



Report on multiple-choice Question Paper

Paper: 7650-010 Radio Amateurs Examination

Examination series: 6 December 1999

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
1 Licensing conditions	18	<p>Questions on the licensing conditions are usually well answered, but four questions in the December 1999 paper attracted wrong responses by many candidates.</p> <p>In a question about the conditions for the Station Log, the correct response was that the call sign of the station contacted should be entered for each contact. Nearly half the candidates said that the entries should be made at the time of sending and receiving. While this used to be a requirement, it is no longer specified in the current licence.</p> <p>Another question asked on whose behalf the Station may be used to send messages. The correct answer was "the User Service concerned", but most candidates thought that messages could be sent of behalf of any other licensed radio operator. While this may be true in the case of other <i>amateur</i> radio operators, it is not the case in respect of licensed radio operators of other services.</p> <p>Most candidates thought that one way by which amateur radio licences could be revoked was by a "written request from the planning authority". Para 8.(4) of BR68 clearly states the methods by which the Licence can be revoked and includes a general broadcast by the BBC.</p> <p>In a question about operation in international waters, many candidates thought they were limited to the bands in their own Schedule, rather than those in the ITU region in which they are located.</p>
2 Operating procedures and practices	7	<p>There was a general lack of knowledge as to the origin of the h.f. frequency band plan. Only 23% of candidates knew that the band plans are produced by the International Amateur Radio Union.</p>
3 Electronic principles and practice	6	<p>A question on the frequency determining components in a series-tuned Colpitts oscillator caused difficulty with many candidates. The application of Ohm's law to a zener diode circuit in another question was also badly answered, only a quarter of the candidates answering the question correctly.</p>
4 Receivers, transmitters and transceivers	8	<p>Three questions in this section were generally not well answered. Many candidates were unable to determine the purpose of the a.g.c. diode in a receiver circuit.</p> <p>A disappointing number of candidates were able to identify the phase detector in the block diagram of a frequency synthesiser.</p> <p>There was some confusion between the purpose of the crystal filter and that of the balanced modulator in an s.s.b. transmitter. 35% of candidates thought that it was the balanced modulator that removed the unwanted sideband, rather than the crystal filter.</p>
5 Transmitter interference	14	<p>27% of candidates chose to use the Squelch control of a transceiver to reduce adjacent channel interference instead of a Notch filter.</p> <p>In a question on a valve power amplifier, the more able candidates knew that it is the control grid to which an alternating source is normally applied.</p>

continued overleaf

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
<p>continued</p> <p>5 Transmitter interference (continued)</p> <p>6 Electromagnetic compatibility</p> <p>7 Propagation and antennas</p> <p>8 Measurements</p>	<p>14</p> <p>7</p> <p>6</p>	<p>A question on a convenient way of measuring the frequency of an incoming signal was again poorly answered, 40% of candidates thinking that a digital frequency meter could merely be coupled to the receiver antenna. The correct answer was to use a calibrated receiver.</p> <p>In another question concerned with the accurate measurement of the frequency of a transmitter, 30% of candidates thought that an absorption wavemeter could be used for the purpose.</p> <p>Most of the questions on e.m.c. were quite well answered, only two requiring comment.</p> <p>The diagram of an r.f. filter in the keying leads to a transmitter was not recognised by many candidates as a device for eliminating short range key clicks. Most candidates thought it would either prevent chirp or long range key clicks.</p> <p>36% of the candidates naïvely felt that current EC regulations covering e.m.c. in vehicles would ensure there being no problems caused by the operation of transceivers in modern cars. Candidates should be aware that, despite legislation on the design of vehicles, dangerous disruption to the vehicle's electronics systems can still occur.</p> <p>Candidates had difficulty with a question that asked about the overall length of a trapped dipole antenna. The problem arises from candidates not knowing that a dipole antenna is half a wavelength long. A trapped dipole antenna for the 7, 14, 21 and 28MHz bands would therefore be somewhat less than 20m in length. 36% of candidates said that it would be 40m.</p> <p>Most candidates do not understand that the turns ratio of a transformer is the square root of the impedance ratio. Hence, a transformer designed to match 300Ω to 75Ω would have a turns ratio of 2:1. 65% of the candidates incorrectly answered 4:1.</p> <p>One question requires particular comment, the other questions being quite well answered.</p> <p>A calculation of the efficiency of a power amplifier stage was very poorly answered, the spread of responses suggesting that many candidates attempted to guess the answer. The question showed a block diagram of a p.a. stage to which the supply voltage was 12.5V at 8A (100W). The output current to a 50Ω dummy load was 1A (50W). 32% of the candidates correctly answered that the efficiency was 50%, while 33% answered 25% and 30% of the candidates thought it was 75%.</p>
<p>General comments on the paper</p>		<p>Several of the questions that were not well answered again show a lacking of some candidates in practical experience or demonstration. The detailed item analysis indicates that the overall performance of candidates was a little better than the average.</p> <p>Of the 236 candidates for the December 1999 examination, 159 (67.4%) were successful.</p> <p>The next Radio Amateurs Examination is scheduled for Monday, 8 May 2000. The City and Guilds fee is £27.55</p>