



Report on multiple-choice Question Paper

Paper: 7650-010 Radio Amateurs Examination

Examination date: 4 December 2000

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
1 Licensing conditions	18	<p>Nearly all the questions on the licensing conditions were very well answered.</p> <p>There was still some misunderstanding about the broadcasting of news of amateur radio interest. Broadcasting of any kind is not permitted under the terms of the Amateur Licence whether it is of amateur radio interest or not. [BR68: 1(7)]</p> <p>One question that caused some difficulty asked about the percentage of mean power outside an amateur band that is permitted in the bandwidth of the emission. [BR68: 4(1)(b)]</p>
2 Operating procedures and practices	7	<p>Some candidates found difficulty with a question about the bandwidth occupied by an s.s.b. signal containing audio frequencies between 250 Hz and 2500 Hz. The correct answer was 2250 Hz.</p> <p>In a question about call signs, many candidates chose 2W1XUL as a club station in Wales. In fact, club stations are not permitted under a Novice Licence and the correct answer was GC1ZUR.</p>
3 Electronic principles and practice	6	<p>Most candidates had a good understanding of basic principles and all the questions were well answered.</p>
4 Receivers, transmitters and transceivers	8	<p>About half of the candidates did not appreciate that reducing the i.f. bandwidth of a receiver could assist in the reception of s.s.b. signals under conditions of high atmospheric noise.</p> <p>In a question about the reason for limiting the audio bandwidth of a transmitter, 39% of candidates thought that it was to prevent over-modulation rather than to prevent wasteful use of the r.f. spectrum.</p> <p>The other questions were very well answered.</p>
5 Transmitter interference	14	<p>35% of candidates thought that spurious emissions were always harmonically related to the carrier frequency. They did not appreciate that parasitic oscillations, excessive sidebands, clicks and other unwanted signals are also regarded as spurious emissions.</p> <p>A question on measuring the frequency of an incoming signal again caused difficulty, illustrating that some candidates lacked knowledge of practical application. 36% of candidates thought that the frequency of an incoming signal could be measured merely by coupling a digital frequency meter to a receiver antenna.</p>
6 Electromagnetic compatibility	14	<p>Candidates found difficulty in answering four of the questions on e.m.c.</p> <p>There was a case history of a 144 MHz s.s.b. transmission causing interference to an FM stereo radio. The symptoms were given but 69% of candidates chose the wrong solution to the problem.</p>

continued overleaf

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
<p>6 Electromagnetic compatibility continued</p> <p>7 Propagation and antennas</p> <p>8 Measurements</p>	<p>7</p> <p>6</p>	<p>The reason for using a filter in the mains supply to a transmitter to prevent r.f. entering the public mains supply was not well understood. Many candidates thought that it was to prevent hum from modulating the transmitter.</p> <p>The purpose of a 1:1 balun still causes problems with some candidates. Instead of preventing r.f. currents flowing on the outer braid of coaxial cable, 70% of the candidates thought that it was to improve impedance matching.</p> <p>The circuit of a filter in the input to a microphone amplifier was not recognised by 59% of candidates as being to limit the audio bandwidth. 39% of candidates thought that the network was provided to filter r.f. feedback.</p> <p>Some candidates were unfamiliar with a quad antenna and could not determine the length of wire required for the driven element. Each side of the square is a quarter of a wavelength, so the total length of wire required for the 14 MHz band would be approximately 20m.</p> <p>Many candidates thought that the speed of radio waves increased with frequency and did not know that the speed depends on the medium through which the waves are moving.</p> <p>There was a lack of knowledge about selective fading which is caused by wave variations with very small changes of frequency. The effect of this is to produce distortion on the modulation of the received signal.</p> <p>A question on the length of a vertical ground plane antenna was very badly answered, only 19% of candidates answering the question correctly. The length is a quarter of a wavelength. Hence, for the 144-146 MHz band the length would be approximately 500mm.</p> <p>23% of candidates knew that a microammeter was used in the circuit of the s.w.r. meter shown. The other candidates thought that the instrument was either a d.c. voltmeter or an r.f. voltmeter.</p> <p>In a diagram showing several meters in a transistor circuit, a quarter of the candidates correctly chose the two meters that gave the same reading. Most candidates thought that the meters in the supplies to the base and collector would read the same.</p> <p>Many candidates did not realise that a thermostatically controlled crystal oven can be used to house a quartz crystal in applications such as the standard used in a digital frequency meter where a high degree of precision and accuracy are required.</p>
<p>General comments on the paper</p>	<p>The more able candidates were able to answer most of the questions correctly, including those that called upon a knowledge of those areas of the syllabus requiring practical application and experience. The successful candidates were well prepared for the examination.</p> <p>There was a total of 171 candidates of whom 117 (68.4%) were successful.</p> <p>The next Radio Amateurs Examination is scheduled to take place at approved centres on Monday, 14 May 2001. The City and Guilds fee for the examination remains at £28.10.</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;">http://www.g4dmp.co.uk/</p>	