

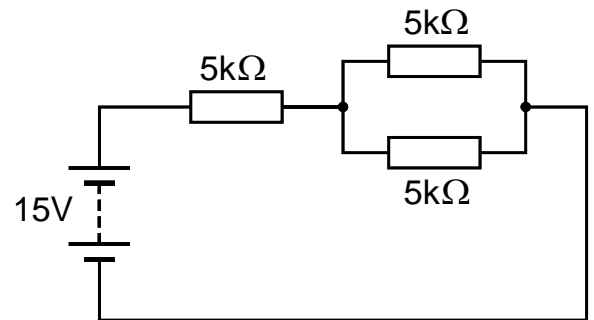
## Syllabus 2019 – Mock Examination Paper

### Intermediate Mock paper 2

- 1** An Intermediate Licence holder may supervise  
1A4, 1B1, 1B2
- A no other person.
  - B any unlicensed person.
  - C any other radio amateur.
  - D any other UK radio amateur.
- 2** Under what circumstances, if any, are you permitted to send an obscured message?  
1C1, 1C2
- A There are no such circumstances.
  - B If you believe it is appropriate to do so.
  - C If the message originator asks you to do so.
  - D If a User Service representative asks you to.
- 3** An amateur must keep a log  
1D1, 1D2
- A of all transmissions from the station.
  - B of all times when the station is in use.
  - C only when requested by a person authorised by Ofcom.
  - D of checks performed from time to time to ensure undue interference is not caused.
- 4** An Intermediate amateur lives on a farm but the farmhouse is in a valley. A transceiver is set up in a suitable building on the highest part of the farm and is remotely controlled by a radio link. Which statement below is correct?  
1E1, 1E2
- A The link power must be below 500mW and in an amateur band.
  - B The link power must be below 500mW pep and in an amateur band.
  - C The link power must be below 500mW pep e.r.p and in an amateur band.
  - D The link must be below 500mW and in an amateur band above 30MHz.
- 5** In order to operate in another CEPT country an Intermediate licensee must  
1F1
- A have a copy of their UK licence and the host country licence conditions.
  - B validate your UK licence at immigration control when first entering the host country.
  - C obey the CEPT licence conditions and also the conditions of your own UK licence.
  - D obtain special permission, if granted, by the host country's licensing authority.
- 6** What is the maximum permitted RF output power for an Intermediate Licence holder operating on 1.850-2.000MHz  
1G1, 1G2
- A 1W erp.
  - B 32W.
  - C 40W.
  - D 50W.

**7** What current is drawn from the battery in the circuit shown?  
2A1, 2C1

- A 1mA.
- B 2mA.
- C 3mA.
- D 9mA.



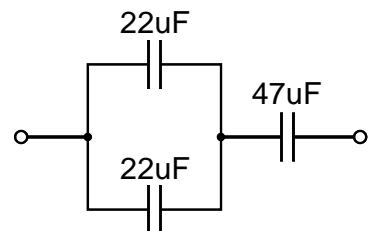
**8** When transmitting to a contact it is noticed that the supply voltage at the battery has fallen from 13V to about 11.5V. This is most likely to be due to the  
2C2, 2C3

- A antenna being too close to the battery and causing RF interference.
- B power cable between the battery and transmitter dropping too much voltage.
- C internal resistance of the battery.
- D increased losses in the transmitter.

**9** What is the approximate capacitance of the circuit shown?

2D1, 2D2, 2D3

- A 23μF.
- B 58μF.
- C 69μF.
- D 91μF.



**10** The purpose of coiling the wire of an inductor into a coil is to

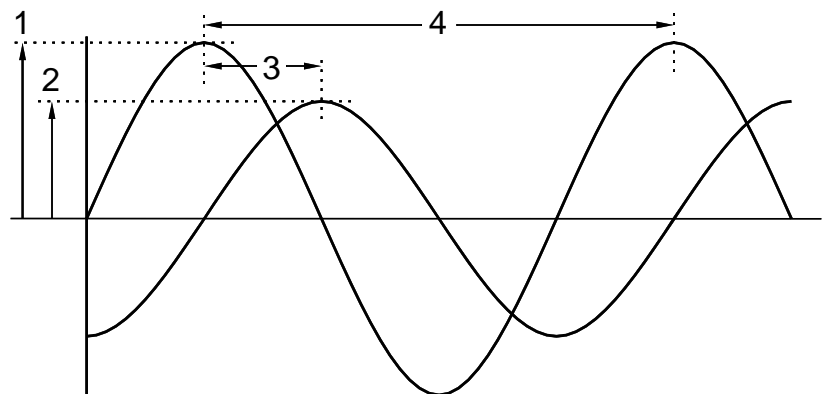
2D4, 2D5, 2D6

- A concentrate the magnetic field.
- B minimise the likelihood of RF pickup.
- C reduce the risk of unwanted radiation.
- D reduce any back emf induced in the coil

**11** Which quantity(s), shown by the numbered arrows, will describe the phase relationship between the two sine waves in the drawing?

2E1, 2E2, 2E3

- A Quantity 1.
- B Quantities 1 and 2.
- C Quantity 3.
- D Quantities 3 and 4.



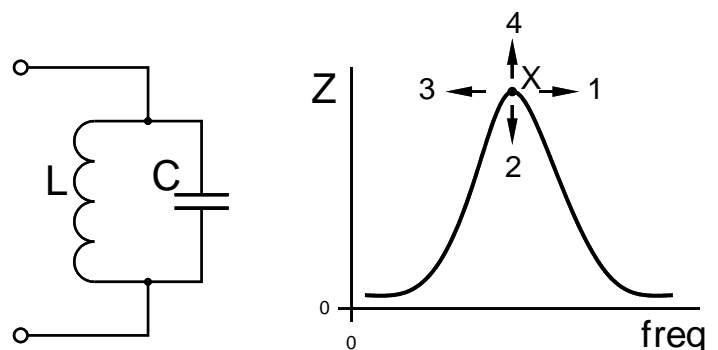
- 12**  
2E4, 2E5, 2E6
- A resistor and capacitor are connected in series and fed from an AC supply. Which statement below is correct?
- A The energy supplied to the resistor is dissipated as heat; the energy supplied to the capacitor is stored and returned to the circuit.
  - B The energy supplied to the resistor is dissipated as heat; the energy supplied to the capacitor is lost in the electric field.
  - C The energy supplied to the resistor is dissipated as heat; the energy supplied to the capacitor is stored and returned in the magnetic field.
  - D The energy supplied to both the resistor and capacitor are dissipated as heat but with a 90 degree phase difference.

- 13**  
2E7, 2E8
- The wavelength of a signal at 14.230MHz is
- A 21.1cm.
  - B 47.4cm.
  - C 21.1m.
  - D 47.4m.

- 14**  
2F1
- Any error in representing the amplitude of an analogue signal by digital sampling can be reduced by
- A sampling the analogue signal more frequently.
  - B filtering the analogue signal prior to sampling.
  - C using more digital bits to quantify the analogue signal.
  - D filtering the digital signal after sampling.

- 15**  
2G1
- The purpose of the iron core in a mains transformer is to
- A concentrate the magnetic field to improve the efficiency of the transformer.
  - B provide a solid and safe support for the transformer windings.
  - C provide a metallic screen to minimise RF interference between the two windings.
  - D prevent external magnetic fields from affecting the transformers function.

- 16**  
2H1, 2H2, 2H3, 2H4, 2H5
- The drawing shows an LC circuit and its frequency response. If the value of C is increased, the point 'X' on the frequency response graph will then to move in which direction?

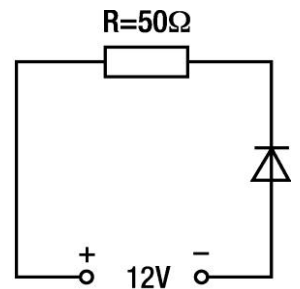


- A Direction 1
- B Direction 2
- C Direction 3
- D Direction 4

17 The current flowing in the resistor will be

211, 212, 213

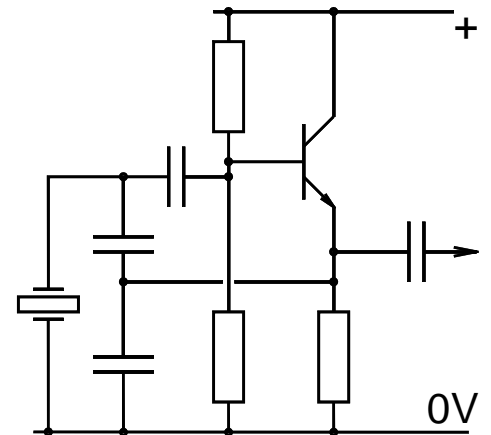
- A 0A.
- B 0.24A.
- C 0.60A.
- D 4.16A.



18 A feature of the circuit shown is that the frequency

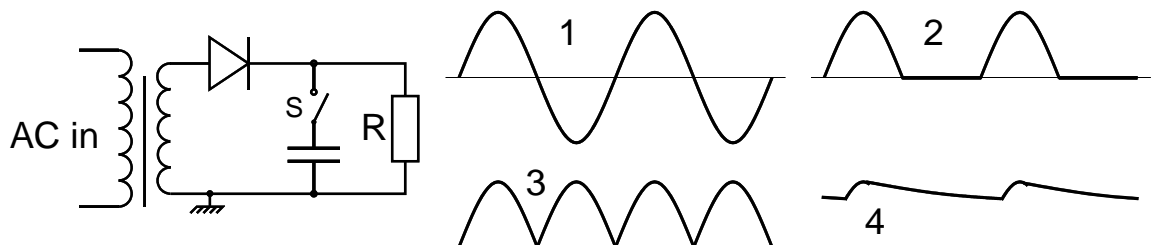
214, 215, 216

- A of operation is continuously variable over an amateur band.
- B the frequency of operation is varied in small but discrete steps.
- C the frequency stability is relatively poor compared to other circuits.
- D the frequency of operation is fixed allowing its use as a reference.



19 The diagram shows a power supply and a number of waveforms that might be observed across the load resistor by using an oscilloscope. Which of the options below shows the correct waveforms, first with the switch S open and then with it closed?

2J1, 2J2, 2J3



- A S open: waveform 1 S closed: waveform 4.
- B S open: waveform 2 S closed: waveform 4.
- C S open: waveform 3 S closed: waveform 2.
- D S open: waveform 1 S closed: waveform 2.

20 A key feature of integrated circuit technology is that

217, 2J4

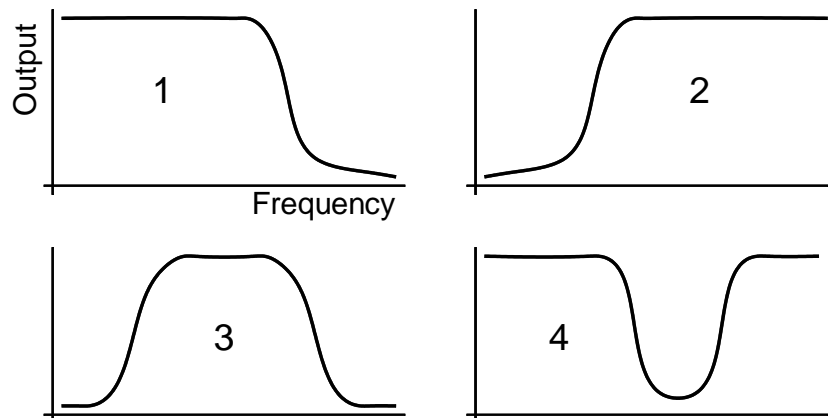
- A each circuit function can be individually adjusted.
- B several functions can be combined in a single device.
- C unsoldering such devices is much easier.
- D higher voltages can be used to improve performance.

- 21** A transmitter using SSB modulation is more efficient because  
 3A2, 3A3, 3B1, 3C1, 3C2, 3C3  
 A transmitting the carrier avoids excessive power in the sidebands.  
 B removing the unwanted sideband reduces the likelihood of interference.  
 C the increased bandwidth over AM eases the process of demodulation.  
 D all the transmitter power can be concentrated in the information content.

- 22** Frequency modulation can be produced by using  
 3E1, 3E2, 3E3, 3F1, 3F2  
 A a variable capacitance diode.  
 B a product detector.  
 C a balanced mixer.  
 D a balanced phase discriminator.

- 23** Which of the following responses would be produced by a high pass filter?  
 3G2, 3G3, 3G4, 3G5

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



- 24** The purpose of the demodulator in a radio receiver is to.  
 3H2, 3H3, 3H4  
 A remove the carrier leaving just the two sidebands.  
 B recover the audio signal from the intermediate frequency.  
 C ensure the levels applied to the mixer are of constant amplitude.  
 D ensure the local oscillator is on the correct frequency.

- 25** The merit of the superheterodyne architecture for a radio receiver is to  
 3I1, 3I2, 3I3  
 A allow the bulk of the gain and selectivity of the receiver to be achieved by circuits working at a narrow fixed frequency range.  
 B simplify the process of demodulation because all signals are of a reasonably constant amplitude.  
 C avoid the need for tuned circuits in the radio frequency stages by eliminating the possibility of image frequencies.  
 D mix all incoming radio frequencies down to audio thereby avoiding the need for several different types of demodulator.

- 26**  
3K1, 3L1
- The purpose of a frequency discriminator is to
- A produce frequency modulation.
  - B demodulate frequency modulation.
  - C measure the frequency of an oscillator.
  - D select the wanted frequency in an FM receiver.
- 27**  
3M1, 3M2,  
3M3
- The (Fast) Fourier Transform
- A takes analogue signals in the time domain and provides an output in the frequency domain.
  - B takes digital signals in the time domain and provides an output in the frequency domain.
  - C takes analogue signals in the frequency domain and provides an output in the time domain.
  - D takes digital signals in the frequency domain and provides an output in the time domain.
- 28**  
4A1, 4A2,  
4A3, 4B1
- A transmitter is producing 50W of RF at its output. This is fed to 30m of feeder which, at VHF, has a loss of about 1dB per 10m. How much power arrives at the antenna?
- A 17W.
  - B 25W.
  - C 47W.
  - D 49W.
- 29**  
4C2, 4C3,  
4C4, 4C5
- The manufacturer of a vertical HF antenna has provided a polar diagram which shows it has an Angle of Radiation of about 20 degrees in free space. When mounted over real ground this angle is likely to
- A hardly change.
  - B increase.
  - C decrease.
  - D reduce to zero.
- 30**  
4D1, 4D2
- An HF dipole has traps fitted to enable it to operate on 14 and 21MHz. The trap should be a
- A series tuned circuit resonant at 14MHz.
  - B series tuned circuit resonant at 21MHz.
  - C parallel tuned circuit resonant at 14MHz.
  - D parallel tuned circuit resonant at 21MHz.
- 31**  
4E1, 4F1,  
4G1, 4H1
- A dummy load should be
- A of 50 $\Omega$  resistance, non-inductive and screened.
  - B of 50 $\Omega$  reactance, coaxial construction and screened.
  - C of 50 $\Omega$  reactance, balanced construction and screened.
  - D of 50 $\Omega$  resistance, non-inductive and unscreened.

- 32**  
5A2, 5A3,  
5A4
- Electromagnetic waves have an electric field and a magnetic field
- A which are at right angles to each other and both are at right angles to the direction of propagation.
  - B which are parallel to each other and at right angles to the direction of propagation.
  - C which are at right angles to each other and the direction of propagation is parallel to the electric field.
  - D which are at right angles to each other and the direction of propagation is parallel to the magnetic field.
- 33**  
5B1, 5B2,  
5B3
- Which of the following is lowest in height?
- A The G layer of the ionosphere.
  - B The D layer of the ionosphere.
  - C The F layer of the ionosphere.
  - D The E layer of the ionosphere.
- 34**  
5B4, 5B5,  
5C3
- When operating a handheld on 70cm walking in a large city centre it is noticed that contact can sometimes be lost when in a more open part of the city and yet maintained on occasions when in tall narrow streets. A likely explanation is
- A multipath reflection off buildings giving almost random coverage and loss.
  - B ionospheric fading due to random fluctuations in the ionosphere.
  - C polarisation changes due to the portable use of a handheld radio.
  - D sporadic-E contact during times of high atmospheric pressure.
- 35**  
6A1, 6A2,  
6A3, 6A4
- Which one of the items listed below is most likely to be the source of interference to other domestic appliances?
- A A television.
  - B A mobile phone.
  - C A DVD player.
  - D A video recorder.
- 36**  
6B1, 6B2,  
6C1, 6C2
- An interfering continuous buzz on an HF receiver is present at all times of day and night. Which item of domestic equipment or facility is probably NOT a potential cause?
- A VDSL data on a telephone line.
  - B A switched-mode power supply to a clock radio.
  - C Mains powered remotely operated garage door opener.
  - D Bi-metal thermostat on a central heating system.

- 37**  
6D1, 6D2,  
6D3, 6D3
- Voice signals from an amateur transmitter are being picked up on a CD player that has external speakers. You should fit
- A a high pass filter in the transmitter feeder.
  - B a low pass filter in the transmitter feeder.
  - C a ferrite ring on the mains cable of the CD player.
  - D ferrite rings on all the leads of the CD player, including the external speaker leads.
- 38**  
6E1, 6E2,  
6E3, 6F2,  
6F3
- What is the purpose of a separate earth in the radio shack?
- A To provide a path to earth for any incidental RF currents produced by the transmitter.
  - B To minimise noise on the mains supply from affecting the receiver.
  - C Enhance the safety of operators and visitors to the station in the event of the mains earth failure.
  - D Provide an anti-static point for use in construction or repair.
- 39**  
7A3, 7A4,  
7B1
- Which of the following organisations is responsible for the bandplans?
- A British Broadcasting Corporation (BBC).
  - B International Amateur Radio Union (IARU).
  - C Office of Communication (Ofcom).
  - D International Telecommunication Union (ITU).
- 40**  
7E1, 7F2,  
7G1, 7G2,  
7G3, 7G4
- When using a computer soundcard and suitable software to operate on-air with one of the digital modes, as well as ensuring correct connections it is necessary to check
- A the section of the band used by that mode in the licence schedule.
  - B the maximum power permitted for the proposed transmission mode.
  - C the possibility of warning sounds being generated by other software.
  - D the time-out limits for the proposed transmission mode.
- 41**  
8A1, 8A2,  
8A4, 8A6,  
8A8, 8E1
- If adjustments to mains powered equipment must be made with the power switched on, it is advisable to
- A use a directly earthed wrist strap.
  - B wear a residual current device (RCD).
  - C ensure the equipment is insulated from earth.
  - D only use one hand to make the adjustments.
- 42**  
8B2, 8B3,  
8B4, 8B5,  
8B6
- Why might a manufacturer specify the use of a slow-blow fuse?
- A To avoid an excessive current surge when the device is switched on.
  - B To ensure the fuse in the mains plug blows first to avoid surges in the equipment.
  - C Because the equipment concerned draws a heavier current when first switched on.
  - D Because the equipment needs to boot up before the supply is disconnected.



- 43** When drilling through metal sheeting you should always  
9A1, 9A2, 9A3, 9A5
- A wear a tool belt.
  - B countersink the hole first.
  - C hold the sheeting in a vice or clamp.
  - D ensure that there is good ventilation.
- 44** To measure current in a series circuit, the multi-meter test probes should be connected  
9B1
- A in parallel with the relevant circuit.
  - B in parallel with the component under test with the battery disconnected.
  - C in series with the relevant components in the circuit.
  - D in series with the component under test with the battery disconnected.
- 45** The schedule to a local broadcast radio licence specifies an output power of 23dBW. What power is that in Watts?
- A 20W.
  - B 23W.
  - C 200W.
  - D 230W.
- 46** A small surface mount capacitor is marked 272. What is its value?  
9C1, 9D1, 9E1, 9E2, 9E3, 9E4
- A 272pF.
  - B 27pF 2% tolerance.
  - C 270pF.
  - D 2700pF.

## Answer key

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