



## Report on multiple-choice Question Paper

Paper: 7650-010 Radio Amateurs' Examination

Examination date: 20 May 2002

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
1 Licensing conditions	18	<p>Most of the questions on the licensing conditions were very well answered.</p> <p>Some candidates were uncertain of the requirements for identifying the Station when using a mode other than Morse code or speech [BR68 ¶ 7(1)(f)].</p> <p>In a question on greetings messages, 65% of the candidates did not realise that greetings messages sent by non-licensed persons from an amateur station may not be supervised by a holder of an Amateur Radio (Intermediate) Licence [BR68 ¶1(8)(a)].</p>
2 Operating procedures and practices	7	<p>All questions were well answered. Some candidates thought that the h.f. band plans were produced by the International Telecommunications Union (ITU) rather than the International Amateur Radio Union (IARU).</p>
3 Electronic principles and practice	6	<p>The only question in which some candidates found difficulty was on the application of a transformer. 27% of the candidates did not recognise a mains isolation transformer as one with an equal number of turns on the primary and secondary windings.</p>
4 Receivers, transmitters and transceivers	8	<p>Many candidates were unable to calculate the frequency of the beat frequency oscillator (b.f.o.) to produce a 1000 Hz tone of a 1820 kHz c.w. signal when the receiver local oscillator was on 3435 kHz.</p> <p>Only 16% of the candidates answered correctly a question about the power supply requirements for an h.f. transceiver providing 400W continuous r.f. output and operated from a 13.8V supply. Most candidates thought that 30A would be adequate. This would have assumed an efficiency of almost 100%, which is impractical. Of the options available, the 50A supply was the correct one to use.</p> <p>55% of the candidates had difficulty with a question on the bandwidth of an amplitude modulated (a.m.) signal. Rather than the bandwidth being twice the modulating audio frequency, many candidates added together the carrier and audio frequencies.</p>
5 Transmitter interference	14	<p>29% of the candidates thought that key clicks could be reduced by improving the stabilisation of the power supply.</p> <p>Many candidates did not appreciate that spurious responses within a receiver can cause the use of a general coverage receiver for monitoring purposes to give misleading results.</p> <p>There continues to be some misunderstanding about what determines the basic accuracy of a digital frequency meter. Some candidates were confused between 'accuracy' and 'precision' and thought that the number of display digits determine the accuracy. If the internal oscillator is not correctly adjusted, no matter how many digits there are, the frequency meter will not be accurate.</p>

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6 Electromagnetic compatibility	14	<p>Four questions in this section require comment:</p> <p>In a question about i.f. breakthrough on a v.h.f. broadcast receiver, 46% of candidates said they would fit a low pass filter, rather than an i.f. trap inside the receiver close to the aerial socket. This would normally be a rejector (parallel) circuit, tuned to 10.7 MHz, which is the usual i.f. frequency of v.h.f. receivers.</p> <p>39% of candidates chose to position ferrite ring r.f. filters close to the loudspeakers instead of as close as possible to the amplifier. Their purpose is to prevent any r.f. currents picked up by the loudspeaker leads from entering the amplifier.</p> <p>44% of candidates did not recognise an inductor and a capacitor in a circuit as being provided to attenuate r.f. currents in the power supply line.</p> <p>In a question about earthing in an amateur station, only 35% of candidates correctly chose to earth the outer of their antenna coaxial cable at the point where the feeder enters the building.</p>
7 Propagation and antennas	7	<p>The questions on propagation and antennas were quite well answered by most of the candidates. There was some misunderstanding about the direction of the magnetic field and its relation to the polarisation of radio waves.</p> <p>The effect of small movements of the ionospheric layers was incorrectly understood by 38% of candidates to enable signals to travel greater distances than normal. Small amounts of movement would mainly cause variation of the signal strength at the receiver (fading).</p>
8 Measurements	6	<p>This section was well answered. The question on displaying three cycles of a waveform on an oscilloscope caused difficulty among the less able candidates. The time base should be set to one-third of the waveform frequency.</p>
General comments on the paper		<p>Candidates were generally well prepared for the examination, their performance being a little above average for the Radio Amateurs' Examination.</p> <p>The total number of candidates was 323 of whom there were 35 from Hong Kong, 20 from Trinidad and Tobago, 6 from Malta and 2 from Oman. The RAE is used in some countries overseas as a qualification for amateur radio licences.</p> <p>The above report is based on a detailed analysis of the results of 245 candidates that were available at the time of writing. Of the 245 candidates, 178 (72.7%) of them were successful.</p> <p>The next Radio Amateurs' Examination is scheduled to take place at approved centres on Monday, 2 December 2002.</p> <p>Reports for the Radio Amateurs' Examination (7650) and the Novice Radio Amateurs' Examination (7730) are normally available on the Internet about three weeks after the date of each examination at</p> <p style="text-align: center;"><a href="http://www.g4dmp.co.uk/">http://www.g4dmp.co.uk/</a></p>