

Advanced Mock Exam 2
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Licence Conditions

1 The Station 2M0ZZZ is heard on the 40m band. The Station is:

- a. a Foundation Licence holder located in the Isle of Man
- b. an Intermediate Licence holder located in the Isle of Man
- c. a Foundation Licence holder located in Scotland
- d. an Intermediate Licence holder located in Scotland

2. Which of the following is NOT a User Service?:

- a. Women's Royal Voluntary Service
- b. International Amateur Radio Union
- c. St Andrew's Ambulance Association
- d. Any Category 2 responder, as defined in the Civil Contingencies Act 2004

3 If the Licence is a Club Licence, which of the following is NOT permitted:

- a. A non-licensed person sending a greetings message under the supervision of a Club member who holds a Full UK Licence
- b. A Club member who holds a UK Foundation Licence sending a greetings message under the supervision of a Club member who holds a UK Intermediate Licence
- c. A non-licensed person on a recognised training course operating the Club Radio Equipment under the supervision of an Club member who holds a Full UK Licence
- d. A Club member who holds a UK Foundation Licence operating the Club Radio Equipment under their own callsign within the limitations of the Foundation Licence Schedule

4. A Maritime Mobile station is permitted to use those frequencies:

- a. allocated in the ITU region being visited
- b. listed in the Lloyd's Shipping Register
- c. listed in their Full Licence Schedule
- d. allocated to Maritime Users

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

- a. UK conditions
- b. CEPT conditions
- c. Host Country conditions
- d. UK conditions plus any additional bands permitted in the Host Country

6 If a UK Licence holder receives a Message on a frequency that is not specified in the UK Full Licence Schedule he may reply on:

- a. any other frequency
- b. a band specified in the UK Full Licence Schedule
- c. the same frequency if the sender has been authorised by Ofcom
- d. the same frequency if the sender is overseas and has authority to use that frequency band

7 Unattended Operation of the Full Licence holder's Station is permitted so long as the Licence holder has:

- a. remained within the terms of his Licence
- d. recorded all transmissions in the Station Log
- b. obtained a Notice of Variation (NoV) from the Radio Licensing Centre
- c. informed the Operations Manager at the local office of OfCom

8 When operating in a contest the Licence holder MUST transmit their callsign:

- a. At least every 30 minutes
- b. At the beginning of every contact
- c. At the beginning and at the end of the contest
- d. At the beginning and end of every over

9 An amateur radio Licence holder must ensure that his Radio Equipment does not cause undue interference to:

- a. any other radio user
- b. any broadcast service
- c. any wireless telegraphy
- d. any other Licence holder

10 Where in the UK are you not permitted to operate between 431.0 to 432.0MHz?

- a. within 1km of an airfield
- b. within 10km of an airfield
- c. Within 100km of Charring Cross, London
- d. Within 100km of Charring Cross, Glasgow

Technical Aspects

11 Which of the following are measured in Ohms?:

1. Resistance
 2. Inductance
 3. Impedance
- a. 1 and 2
 - b. 2 and 3
 - c. 1 and 3
 - d. 1, 2 and 3

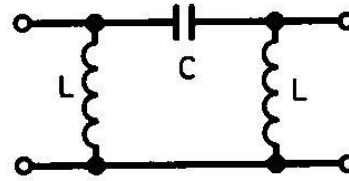
12. If 2 $22\mu\text{F}$ capacitors connected in parallel are connected in series with a $47\mu\text{F}$ capacitor, what is the approximate overall value?

- a. $22\mu\text{F}$
- b. $27\mu\text{F}$
- c. $58\mu\text{F}$
- d. $95\mu\text{F}$

13: If a 9 turn inductor has a measured value of $20\mu\text{H}$ and the turns are squeezed closer together the inductance would change to approximately:

- a. 20mH
- b. $22\mu\text{H}$
- c. $18\mu\text{H}$
- d. $10\mu\text{H}$

- 14: The time period of a signal at 3.8MHz is:
- 0.16s
 - 0.61ms
 - 0.62ns
 - 0.26 μ s

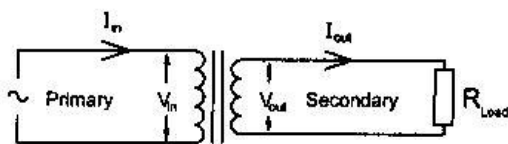


- 15: If a circuit containing only 100pF pure capacitance is fed from a 20MHz voltage source?
- The voltage and the current will be in phase
 - The current will lead the voltage by 90°
 - The voltage will lead the current by 90°
 - The reactance will lead the impedance by 90°

- 18: The circuit shown above would:
- pass frequencies below the cut off frequency
 - pass frequencies above the cut off frequency
 - pass frequencies above and below the cut off frequency
 - stop frequencies above and below the cut off frequency

- 16: You find that the inductor in your 28MHz antenna trap has broken. On inspection you find that the capacitor is marked 15pF but the inductor has no markings. What value of inductor will you need to repair the trap?
- 2 μ H
 - 365 μ H
 - 2mH
 - 365mH

- 19: A best way of preventing RF from the transmitter being picked up by the main oscillator circuit is to ensure that:
- the oscillator's power supply is well regulated
 - the transmitter's output filters are decoupled
 - the oscillator uses a physically rigid construction style
 - the main oscillator is housed in its own screened (metal) enclosure



- 17: The primary winding of the transformer in the figure above has a potential difference of 230V AC across it and 2A flowing through it. If the potential difference across the secondary winding is 50V AC, what is the secondary current?:
- 230mA
 - 9.2A
 - 2.3A
 - 5750A

20. Where P and N material form a junction and there is no external bias:
- electrons move from the P material into the N material to form a depletion layer
 - the movement of 'holes' and electrons forms a depletion layer
 - electrons move from the N material into the P material so the junction is able to conduct
 - 'holes' move from the N material into the P material so the junction is able to conduct

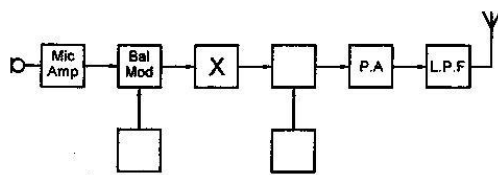
21. Which of the following diodes is normally used in tuned circuits?:
- Zener
 - Varactor
 - Avalanche
 - Germanium

22. Which 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 pass transistor and a Zener diode
 - a step down transformer and a bridge rectifier
 - a large value reservoir capacitor and a rectifier diode
 - a bridge rectifier and a large value reservoir capacitor

25. Applying an audio signal to a variable capacitance diode that forms part of an oscillator's tuned circuit will produce:
- Amplitude Modulation (A3E)
 - Frequency Modulation (F3E)
 - Frequency Shift Keying (F1B)
 - Single Sideband Modulation (J3E)

26. Over-driving an external linear amplifier will:
- draw too much current
 - generate intermodulation products
 - result in radiation greater than 400W
 - damage the transmitter driving the amplifier

Transmitters



23. In the block diagram of an HF transmitter above, what is the box marked X?
- the main mixer
 - a sideband filter
 - a crystal oscillator
 - the variable frequency oscillator

24. If you are designing a transmitter that will mix a carrier oscillator with a VFO you should:
- ensure that the frequencies are locked 'in phase'
 - avoid using one oscillator that is a harmonic of the other
 - use an accurate frequency meter to ensure that the oscillators are 'netted' on the same frequency
 - not use oscillators that will produce unwanted outputs close to the wanted frequency

27. Chirp can be cured by:
- filtering the keying circuit
 - using a balanced modulator
 - reducing the receiver selectivity
 - stabilising the voltage to the oscillator circuits

28. The chance of producing harmonics from an HF transmitter would NOT be reduced by:
- using a push-pull final amplifier stage
 - fitting a high-pass filter in the transmitter output
 - using the minimum drive levels necessary
 - coupling the amplifier stage via suitable inductive transformers

29. Which of the following modes of transmission has the highest duty cycle?:
- AM (A3E)
 - FM (F3E)
 - CW (A1A)
 - SSB (J3E)

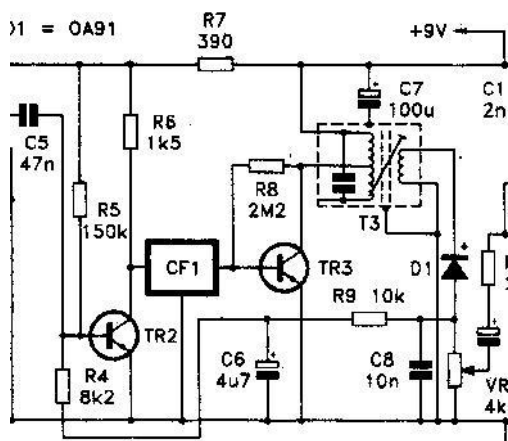
Receivers

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

- sensitivity
- selectivity
- dynamic range
- signal to noise ratio

31. In a superheterodyne receiver the AF output is maintained at a fairly constant level by the:

- IF amplifier
- RF amplifier
- AF amplifier
- AGC amplifier



32. In the circuit shown above TR3 is:

- IF amplifier
- RF amplifier
- AF amplifier
- AGC amplifier

33. In a double superheterodyne receiver the second mixer will convert:

- the wanted signals from the antenna to the intermediate frequency
- the first intermediate frequency to the image frequency
- the first intermediate frequency to the second intermediate frequency
- the second intermediate frequency to the audio frequency

34. Which of the following modes of transmission does NOT include the carrier wave?:

- AM
- FM
- CW
- SSB

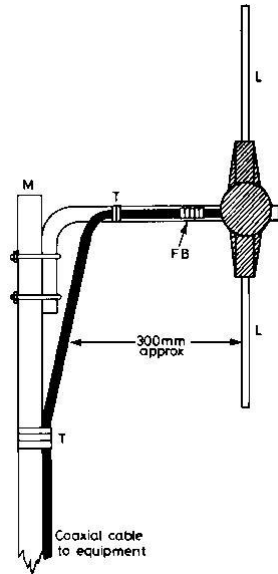
35. In order to receive amateur signals on VHF whilst transmitting on HF the operator might use:

- a down link
- a wobulator
- a transmatch
- a receive converter

Feeders and Antennas

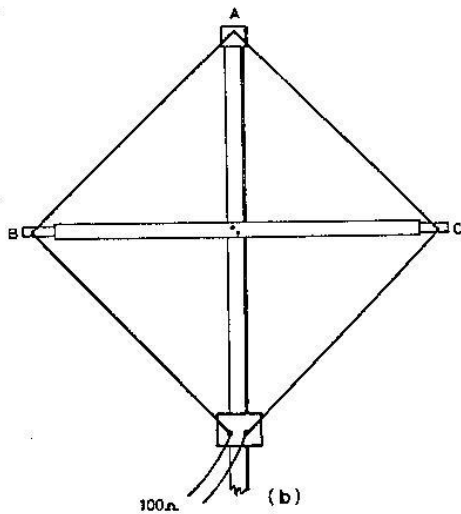
36. A half-wavelength of 50Ω feeder will:

- always be shorter than its electrical length
- always be longer than its electrical length
- always be the same as its electrical length
- sometimes be longer and sometimes be shorter than its electrical length, depending on the velocity factor of the feeder



37. The feedpoint of the UHF antenna shown above is likely to be approximately:

- a. 35Ω
- b. 50Ω
- c. 75Ω
- d. 300Ω

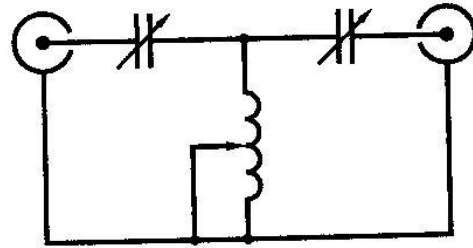


38. The antenna shown in the diagram above is:

- a. a quad
- b. a delta loop
- c. a trap dipole
- d. a folded dipole

39. If an antenna system has a return loss of 60dB and the feeder has a loss of 2.5dB, what is the return loss of the antenna itself?:

- a. 55dB
- b. 57.5dB
- c. 62.5dB
- d. 65dB



40. The circuit shown above can be used as:

- a. an antenna reactance analyser
- b. an antenna matching unit
- c. a return loss bridge
- d. an SWR meter

Propagation

41. As radio waves propagate away from the antenna the:

- a. velocity decreases
- b. Field Strength increases
- c. Power Flux Density increases
- d. E and H fields remain in phase

42. Which of the following combine at night time?:

- 1. D layer
 - 2. E layer
 - 3. F1 layer
 - 4. F2 layer
- a. 1 and 2
 - b. 2 and 3
 - c. 3 and 4
 - d. All of them

43. Which of the following bands would give best chance of propagation between Wales and Scotland during the day?

- a. 3.5MHz
- b. 14MHz
- c. 21MHz
- d. 50MHz

EMC

44. A neighbour reports breakthrough on his terrestrial TV set. You check your Log and find that your 2 metre transmissions are the source. Which harmonic might be the cause?:

- a. 1st
- b. 3rd
- c. 5th
- d. 7th

45. If a frequency modulated signal causes picture loss on a TV screen, the effect is known as:

- a. cross modulation
- b. frequency drift
- c. blocking
- d. ghosting

46. If breakthrough is occurring through a home entertainment system and disconnecting the antenna feeder has no effect, you could rule out:

- a. IF breakthrough
- b. mains borne signals
- c. pick up on the feeder
- d. pick up on the speaker leads

47. The main purpose of a mains filter is to:

- a. prevent mains borne interference entering a receiver
- b. prevent mains borne interference entering the transmitter
- c. ensure the transmitter has a good earth connection
- d. prevent a mains powered transmitter from radiating harmonics

48. Fitting a low loss TV frequency band-pass filter in the TV downlead will attenuate:

- a. the wanted TV signals
- b. common mode currents
- c. signals outside the TV frequency band
- d. UHF harmonics from VHF transmitters

49. If you are radiating 4kW ERP from an antenna located 27m away, what field strength would you be subjected to?:

- a. 0.52V/m
- b. 16V/m
- c. 148V/m
- d. 1037V/m

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

51. If you receive an EMC complaint, your first action should be:
- close your Station down
 - send a report to the local OfCom office
 - seek confirmation of the problem in writing
 - seek confirmation of dates and times of the breakthrough

Operating Practices

52. Packet radio is unique because it is the only data mode that:
- has built in error correction
 - is restricted to Full Licence holders
 - is not permitted to be sent via space communication channels
 - uses a network of amateur Stations to pass messages from the sender to the intended recipient

53. If you are listening to a 70cm repeater on 433.325MHz and you hear another Station calling CQ, on what frequency would you transmit?:
- 431.725MHz
 - 433.325MHz
 - 433.925MHz
 - 434.925MHz

54. Special Event Stations are mainly used to:
- promote amateur radio equipment manufacturers
 - increase contest scores by using an unusual Callsign
 - provide the general public with an introduction to amateur radio
 - allow people who do not hold an amateur radio Licence to operate a Station

55. International bandplans are:
- legally binding
 - used to regulate transmission power levels across the globe
 - formulated by the International Amateur Radio Union (IARU)
 - required by the International Telecommunications Union (ITU)

Safety

56. If adjustments to mains powered equipment must be made with the power switched on, it is advisable to:
- earth your wrists
 - wear a residual current device (RCD)
 - ensure the equipment is insulated from earth
 - only use one hand to make the adjustments

57. You intend to set up a temporary HF station at your local Scout headquarters. Before doing so it is most important to check that:
- there is no risk of thunderstorms during the event
 - there is a clear take off from the roof to ensure good line of sight contacts
 - the mains supply will deliver sufficient current for the equipment involved
 - the RSGB propagation forecast to ensure good international contacts

58. Where a house uses a protective multiple earthing system you should:

- a. bond all metal surfaces to a good RF earth
- b. only connect your antenna system to a good RF earth
- c. bond all metal surfaces to the earth terminal of the electrical consumer unit
- d. fit an earthed static discharge device in the feeder of any unbalanced antenna system

Measurements

59. If a $220\text{k}\Omega$ resistor is connected in series with a $50\mu\text{A}$ meter movement, the meter will indicate a full scale deflection of:

- a. 11V
- b. 4.4V
- c. 4.4kV
- d. 11kV

60. The 7MHz band now extends to 7.200MHz in the UK. If you are using an amateur receiver and a crystal calibrator to mark the band edge of a 7MHz transmitter VFO the calibrator must have outputs at intervals of:

- a. 1kHz
- b. 10kHz
- c. 100kHz
- d. 1MHz

61. To expand an AC waveform on an oscilloscope display you would need to:

- a. increase the timebase setting of the X axis (i.e. more time per division)
- b. decrease the timebase setting of the X axis (i.e. less time per division)
- c. increase the timebase setting of the Y axis (i.e. more time per division)
- d. decrease the timebase setting of the Y axis (i.e. less time per division)

62. Another name for a reflectometer is:

- a. an ionoscope
- b. an SWR meter
- c. a return loss bridge
- d. a mirror backed needle movement

NOW GO BACK AND CHECK YOUR WORK!

**Advanced Mock Exam 2 -
Answers:**

Question	Answer	Book Page
1	D	8 & Licence
2	B	8 & Licence
3	B	6 & Licence
4	A	7 & Licence
5	C	7 & Licence
6	B	8-9 & Licence
7	A	9 & Licence
8	B	10 & Licence
9	C	Licence
10	C	Schedule
11	C	23-30
12	A	25-26 (Calc)
13	B	26-27 (Calc)
14	D	27 (Calc)
15	B	28-29 (Calc)
16	A	31-32 (Calc)
17	B	32 (Calc)
18	B	92
19	D	33
20	B	34-35
21	B	36
22	A	41-42
23	B	44
24	D	56-57
25	B	46 & 49
26	B	60
27	D	55-56
28	B	56
29	B	53
30	C	61
31	D	66-67

Question	Answer	Book Page
32	A	65
33	C	63-64
34	D	66-68
35	D	70
36	A	73-74
37	C	74
38	A	76
39	A	73
40	B	78-79
41	D	80 & 86
42	C	82
43	A	81 (Table)
44	B	88 & table on 89
45	C	89
46	C	88
47	A	92-93
48	C	91-92
49	B	86 (Calc)
50	D	87-88
51	D	95
52	D	11
53	D	12
54	C	12-13
55	C	13
56	D	14
57	C	14-15
58	C	17
59	A	96
60	C	101
61	B	100
62	B	97-98