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: 7650-001 Radio Amateurs' Examination Examination series: December 1995

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
1 Licensing conditions	15	Although most of the questions on licensing conditions were quite well answered, some candidates had particular difficulty with three questions: Only 38% of the candidates answered correctly a question about the use of an amateur station. Many candidates thought that the licence allowed the transmission of amateur radio news and the relaying of another amateur station to increase the range. There was evidently confusion between the Amateur Radio Licence and the special licences issued for news broadcasts and packet repeaters. Also on the use of the Station, most candidates thought that the licence authorised the reception of broadcast stations. The correct answer was that the licence authorises the licensee to receive Standard Frequency transmissions. This does, however, include the Droitwich 198kHz transmission, which carries BBC Radio 4, the frequency of which is accurate to within ± 2 parts in 10^{11}. 37% of candidates answered correctly a question about the bands that could be used to meet the needs of international disaster communications. This showed a lack of knowledge of para 1(3) of the Licence Booklet.
2 Transmitter interference	15	The performance of candidates on questions on transmitter interference was generally not good, six of the fifteen questions being badly answered by many candidates: The advantage of a transistorised broadband p.a. stage was not recognised as being operator convenience. Many candidates thought that it provided good harmonic suppression. Many candidates thought that key clicks were caused by the actual sparks at the key contacts, rather than them being due to the steep rise and decay of carrier amplitude.

continued overleaf

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
continued		
2 Transmitter interference (continued)		The cause of parasitic oscillations was not understood, many candidates thinking that they were the result of a stage having high amplification. Only 17% of candidates were able to identify a parasitic stopper resistor in the circuit of a p.a. stage. Over half the candidates did not recognise a general coverage receiver as being suitable for detecting the presence of parasitic oscillations. 30% of candidates thought that a simple absorption wavemeter and detector circuit was suitable for ensuring that a transmission was free from frequency instability. It is suitable only to check that a transmitter is in the correct band.
3 Electromagnetic compatibility	15	Five questions in this section require comment: Many candidates thought that e.m.c. was concerned only with the generation of unwanted r.f. rather than the ability of several systems to coexist without interaction. 30% of candidates incorrectly selected a commutator motor as the device that produced narrow band interference. This question was more poorly answered than previously, indicating that the comments in the Examiner's Report for the December 1993 paper had apparently gone unheeded. 41% of the candidates chose to use an h.t. smoothing circuit comprising two 8μF capacitors and a 10H choke to suppress mains borne interference. Again, the December 1993 Report points out this error. A question on the use of ferrite rings to suppress interference on a domestic amplifier system was not well answered. Nearly half the candidates chose to use an electrolytic capacitor in a mains filter, rather than a paper capacitor.
General comments on the paper		There were many questions in this paper that were very badly answered. Several of these showed a lack of practical experience and understanding of the subject matter. While candidates should **not** try using electrolytic capacitors in mains filters, they should be aware of the dangers. Practical work demonstrating parasitic oscillations, commutator motor interference and the uses of the absorption wavemeter should not be difficult to devise.

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: 7650-002 Radio Amateurs' Examination

Examination series: December 1995

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
1 Operating procedures	9	Generally well answered. In one question a third of the candidates thought that the log should be retained for one year. The correct answer was that the log can be a valuable aid to the operation of the station.
2 Electrical theory	6	34% of candidates thought that a steady d.c. current would flow through a resistor connected in series with a capacitor, and that the current would depend on the value of the resistor. Assuming no leakage, the current would, of course, be zero. A question about the factors affecting the inductance of a coil produced many wrong answers. Only 30% of candidates knew that, of the factors given, an increase in the cross-sectional area of the coil caused an increase of inductance.
3 Solid state devices	7	In a question on the symbol for a field effect transistor (FET), many candidates confused the Source with the Gate. About half of the candidates answered correctly that the operation of an oscillator depends on positive feedback. Most of the other candidates thought that it was caused by modulation. The purpose of high value resistors to equalise the voltage across smoothing capacitors was not known by most candidates, many thinking that they were to limit current or prevent damage caused by transient surges.
4 Receivers	7	Apart from one question about the advantage of a low i.f., questions on receivers were well answered. A third of the candidates thought that a low intermediate frequency was chosen to minimise second channel interference, rather than to increase selectivity, and hence minimise adjacent channel interference.

continued overleaf

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
continued		
5 Transmitters	8	Two questions on frequency synthesisers were not well answered. Many candidates did not know that the step frequency in an s.s.b. transceiver is usually 100Hz. In another question, candidates did not know how the output frequency is related to the reference frequency and dividing factor. Only a third of the candidates answered correctly a question about reducing the audio bandwidth of a telephony transmitter. Most candidates thought this would be achieved by turning down the microphone gain control, rather than by connecting a capacitor across the microphone to limit the high frequencies.
6 Propagation and antennas	9	Most candidates did not know that fade outs are caused by sudden bursts of ultraviolet radiation from the sun. The effect of lowering the height of a dipole has on its impedance was understood by only 28% of the candidates. Only 20% of the candidates recognised that the feeder suitable for connecting directly to the centre of a half wave dipole should be 75Ω balanced twin. Most candidates suggested either 50Ω or 75Ω co-axial (unbalanced) feeder be used.
7 Measurements	9	While some questions were well answered, three caused particular difficulty: Many candidates were unfamiliar with the efficiency of a p.a. stage and how to calculate the efficiency from the power output and power input. Fewer than half the candidates recognised a meter connected across a dummy load resistor as an r.f. voltmeter. Most thought it was an ammeter. A circuit diagram showing an inductor, variable capacitor and filament lamp connected in series was not recognised by most candidates as an absorption wavemeter suitable for measuring the approximate frequency of a transmitter. Many thought it was to detect the presence of over modulation.
General comments on the paper		The performance of candidates in Paper -002 was disappointing and well below average. This shows that many candidates were not prepared for the examination. While there was a knowledge of some of the more simpler principles and practices, many candidates were unfamiliar with several topics essential for the practising radio amateur. In consequence, the proportion of candidates successful in this paper is lower than usual.