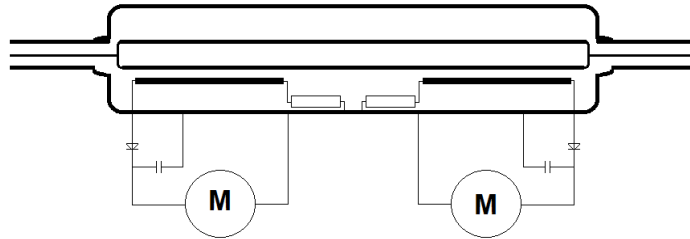
Q54. You have a small 50 μ A movement meter which has to be used to measure the voltage of 0-20V DC. The meter has a resistance of 50 Ω . What value of resistor should be used and how should this be installed in relation to the meter?

- A. 400k Ω in series
- B. 400k Ω in parallel
- C. 20k Ω in series
- D. 20k Ω in parallel

Q55. You are using an RF voltmeter which is designed to read voltage at RMS value. The meter shows, when you transmit CW from your transceiver with a 50Ω load, a reading of 150V. This represents a power rating of?

- A. 1.3kW
- B. 450W
- C. 300W
- D. 250W

Q56.



The above diagram is a device which helps measure

- A. Gain of an antenna.
- B. Return loss of the antenna system.
- C. Resistance and current.
- D. Velocity factor of coax.

Q57. What is the gain of the antenna system where the antenna is fed with 44W and the output of the antenna is 1200W?

- A. 26dB
- B. 14dB
- C. 12dB
- D. 8dB

Q58. You have a capacitor with a value of 100pF. The online specification states that it is $+200\text{ppm}/^\circ\text{C}$. Should the capacitor rise in temperature by 12°C , what would the value of the capacitor be (not including any manufacturing tolerances).

- A. 99.76pF
- B. 76pF
- C. 100.24pF
- D. 0.24pF

ANSWERS

Q1 = C

Q2 = B

Q3 = C

Q4 = B

Q5 = D

Q6 = D

Q7 = A

Q8 = A

Q9 = B

Q10 = C

Q11 = B

Q12 = C

Q13 = C

Q14 = B

Q15 = A

Q16 = B

Q17 = B

Q18 = C

Q19 = C

Q20 = C

Q21 = A

Q22 = B

Q23 = C

Q24 = B

Q25 = B

Q26 = C

Q27 = B

Q28 = B

Q29 = D

Q30 = A

Q31 = A

Q32 = B

Q33 = A

Q34 = C

Q35 = A

Q36 = A

Q37 = B

Q38 = B

Q39 = C

Q40 = D

Q41 = D

Q42 = C

Q43 = C

Q44 = C

Q45 = D

Q46 = B

Q47 = D

Q48 = B

Q49 = C

Q50 = B

Q51 = D

Q52 = B

Q53 = D

Q54 = A

Q55 = B

Q56 = B

Q57 = B

Q58 = C