



Report on multiple-choice Question Paper

Paper: 7650-003/004 Radio Amateurs Examination

Examination series: May 1998

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
1 Licensing conditions	18	<p>Most candidates had an excellent knowledge of the licensing conditions and obtained high marks. Three questions caused difficulty among several of the less able candidates.</p> <p>In a question about greetings messages by non-licensed persons at a club station, 78% of the candidates did not know that each person is permitted to send only one message to each station in contact.</p> <p>41% of the candidates thought that the Amateur Licence authorised the Licensee to receive broadcasting stations, whereas the correct answer to this question was that the Licensee may use the Station to receive transmissions in the Standard Frequency Service. No licence is required to receive broadcast stations or licensed amateur stations.</p> <p>When asked what need not be entered in the log, 26% of the candidates thought that it was unnecessary to log the power. Since the issue of the Amateur Licence in 1988 it has been a requirement to show the power (or power level in dBW) in the log.</p>
2 Operating procedures and practices	7	<p>All questions on operating practices were well answered with the exception of one item on an amateur station log. 36% of candidates thought that the log must be retained at the station for one year; 25% thought that it must contain only the information required by the Licence. The correct response, answered by 33% of the candidates, was that the log can be a valuable aid to the operation of the station by logging all communications and observations in full.</p>
3 Electronic principles and practice	6	<p>Generally well answered, but only one third of the candidates knew that a parallel resonant circuit would be more selective if the coil had a low resistance. In a question that showed a diagram of a common emitter transistor switching a relay, many candidates did not know the purpose of a resistor in the base circuit.</p>
4 Receivers, transmitters and transceivers	8	<p>Only a quarter of the candidates answered correctly a question that asked about the purpose of a pre-selector in a superheterodyne receiver.</p> <p>Another question that was not well answered asked the candidates to calculate the frequency of the beat note of a c.w. signal, given the frequencies of the signal, the local oscillator and the b.f.o. Candidates did not know how to determine the intermediate frequency and then subtract from it the frequency of the b.f.o.</p> <p>There was some misunderstanding about the purpose of the IF Shift control on an h.f. band transceiver, many candidates thinking that it was to adjust the gain of the i.f. amplifier stages rather than to minimise adjacent channel interference.</p> <p>The other questions in this section were well answered.</p>
5 Transmitter interference	14	<p>Several questions on transmitter interference require comment. In a question about a 7MHz transmitter causing interference on the 14MHz band, 40% of the candidates thought that this was caused by poor frequency stability of the oscillator.</p>

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
<p>continued</p> <p>5 Transmitter interference</p> <p>6 Electromagnetic compatibility</p> <p>7 Propagation and antennas</p> <p>8 Measurements</p>	<p></p> <p>14</p> <p>7</p> <p>6</p>	<p>Parasitic oscillations in the p.a. stage of a transmitter were not well understood, many candidates thinking that their frequency would be on a harmonic of the oscillator.</p> <p>Many candidates understood a two-tone test to be somehow related to repeater access rather than as a method of checking the operation of an s.s.b. transmitter.</p> <p>Half of the candidates did not understand that frequency chirp from a c.w. transmitter is often caused by poor power supply regulation; a third of the candidates thought that it was due to the fast rise time of the carrier envelope. They were evidently confusing chirp with key clicks.</p> <p>Many candidates did not know that reducing the microphone gain can often minimise splatter.</p> <p>Many candidates did not realise that digital circuitry controlling a crystal clock oscillator would be likely to generate interference on a wide range of frequencies, eg, a computer operating in close proximity to a receiver. Over half of the candidates thought that it would cause either very narrow band interference or no interference at all.</p> <p>A question on a 1:1 balun caused problems, 63% of the candidates thinking that this would improve the impedance match between the antenna and the transmitter. 28% of the more able candidates answered correctly that the balun prevents r.f. currents flowing on the outer of the coaxial cable. The other questions on e.m.c. were well answered.</p> <p>Only 33% of candidates answered correctly that the polarisation of a radio wave is determined by the direction of the electric field.</p> <p>In a question about a folded dipole, many candidates said they would feed it with 75Ω coaxial cable and a 1:1 balun. Of the choices available, the correct feeder was 300Ω ribbon feeder.</p> <p>Most candidates did not recognise 600Ω open wire feeder as a feeder that would introduce the lowest losses. Many of them chose 50Ω coax.</p> <p>A quarter of the candidates chose to use an a.c. meter to measure a d.c. voltage across a resistor in a potential divider.</p> <p>A question on the measurement of d.c. power input to the final stage of a transmitter caused difficulty, many candidates choosing to multiply the base current, rather than the collector current, by the applied voltage.</p> <p>The interpretation of an oscilloscope trace caused difficulty with some candidates. Many of them did not know how to use the trace to find the peak r.f. power output of a transmitter.</p>
<p>General comments on the paper</p>		<p>This was the first examination in the new style of paper comprising two parts in which candidates were required to be successful in the first part in order to be successful in the paper as a whole. The above comments on several of the questions are intended to advise candidates and their tutors on some areas of weakness.</p> <p>A detailed analysis of the paper showed it to be more difficult than normal. The performance of the candidates was found to be slightly better than average. This was taken in account during moderation of the paper and is reflected in the percentage of candidates who were successful in the examination.</p> <p>Of the 872 candidates who took the examination, 589 (67.5%) were successful. In addition, there were 55 people who entered for the examination but did not attend. Of all the candidates who took the examination, 88.1% of them were successful in Licensing Conditions and Operating Procedures.</p>