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City & Guilds

OTS 99

Report on multiple-choice Question Paper

Paper: 7650-010 Radio Amateurs Examination

Examination date: 3 December 2001

Syllabus Topic or Objective	Number of items	Comments on performance of candidates
1 Licensing conditions	18	Most of the questions on the licensing conditions were very well answered, just two questions needing comment: The question on what would not be an acceptable location identifier cause some difficulty. 30% of candidates thought that the full postcode would not be accepted. The correct answer was the National Grid Reference correct to 10km. For the NGR to be acceptable, it must be correct to six figures [BR68 Note (v)]. 61% of the candidates did not know that the bands that may be used when operating Maritime Mobile in international waters are those in the ITU region in which the ship is located [BR68 2(13)].
2 Operating procedures and practices	7	In a question that asked on which band s.s.b. should not be used, one third of the candidates chose the 50 MHz band. The correct answer was the 10.100-10.150 MHz band. As this band is only 50 kHz wide, on a worldwide basis, the international band plan recommends that only c.w. and digimodes are used. Several candidates had difficulty with a circuit using light emitting diodes to indicate that a fuse had blown.
3 Electronic principles and practice	6	A question on the effect of squeezing a self-supported coil thereby shortening its overall length was not well answered. 66% of candidates did not appreciate that this would increase the coil's inductance and hence lower its resonant frequency.
4 Receivers, transmitters and transceivers	8	The control voltage to provide automatic gain control (a.g.c.) in a receiver was not understood by most candidates. It was not generally known that the voltage is normally obtained from the output of the i.f. amplifier stage. Only 37% of the candidates were able to recognise a circuit diagram as being suitable for applying frequency modulation to a transmitter. The other questions in this section were well answered.
5 Transmitter interference	14	Fewer than half of the candidates knew that chirp on a c.w. transmission is often due to poor power supply regulation. 35% of the candidates thought that chirps were produced by fast rise time of the carrier envelope, evidently confusing chirp with key clicks. The production of spurious sidebands caused by over modulation was not understood by many candidates. 29% of candidates thought that a dip oscillator was a device for checking a transmitter for spurious emissions. Of the options in the question, the general coverage receiver was the best choice for this purpose. Another question which continues to cause difficulty was on a means of measuring the frequency of an incoming signal. Many candidates thought that this could be done merely by coupling a digital frequency meter to the receiver antenna. A receiver should be used, its calibration having been checked against a crystal calibrator. continued...

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6 Electromagnetic compatibility	14	In a question on the use of ferrite ring filters to cure r.f. interference to audio hi-fi equipment, many candidates chose to insert the filters at the speakers rather than as close as possible to the output terminals of the amplifier. A circuit of a simple audio pre-amplifier was given in which candidates were asked which capacitor had the function of improving immunity of interference from a transmitter. 29% of the candidates selected the correct capacitor in the circuit. Only one-third of candidates recognised the filter circuit at the input of a microphone amplifier as being provided to limit the bandwidth of the audio signals. A question about potential e.m.c. problems in vehicles was not well answered, 28% of the candidates incorrectly assuming that there would be no problems provided the installation was covered by EC regulations.
7 Propagation and antennas	7	There was some misunderstanding among many of the candidates about the relationship between the electric and magnetic fields of a radio wave. 29% of candidates incorrectly thought that the ionosphere was the main means of propagation at v.h.f. and u.h.f. In a question on a trap dipole designed for the 14 and 28 MHz bands, 65% of candidates were unable to determine the approximate distance between the two traps.
8 Measurements	6	The questions on measurements were very well answered, just one question causing difficulty with some candidates. When measuring the voltage across one resistor of a potential divider network, several candidates did not take the resistance of an analogue meter into consideration.
General comments on the paper		Candidates were generally well prepared for the examination, their overall performance being about average for this examination. Again, there was evidence that some candidates were lacking in practical application. Perhaps an exercise that could be included in courses would be for candidates to be given the task of measuring the frequency of an incoming signal, given various types of test equipment. From the detailed analysis of the results of each of the questions the pass mark was determined. Of the 187 candidates, 127 (67.9%) of them were successful. The next Radio Amateurs Examination is scheduled to take place at approved centres on Monday, 20 May 2001. The City and Guilds fee is £29.00. 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 http://www.g4dmp.co.uk/