



1. Under the terms of the licence you are considered as operating Maritime Mobile when you are operating from

2019-Full40

- A any Vessel.
- B a Vessel on a Lake.
- C a vessel on an Inland Waterway.
- D a Vessel at Sea.

2. The licence requires the holder to have equipment capable of receiving messages on all frequencies and modes in use for transmission because

2019-Full7654

- A it is necessary to remain within the Band Plans whilst operating.
- B there is a requirement to monitor your own transmissions.
- C cross-band communication is not permitted on the HF bands.
- D it will reduce the likelihood of you causing Undue Interference.

3. The power limit for the hidden transmitter used in a direction finding competition on 1.96MHz is:

2019-Full763

- A 25W.
- B 32W erp pep.
- C 32W.
- D 25W erp pep.

4. When supervising a non-licensed visitor sending a message the supervisor must be

2019-Full34

- A the operator of the transmitter.
- B the owner of the transmitter.
- C in the presence of and directly supervising the visitor.
- D in the same room as the transmitter.

5. When operating within the 5MHz band while at a temporary location you must

2019-Full7658

- A give your location every 15 minutes.
- B be within reach of a working telephone.
- C limit your power to 100W erp.
- D limit the antenna height to 15 metres.



6. When joining a group of amateurs already in radio contact the Licence requires you to

2019-Full448

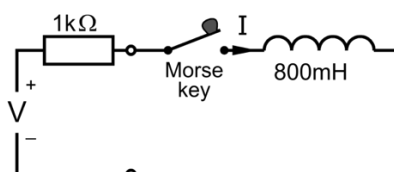
- A just join in at suitable moment.
- B establish communication with each member of the group as they speak.
- C establish communication with the control station.
- D establish communication with any one member of the group.

7. When recording and retransmitting a Message containing the originator's call sign the Licensee must

2019-Full442

- A always include the call sign of the originator of the Message.
- B ensure that the retransmission is such that the origin of the Message and the origin of the retransmission are clear.
- C retransmit the Message only to the original sender, for the purposes of carrying out a test, which must be recorded in the Logs of both amateurs.
- D relay the message on to the Station specified.

8. The drawing shows part of the circuit of a Morse key. The voltage source and  $1\text{k}\Omega$  resistor are inside the transmitter and the coil is added externally to slow the rise and fall of the keying waveform. What is the time constant of the keying circuit?



2019-Full7889

- A  $800\mu\text{s}$ .
- B  $800\text{ms}$ .
- C  $1.25\mu\text{s}$ .
- D  $1.25\text{ms}$ .

Candidate: FULL, Mock

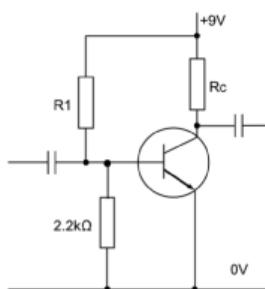
Exam: Amateur Radio Examination Full Level **Syllabus V1.5**

Centre: RSGB (RSGB – ONLINE REMOTE INV)

Date: Mon, 1<sup>st</sup> April 2024



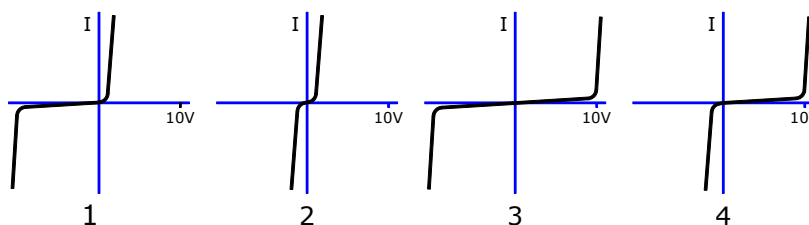
9. The circuit diagram shows an NPN transistor being used as an amplifier. The potential difference across the Base-Emitter junction is 0.6V. Select from the list below which resistor may be used for R1 in order to create the correct transistor bias. You may assume the Base current is insignificant.



2019-Full3361

- A 39k.
- B 3.9k.
- C 2.7k.
- D 33k.

10. Which of the graphs shown shows the characteristics of a Zener diode? Forward bias is shown to the right.



2019-Full3418

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

11. The purpose of a low pass filter in the microphone amplifier of an SDR transmitter prior to the analogue to digital converter (ADC) is to

2019-Full6018

- A avoid higher frequency signals causing aliases in the digital representation.
- B prevent excessive bandwidth of the transmitted radio frequency signal.
- C minimise the generation of phase noise in the audio modulator.
- D optimise the average to peak power ratio to give maximum power without over-modulation.



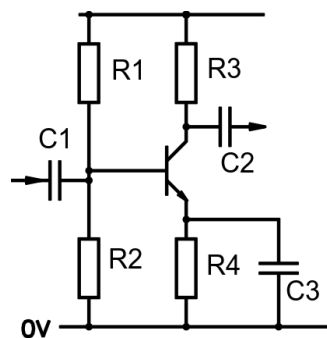
12. The back EMF created when a current changes is due to the  
2019-Full105

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

13. A transformer can NOT be used to  
2019-Full168

- A produce a greater power output in the secondary winding than the power fed into the primary winding.
- B provide electrical isolation between the primary winding and the secondary winding or windings.
- C produce a different voltage across any of its secondary windings from that fed across the primary winding.
- D match the impedance of a load to the output impedance of a device that is used to power the load.

14. What is the main function of capacitor C3 in the circuit shown?



2019-Full3422

- A Providing feedback to stabilise the gain.
- B Decoupling AC signals on the emitter.
- C Coupling AC signals into the transistor.
- D Maintaining a DC voltage on the emitter.

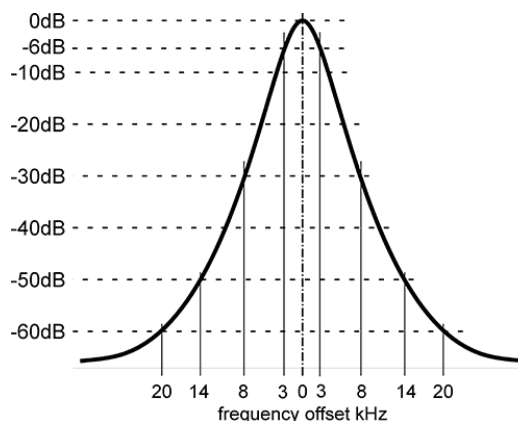


15. The rectifier diodes in a mains operated 12V stabilised power supply have failed and must be replaced. Which of the following diodes would be chosen to replace them?

2019-Full344

- A Diodes with a PIV rating of 12V.
- B Diodes with a PIV and current rating equal to or greater than the original diodes.
- C Diodes with a current rating equal to or greater than the original diodes.
- D Diode with a PIV rating equal to or greater than the original diodes.

16. The drawing shows the response curve of the IF of a receiver. If the receiver is used to receive amplitude modulated audio signals of up to 6kHz, the attenuation of the 6kHz audio will be about



2019-Full690

- A 60dB.
- B 6dB.
- C 0dB.
- D 25dB.

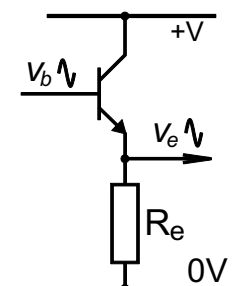
17. The relative permittivity of a dielectric is a measure of the

2019-Full94

- A amount of voltage permitted on the plates of a capacitor, when fed by a rectifier diode in a power supply.
- B amount by which the core of a coil affects the inductance, when compared with the inductance in a vacuum.
- C ratio of the capacitance with the dielectric to the capacitance in a vacuum.
- D dynamic resistance of a series tuned circuit, when it is fed with a signal at the resonant frequency.



18. The diagram shows a bipolar transistor connected as an Emitter-Follower. Other circuit components have been omitted for clarity.  $V_b$  and  $V_e$  are the peak signal and peak emitter voltages. An important feature of such a circuit is that



2019-Full3339

- A  $V_e$  is about 0.6 Volts more than  $V_b$ .  
 B the signal voltage gain  $V_e/V_b$  is always much greater than 1.  
 C its input impedance is greater than its output impedance.  
 D its output impedance is much greater than its input impedance.
19. The drawing shows the spectrum of the input and output of an external RF power amplifier being fed from an SSB transmitter. The most likely explanation for the change in the spectrum is that



2019-Full7788

- A standing waves on the feeder are causing multiple reflections.  
 B intermodulation products are being generated in the power amplifier.  
 C the lower power in the base transmitter is masking its intermodulation products.  
 D the power amplifier is not correctly matched to the output of the transmitter.
20. An operator should not overdrive an external power amplifier with a transmitter in order to avoid

2019-Full486

- A inter-modulation products.  
 B a high SWR.  
 C loss of modulation on FM.  
 D exceeding the power permitted in the licence.



21. What is the frequency of the local oscillator of a transverter that enables a 28MHz to 30MHz transceiver to be operated on the 70MHz band?

2019-Full3849

- A 29MHz.
- B 22MHz.
- C 116MHz.
- D 42MHz.

22. In order to use digital processing to tune to and demodulate a radio signal one can employ a mixing process where the incoming RF signals

2019-Full6029

- A are combined in the IF stages to give two copies of the modulation 180 degrees apart.
- B are combined in the IF stages to give two copies of the modulation 90 degrees apart.
- C are mixed with two local oscillator signals of the same frequency but 180 degrees different in phase.
- D are mixed with two local oscillator signals of the same frequency but 90 degrees different in phase.

23. In a double conversion super-heterodyne receiver, the second mixer will convert

2019-Full3943

- A The first IF to the second IF.
- B The second IF to the first IF.
- C The second IF to the third IF.
- D The second IF to AF.

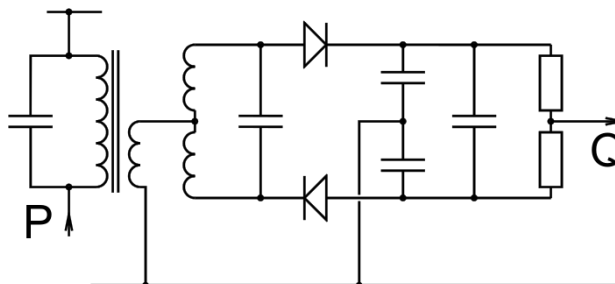
24. As the Modulation Index of an FM transmission increases it is always the case that the

2019-Full7773

- A volume of the received audio signal increases.
- B frequency of the received audio signal increases.
- C number of sidebands required increases.
- D bandwidth of the transmission increases.



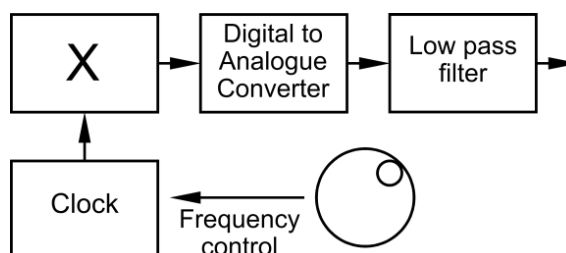
25. What signals should be at the points 'P' and 'Q' in the drawing?



2019-Full3633

- |   |                           |                                 |
|---|---------------------------|---------------------------------|
| A | P: audio                  | Q: frequency modulated carrier. |
| B | P: amplitude modulated IF | Q: audio.                       |
| C | P: audio                  | Q: amplitude modulated carrier. |
| D | P: frequency modulated IF | Q: audio.                       |

26. What function is performed in the box marked X?



2019-Full7743

- |   |                                  |
|---|----------------------------------|
| A | Fourier transformation.          |
| B | Anti-alias filtering.            |
| C | Sine wave lookup table.          |
| D | Digitally controlled oscillator. |

27. A receiver is being designed to receive a medium wave broadcast on 1.000MHz. The local oscillator is set to 1.465MHz. For the same IF, what other frequency could the local oscillator be set to?

2019-Full512

- |   |          |
|---|----------|
| A | 1000kHz. |
| B | 535kHz.  |
| C | 1465kHz. |
| D | 465kHz.  |





28. It is proposed to generate a microwave signal by feeding the output of a UHF transmitter to a frequency multiplier circuit. This arrangement is suitable for use with

2019-Full688

- A single sideband modulation with suppressed carrier.
- B frequency modulation.
- C single sideband modulation with a pilot (reduced) carrier.
- D amplitude modulation.

29. A 70cm receiver has a long feeder to an antenna at the far end of the garden. To improve reception of weak signals a low-noise pre-amplifier is fitted alongside the receiver. The improvement in signal to noise ratio is noticeable but not impressive, certainly only a fraction of the expected improvement given the gain of the pre-amp. To try to further improve matters it is worth

2019-Full7900

- A swapping the pre-amplifier for one of a higher gain.
- B moving the pre-amplifier to the antenna end of the main feeder.
- C fitting a high-pass filter to remove signals at 2m and below.
- D running the feeder at least 20cm deep in the soil.

30. What is the most serious consequence of an unstable carrier frequency?

2019-Full419

- A The transmission could move outside the authorised band.
- B The transmissions could interfere with other amateurs.
- C The receiving station would have difficulty receiving the signal.
- D The transmission could interfere with television receivers.

31. A 100Ω antenna is feeding a receiver with a 50Ω input impedance. It is decided to improve the matching by inserting a  $\lambda/4$  length of coaxial cable as an impedance transformer. The characteristic impedance of this cable should be

2019-Full720

- A 100Ω.
- B 72Ω.
- C 50Ω.
- D 300Ω.



32. Which of the following is NOT a type of balun?

2019-Full570

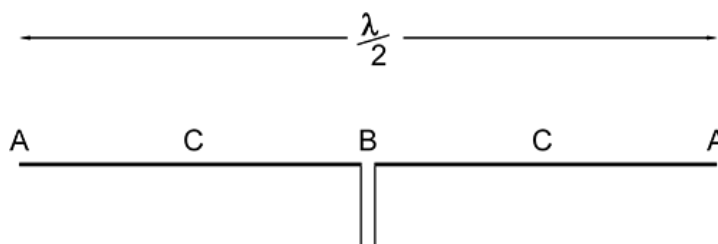
- A Differential.
- B Transformer.
- C Sleeve.
- D Choke.

33. The maximum potential difference between the conductors of a feeder divided by the minimum potential difference is known as the

2019-Full593

- A return loss.
- B standing wave ratio.
- C vector sum.
- D maximum working voltage.

34. When a signal is applied to the antenna in the diagram the RF voltage is



2019-Full3662

- A highest at point B.
- B lowest at points C.
- C highest at points A.
- D uniform throughout.

35. The rapid fluttering typical of VHF auroral contacts is caused by

2019-Full6044

- A ionisation effects of a changing D layer.
- B the interaction between the radio waves and the charged particles which cause the aurora.
- C the random movements of the auroral curtains which can reflect VHF radio waves.
- D the normal atmospheric scintillation evident over such lengthy auroral paths.



36. An isotropic fade-out or Sudden Ionospheric Disturbance is normally caused by

2019-Full7811

- A prolonged high temperatures.
- B a full moon.
- C a recent solar flare.
- D a sunspot minima.

37. Under free space conditions at a distance of 10m from a transmitting antenna the field strength is measured as 16 Volts per metre. At double the distance of 20m from the same transmitting antenna, the field strength will

2019-Full3759

- A be the same at 16 Volts per metre.
- B be halved to 8 Volts per metre.
- C be quartered 4 Volts per metre.
- D be doubled to 32 Volts per metre.

38. An alarm system meets the various standards including EMC. However, it is found to react to a neighbour's radio transmissions on several HF bands. Why might that be?

2019-Full6046

- A The alarm is good but it has been installed poorly with many unshielded wires.
- B It is more than 12 months old and the guarantee has expired.
- C The transmissions happen to be on the image frequency of the alarm.
- D The pickup on the alarm wires is differential mode interference.

39. The PN junction in a semiconductor device can be the cause of breakthrough by

2019-Full343

- A generating odd harmonics.
- B rectifying the interfering signal.
- C causing overheating.
- D changing the frequency of the signal.



40. When installing amateur radio equipment in a vehicle

2019-Full6079

- A the new power, control and RF cables should be kept away from existing car wiring and ideally only cross at right angles.
- B the power cables should be connected directly to the vehicle battery with a fuse in both positive and negative wires.
- C the power should be obtained from an existing circuit, preferably one that is only live when the engine is running.
- D the accessory socket is ideal for transmit powers below 50W and can quickly and easily be disconnected.

41. A quarter wave vertical antenna installed without an RF earth and connected to a transmitter is likely to cause?

2019-Full6053

- A excessive noise on receive resulting in an inability to receive weaker signals.
- B RF currents in the mains earth and power leads.
- C difficulty in getting a low SWR on the feeder to the antenna.
- D frequency instability due to RF getting into other sections of the transmitter circuitry.

42. A home made transceiver must comply with the

2019-Full7931

- A EU Radio Equipment Directive 2014/53/EU.
- B EU Electro-Magnetic Compatibility Directive 2014/30/EU.
- C UK Radio Equipment Regulations 1206/2017.
- D Amateur Radio Wireless Telegraphy Licence Conditions Booklet.

43. A temporary installation of a transceiver in a vehicle suffers from the transmitter remaining on transmit, despite the PTT being released. It is found that putting ferrite beads on the microphone leads close to the transmitter cures the problem. This is because the

2019-Full282

- A added inductance reduces the RF entering the transceiver microphone socket.
- B ferrite beads act as a high pass filter to the transmitted signal.
- C capacitance across the switch contacts is low at radio frequencies.
- D DC signal for the PTT cannot easily pass through ferrite beads.



44. Which of the following are likely to reduce the generation of passive inter-modulation products at your station?

1. Including a low pass filter (LPF) in your station.
2. Including a high pass filter (HPF) in your station.
3. Ensuring all antenna joints and connections are clean and not corroded.
4. Changing old metal guttering for plastic guttering.

2019-Full317

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

45. A neighbour contacts you asking if you were on the radio the previous evening as they were experiencing some interference. What is the first thing you should do?

2019-Full3950

- A Offer to carry out some tests to discover the cause of the interference.
- B Cease all transmissions until the matter is resolved.
- C Refer them to Ofcom.
- D Advise them to fit some ferrite rings to their television system.

46. A transmitter is feeding 400W to an antenna array of four nineteen element Yagis with a combined gain of 23dB. At what distance has the field strength fallen to 3.3V/m?

2019-Full7937

- A 2km.
- B 600m.
- C 424m.
- D 86m.

47. A VHF FM radio receiver is being used on 95.8MHz when a distorted voice like sound is noticed alongside the wanted programme. Tuning to other broadcast programmes has minimal effect but the interference is a bit more noticeable on weaker broadcasts. A likely source of the interference is an

2019-Full3959

- A FM transmission in the 29MHz amateur band.
- B FM transmission in the 10MHz amateur band.
- C SSB transmission in the 29MHz amateur band.
- D SSB transmission in the 10MHz amateur band.



48. Operating 'split' frequency might be considered if

2019-Full6075

- A you are relying on grey-line propagation which has asymmetric propagation characteristics.
- B you are a rare station generating a very large number of callers trying to make contact.
- C you want full break-in capability on a transceiver which is slow to change from transmit to receive.
- D your transmissions are overloading the capability of the receiver to reject them.

49. Often the frequency of a data signal is specified by its nominal carrier frequency. A risk with this approach, particularly in the 5.4035MHz sub-band is

2019-Full6071

- A omitting to specify whether it is upper or lower sideband.
- B data tones being present outside the licenced bandwidth.
- C confusion as to exactly which frequency the receiver should be tuned.
- D the possibility of getting the mark and space frequencies reversed.

50. To ensure a public amateur radio demonstration does not cause RF fields above a safe level you should check the guidance provided by the

2019-Full6066

- A ICNIRP
- B RSGB.
- C IET or IEEE.
- D local authority.

51. When operating your station while in charge of a motor vehicle you should

2019-Full187

- A only operate using frequency modulation.
- B ensure you can operate safely without compromising your ability to control the vehicle.
- C not worry about safety as licensed amateurs are exempt from the regulations regarding 'hands free' operation.
- D only operate with a voice activated (VOX) microphone.



52. In a domestic Protective Multiple Earth type (PME) electrical system,

2019-Full3355

- A earthed equipment will be safe if the neutral supply fails.
- B an earthing stake must be connected to the main earth terminal.
- C the main earth terminal will provide an excellent earth for RF.
- D the neutral supply is at the same potential as the main earth terminal.

53. When seeking insurance cover for an event open to the public the insurers will expect

2019-Full6065

- A you to advise the emergency services of the nature and location of the event to allow a speedy response if it is required.
- B to see evidence you have identified the risks involved, sought to minimise risk and outcome and kept records of that process.
- C you to take all due precautions and remember to advise the visiting public what they can and cannot do.
- D you to have guides to keep visitors at a safe distance from masts and other structures that could cause injury.

54. Which ONE of the following would be used to check for the second and third harmonics, when using a transmitter which is set to a frequency of 14.150MHz?

2019-Full161

- A An RF power meter.
- B An SWR meter.
- C An HF/VHF receiver.
- D A digital frequency meter.

55. To measure the RF output power of a transmitter, the power meter should be

2019-Full143

- A connected as close as possible to the antenna.
- B connected in parallel with the antenna.
- C connected in between the transmitter and its power supply.
- D set to the highest power range to begin with.

Candidate: FULL, Mock

Exam: Amateur Radio Examination Full Level **Syllabus V1.5**

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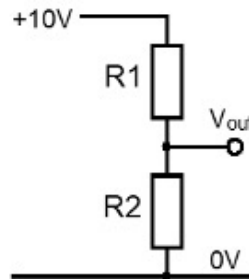


56. The unit dBm is often used to express power with respect to 1mW; that is 0dBm=1mW. What power is 20dBm?

2019-Full337

- A 1000mW.
- B 100mW.
- C 1mW.
- D 10mW.

57. The drawing shows a potential divider where R1 is 80k $\Omega$  and R2 is 20k $\Omega$ . Both resistors are 10% tolerance. The output voltage might be lower than its design value by a maximum of



2019-Full8067

- A 100 mV.
- B 180 mV.
- C 200 mV.
- D 300 mV.

58. A 10MHz quartz crystal oscillator is understood to have a negative frequency drift of 2ppm/year. What would you expect its frequency to be, 3 years after calibration?

2019-Full3926

- A 10·000,004MHz.
- B 9·999,996MHz.
- C 9·999,940MHz.
- D 10·000,060MHz.



Candidate: FULL, Mock

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## Answers MARCH MOCK FULL

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