



Radio Communications Foundation Intermediate Level Examination in Radio Communications

This paper consists of 45 questions, Duration 75 minutes.

INSTRUCTIONS TO CANDIDATES

- You should have 2 items.
1. This question paper
 2. The Schedule to the Intermediate Amateur Licence

All questions have equal marks and all questions should be attempted.

Each question has 4 possible answers, identified 'A' 'B' 'C' and 'D'. Only one answer is correct, the others are wrong. You should decide which of the 4 answers is the correct one and mark the answer box for each question accordingly.

If you decide answer 'C' is correct, show this by ticking in the box marked 'C'. **Take care to ensure your tick does NOT cover two boxes.**

A [] A [✓]

B [] B []

C [✓] C []

D [] D []

If you then change your mind, shade out the tick and tick the box for your new choice.

The Schedule to the licence may be used to help answer any question.

You may also use a calculator.

This paper will contain your answers and must be handed in at the end of the assessment.

Please fill in the details below before the start.

Family Name:	
First names:	
Date of birth:	
Candidate Number:	
Test centre location:	
Date of Test:	

Notice to candidates

You must not talk to or distract any other candidate in the exam room.

You are not allowed any assistance with the exam questions and the invigilator is not permitted to discuss exam questions.

If you need other assistance, please raise your hand and talk quietly to an invigilator when approached.

You may not leave the exam room without permission and may not re-enter the room unless an invigilator has escorted you at all times.

You must use a blue or black pen for your answers and any calculations may be done on the reverse of the question paper.

- 1 Which of the following call signs is that of a UK Intermediate Licence holder?
- A ☐ M3QRP
 - B ☐ MM1QRZ
 - C ☐ 2U0QTH
 - D ☐ GI4QRX
- 2 An Intermediate Licence holder may supervise
- A ☐ no other person
 - B ☐ any unlicensed person
 - C ☐ any other radio amateur
 - D ☐ any other UK radio amateur.
- 3 A temporary location is
- A ☐ anywhere other than the Main Station Address
 - B ☐ an alternative fixed location without a postal address
 - C ☐ an alternative fixed location with a postal address
 - D ☐ any location when mobile.
- 4 An Intermediate Licence holder may operate
- A ☐ outside the UK
 - B ☐ from an aircraft
 - C ☐ from a ship at sea
 - D ☐ through satellites.
- 5 Which of the following types of operation is NOT covered by your Intermediate Licence?
- A ☐ Beacon transmissions.
 - B ☐ Leaving your data transmitter running whilst out at work.
 - C ☐ Operation of a hidden transmitter intended for a direction finding contest.
 - D ☐ Allowing another licensed radio amateur to use your transmitter whilst you are out at work.
- 6 How often must an Intermediate Licence holder test his/her station to ensure it is not causing 'undue' interference?
- A ☐ From time to time.
 - B ☐ Daily.
 - C ☐ Weekly.
 - D ☐ Monthly.

- 7 An amateur Licence must be renewed at least once every
- A ☐ two years
 - B ☐ three years
 - C ☐ four years
 - D ☐ five years.
- 8 What is the maximum permitted RF output power for an Intermediate Licence holder operating on 1.850-2.000MHz
- A ☐ 1W erp
 - B ☐ 32W
 - C ☐ 40W
 - D ☐ 50W
- 9 On which of the following Intermediate Licence frequency allocations must users accept interference from Industrial, Scientific and Medical (ISM) users?
- A ☐ 14.000 – 14.350MHz
 - B ☐ 24.890 – 24.990MHz
 - C ☐ 24000 - 24150MHz
 - D ☐ 248000 – 250000MHz
- 10 A Primary cell is
- A ☐ rechargeable
 - B ☐ normally 1.38V
 - C ☐ a manual handling risk
 - D ☐ useless once discharged.
- 11 If three 10k Ω resistors are wired in series their combined value will be
- A ☐ 1k Ω
 - B ☐ 3.3k Ω
 - C ☐ 10k Ω
 - D ☐ 30k Ω
- 12 A capacitor could be described as
- A ☐ a number of turns of wire
 - B ☐ two metal discs separated by a thin layer of plastic
 - C ☐ a diode that can be used to set the frequency of a tuned circuit
 - D ☐ a semi-conductor.

- 13** Impedance is best described as opposition to energy transfer or storage in a circuit containing
- A ☐ a resistor
 - B ☐ a capacitor
 - C ☐ an inductor
 - D ☐ a resistor and either a capacitor or an inductor.
- 14** 14 To change the resonant frequency of a tuned circuit you would need to change the
- A ☐ frequency of the oscillator
 - B ☐ value of the supply current
 - C ☐ value of the supply voltage
 - D ☐ value of the inductor or the capacitor.
- 15** In a 24V mains power supply unit the rectifier diode is used to
- A ☐ smooth the DC pulses
 - B ☐ change the AC to pulses of DC
 - C ☐ reduce the 230V mains to 24V AC
 - D ☐ reduce the 230V mains to 24V DC.
- 16** If a small base current flows in a transistor the collector current will be
- A ☐ equal to the base current
 - B ☐ larger than the base current
 - C ☐ smaller than the base current
 - D ☐ opposite to the base current.
- 17** To measure current in a series circuit, the multi-meter test probes should be connected
- 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.
- 18** In a modern transmitter the output of the balanced modulator is
- A ☐ a single sideband
 - B ☐ two sidebands
 - C ☐ frequency modulated
 - D ☐ two tones for data transmissions.

19 Mixing audio and radio signals together produces

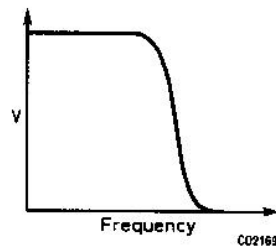
- A ☐ sidebands
- B ☐ harmonics
- C ☐ oscillations
- D ☐ spurious emissions.

20 Multiples of the fundamental output of a transmitter are called

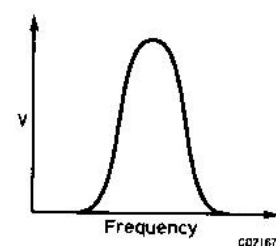
- A ☐ echoes
- B ☐ overtones
- C ☐ harmonics
- D ☐ reflections.

21 Which of the following responses would be produced by a high pass filter?

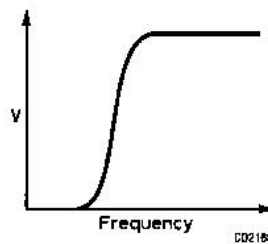
- A ☐ Response A
- B ☐ Response B
- C ☐ Response C
- D ☐ Response D



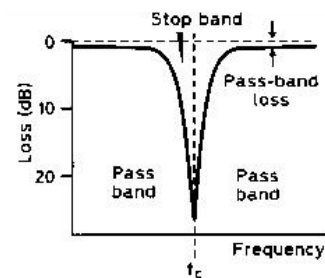
A



B



C



D

22 The output from the demodulator in a superheterodyne receiver will be at the

- A ☐ audio frequency
- B ☐ intermediate frequency
- C ☐ wanted radio frequency
- D ☐ local oscillator frequency

- 23** The wanted signals in a superheterodyne receiver are selected by tuned circuits in the
- A ☐ AF amplifier
 - B ☐ IF amplifier
 - C ☐ RF amplifier
 - D ☐ RF and IF amplifiers.
- 24** 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.
- 25** Coaxial feeder can be buried in damp ground and still work effectively because
- A ☐ the outer insulation acts as an RF screen
 - B ☐ the damp earth absorbs unwanted radiation
 - C ☐ The RF field is confined within the cable
 - D ☐ the equal and opposite RF fields cancel each other out.
- 26** If you find that you have a high SWR reading, you can reduced it by
- A ☐ shortening the feeder length
 - B ☐ adjusting the ATU to match the feeder's input impedance to the transmitter
 - C ☐ tuning the transmitter's power amplifier to match the frequency in use
 - D ☐ adjusting the ATU to match the feeder's characteristic impedance to the transmitter.
- 27** If an Intermediate Licence holder feeds 16W of RF power into an antenna with a gain of 12dB the ERP in the direction of maximum radiation will be
- A ☐ 1W
 - B ☐ 28W
 - C ☐ 192W
 - D ☐ 256W
- 28** Which of the following is the lowest in height?
- A ☐ The troposphere.
 - B ☐ The D layer of the ionosphere.
 - C ☐ The E layer of the ionosphere.
 - D ☐ The F layer of the ionosphere.

- 29** Snow, ice or heavy rain would reduce propagation mostly on
- A ☐ LF
 - B ☐ HF
 - C ☐ VHF
 - D ☐ UHF.
- 30** The wavelength of a signal at 14.230MHz is
- A ☐ 21.1cm
 - B ☐ 47.4cm
 - C ☐ 21.1m
 - D ☐ 47.4m.
- 31** Transmitters for the amateur market built by reputable manufacturers may still cause interference because
- A ☐ the level of harmonics is not normally specified
 - B ☐ different countries have different requirements on their manufactures
 - C ☐ EMC regulations do not apply to amateur equipment
 - D ☐ the RF fields generated are greater than the limits specified in EMC regulations.
- 32** Faulty operation of a transmitter is causing radiation on closely adjacent frequencies; to check for this you should
- A ☐ replace the transmitting antenna with a dummy load
 - B ☐ tune a sensitive receiver to multiples of the transmitter frequency
 - C ☐ tune a de-sensitised receiver to either side of the transmitter frequency
 - D ☐ replace the mains power supply unit with a battery.
- 33** A digital television is suffering from interference from a nearby radio transmission. A likely effect is that
- A ☐ the picture freezes or appears very jerky
 - B ☐ the picture colours are incorrect
 - C ☐ wavy lines appear across the picture
 - D ☐ bands of white and bright dots appear at regular intervals.

- 34** 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.
- 35** When investigating a complaint of breakthrough from your Station which of the following documents would be MOST useful?
- A ☐ your logbook
 - B ☐ your TV Licence
 - C ☐ the Ofcom Licence Document
 - D ☐ your current Validation Document.
- 36** What is the meaning of the code QRZ?
- A ☐ Who is calling me?
 - B ☐ What is your location?
 - C ☐ Do you have my details?
 - D ☐ Are you suffering from static noise?
- 37** Which of the following types of HF transmission is LEAST likely to be affected by rapidly changing propagation conditions?
- A ☐ CW
 - B ☐ SSB
 - C ☐ FM
 - D ☐ SSTV.
- 38** When entering an amateur radio contest you will normally need to
- A ☐ operate from an unusual location
 - B ☐ exchange specified information correctly
 - C ☐ produce QSL cards confirming all contacts
 - D ☐ be a member of the relevant national society.

39 When using an amateur satellite to contact another country you must be able to receive:

- A ☐ the up-link frequency
- B ☐ the down-link frequency
- C ☐ both the up-link and down-link frequencies
- D ☐ the satellite's beacon.

40 When soldering, good eye protection is needed because

- A ☐ the tip of the soldering iron is very hot
- B ☐ the solder fumes are corrosive to eyes
- C ☐ getting solder fumes in your eyes can cause asthma
- D ☐ molten solder could be flicked into the eyes causing blindness.

41 When drilling through metal sheeting you should always

- 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.

42 If you are fixing a new antenna to your property you should

- A ☐ only use a metal ladder
- B ☐ ensure that you are alone on the site
- C ☐ set the ladder at an angle of 4 up to 1 out
- D ☐ ensure that the ladder is placed well away from the antenna.

43 A fuse is used to

- A ☐ produce inductance in a mains lead
- B ☐ remove the mains supply in the event of too much current flowing
- C ☐ remove the mains current if there is a very small current to earth
- D ☐ protect against PME.

44 'Tinning' can be described as

- A ☐ scraping the bare wire to make it shine
- B ☐ enclosing a tuned circuit with a tin shield
- C ☐ ringing in the ears caused by listening to the radio at high volume
- D ☐ coating a surface with solder before making the joint.

45 A resistor with the coloured bands brown, black, black, silver would have a value close to

A [] 0.1Ω

B [] 1Ω

C [] 10Ω

D [] 100Ω

Answer key

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