

City and Guilds of London Institute

DEPARTMENT OF TECHNOLOGY

1957

55.—RADIO AMATEURS' EXAMINATION

Friday, May 10th, 6.30 to 9.30 p.m.

*Eight questions in all are to be attempted, as under :**All four in Part 1 (which carry higher marks) and four others from Part 2.***Part 1***All four questions to be attempted from this part.*

1. Licence conditions.

(a) State the requirements in respect of the following:—

(i) Log-keeping. What entries should be made?

(ii) Frequency control and measurement.

(b) (i) What is meant by "shared" bands?

(ii) Which bands are shared? (15 marks)

2. With the aid of a diagram describe an "artificial" aerial. How can an "artificial" aerial be used to measure the power output of a transmitter? (15 marks)

3. Describe, with the aid of a circuit diagram, a frequency-stabilised C.W. telegraph transmitter. Comment on the method of keying. (15 marks)

4. List various types of interference that can be caused by an amateur transmitter. Describe methods of abating the interference in each case. (15 marks)

Part 2*Four questions only to be attempted from this part.*

5. Describe the construction of a half-wave dipole aerial and indicate a method of coupling it to the transmitter. Show the voltage and current distribution in the aerial and the radiation pattern.

(10 marks)

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6. Describe any one method of checking that a telephony transmitter is not over-modulated. (10 marks)

7. Define *thermionic emission* and explain in simple terms how this effect is used in radio valves. (10 marks)

8. With reference to wave propagation describe briefly:—

(a) skip distance,

(b) ground wave,

(c) the causes of fading. (10 marks)

9. What is capacitive reactance? How does it affect the current flow in an a.c. circuit?

Calculate the reactance of a 200 pico-farad capacitor at a frequency of 7 Mc/s. (10 marks)

10. What losses are encountered in inductors carrying high frequency currents?

State how the losses are kept to a minimum in:—

(a) an air-cored inductor,

and (b) an inductor with a core of magnetic material. (10 marks)