City and Guilds of London Institute

DEPARTMENT OF TECHNOLOGY

1949

55. — RADIO AMATEURS' EXAMINATION

Friday, May 6th, 7 to 10 p.m.

Candidates should attempt as many questions as possible. Use should be made of diagrams where applicable. The maximum possible marks obtainable is affixed to each question.

1. What steps should be taken in the design of a transmitter to minimise the risk of interference to broadcast and television reception ?

Indicate what special precautions can be taken to reduce radiation of harmonics. *(20 marks)*

2. What types of message may be exchanged with other amateur stations ? For what purposes is the use of the station prohibited ? *(15 marks)*

3. An alternating voltage of 10 volts at a frequency of $5/\pi$ Mc/s. is applied to a circuit of the following elements in series :–

(i) a capacitance of 100 pico-farads,

(ii) a non-inductive resistor of 10 ohms.

(a) What value of inductance in series is required to tune the circuit to resonance ?

(b) At resonance, what is the current in the circuit ? *(15 marks)*

[SEE OVER]

4. Discuss the advantages and disadvantages of a tuned radio-frequency and a superheterodyne receiver for amateur reception on the 14 Mc/s. band.

. *(10 marks)*

5. State the essential difference in the operation of a triode valve as a detector and as an amplifier. Explain the meaning of the terms "amplification factor" and "impedance" of a valve. *(10 marks)*

6. Describe three methods commonly used for coupling transmitters to aerials and discuss the relative merits of each type of coupling. *(10 marks)*

7. Describe a method of obtain the high-tension supply for an amateur transmitter from alternating current mains. Include particulars of the smoothing circuit. Illustrate your reply with a diagram. *(10 marks)*

8. What do you understand by "over-modulation" ? Describe a modulation meter and explain how it is used to indicate the depth of modulation.

(10 marks)