Assessment Services
1 Giltspur Street London EC1A 9DD
Telephone 0171 294 2468 *Facsimile* 0171 294 2400

City & Guilds

OTS 99

Report on multiple-choice Question Paper

Paper: 7650-010 Radio Amateurs Examination

Examination series: May 1999

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
1 Licensing conditions	18	Questions on the licensing conditions were very well answered by nearly all candidates. 37% of candidates did not recognise "Signals (not enciphered) which form part of, or relate to, the transmission of Messages" as being one of the conditions for messages in Booklet BR68. 35% of candidates thought they were allowed to broadcast messages for general reception by other amateurs. Candidates were perhaps being confused by the amateur news services which are not covered by a normal Amateur Licence.
2 Operating procedures and practices	7	Almost half of the candidates did not appreciate s.s.b. as being the preferred method of modulation to minimise power requirements when using a satellite transponder. A third of the candidates thought that frequency modulation would use less power. A question of the use of the phonetic alphabet caused some difficulty, a third of the candidates thinking that the phonetic alphabet set out in the Licence was mandatory. In fact, Note (u) of the Licence only recommends the version to be used.
3 Electronic principles and practice	6	53% of candidates knew that a transformer could not provide a higher power output from that of the source. But many candidates did not understand that the load impedance can differ greatly from that of the supply. There was confusion among many candidates between the gate and source in the circuit symbol for an FET, only 55% of candidates correctly identifying the gate. The other questions in this section were well answered.
4 Receivers, transmitters and transceivers	8	In an example of second channel interference, fewer than half of the candidates recognised this as being due to poor image frequency rejection in the receiver. Despite the frequencies being given in the question, a quarter of the candidates thought that the interference was caused by harmonic radiation. The frequency on which the beat frequency oscillator of a receiver is tuned was not generally understood, only 34% of the candidates knowing that it is normally tuned near to the intermediate frequency. 38% of candidates thought that a buffer stage in a transmitter was used to protect the driver stage from overmodulation. Its use to isolate the oscillator from other stages in the transmitter was understood by half of the candidates. 52% of the candidates knew that too large an audio signal applied to an f.m. transmitter would cause excessively wide sidebands, while 27% of them thought that it would result in the radiation of harmonics.
5 Transmitter interference	14	In a question on spurious emissions from an s.s.b. transmitter, only half of the candidates understood the importance of using a linear output stage. 37% of the candidates thought that using an unstabilised power supply would be the cause of spurious emissions. When detecting the presence of parasitic oscillations in a transmitter, 41% of the candidates chose to tune a receiver over only the band on which the transmitter is being used, not realising that parasitic oscillations can be on h.f., v.h.f. or u.h.f. frequencies.

continued overleaf

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
continued		
5 Transmitter interference (continued)		Fewer than half of the candidates selected a 100kHz crystal for a calibrator used in conjunction with a receiver to ensure that a transmitter is operating within the limits of the 28.0 to 29.7MHz band. Many candidates said they would use a 10kHz crystal.
6 Electromagnetic compatibility	14	Candidates had a good knowledge of e.m.c. matters but two questions require comment. When asked what piece of equipment would generate a single, narrow band signal, many candidates chose a computer rather than the station transmitter. In a question on a filter connected in the mains supply to a transmitter, most candidates thought that its purpose was to prevent mains borne interference affecting the operation of the transmitter, rather than to prevent r.f. from the transmitter entering the public electricity supply.
7 Propagation and antennas	7	There was some confusion as to whether the polarisation of an antenna corresponded to the electric or magnetic component of a transmitted wave. A question on the distribution of current in a half wave dipole was not well answered. Four alternative diagrams were given as possible answers. 38 % of the candidates correctly chose the one showing minimum current at each end and a maximum at the centre. In another question on a balanced feeder with spaced conductors, only a third of the candidates recognised this as having an impedance of about 600 ohms.
8 Measurements	6	Some candidates thought that the base voltage of a transistor should be measured with a voltmeter having a moving coil, rather than merely one having a high resistance. A question asked what a reasonable output would be from a class C stage having a d.c. input of 45W. Most candidates did not consider the efficiency of the stage and answered 45W. Another question on measuring the output power of a transmitter showed a diagram with a meter connected directly across a dummy load resistor. Half of the candidates correctly recognised this as an r.f. voltmeter but a quarter of them thought it was an ammeter.
General comments on the paper		Questions on the licensing conditions and operating procedures were very well answered, but many of the less able candidates found difficulty with some of the practical aspects essential for operating and maintaining an amateur station. In particular, such topics as preventing the radiation of spurious signals and the measurement of transmitter power are necessary to ensure that a licensee operates within the terms of the Amateur Licence. The overall performance of candidates for the examination was about average. This report is based on a detailed analysis of the performance in each of the questions of candidates whose papers had been returned promptly to City and Guilds following the examination. Of the 664 candidates, 463 of them (69.7 %) were successful. There were a further 50 entrants for the examination, the results of which were not available for inclusion in the analysis for this report.