City and Guilds of London Institute

DEPARTMENT OF TECHNOLOGY

1956

55.—RADIO AMATEURS' EXAMINATION

Friday, May 4th, 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. What are the requirements in respect of the following :–
   (a) Operators and access to apparatus,
   (b) Inspection,
   (c) Retransmission of recorded messages,
   (d) Types of messages which may and may not be exchanged between amateur stations ? *(15 marks)*

2. If the d.c. feed to the final stage of a transmitter is 500 volts, 80 milliamperes and the RF current in the artificial aerial load resistor of 750 ohms is 0.2 ampere, calculate :–
   (a) the power input,
   (b) the power output,
   (c) the efficiency of the stage,
   (d) the anode dissipation. *(15 marks)*

[SEE OVER]

3. (a) State what precautions should be taken in a radio transmitter to avoid :–

(i) Radiation of harmonics,

(ii) Key clicks and thumps.

(b) With the aid of a diagram, describe a simple form of detector circuit for checking harmonic radiation. *(15 marks)*

4. (a) What are the relative advantages and disadvantages of a variable frequency oscillator over a crystal controlled oscillator for use in an amateur's transmitter?

(b) Describe, with the aid of a diagram, a variable frequency oscillator for generating a stable frequency. *(15 marks)*

Part 2

Four questions only to be attempted from this part.

5. Describe two types of feeders used in a transmitter aerial system. State what steps must be taken to ensure maximum transference of energy to the aerial. *(10 marks)*

6. Explain the meaning of the following terms as applied to a radio receiver :–

(a) Selectivity,

(b) Bandwidth,

(c) Sensitivity. *(10 marks)*

7. Two capacitors of 4 and 12 picofarads are connected in series; two others of 8 and 24 picofarads are also connected in series. What is the equivalent capacitance if these series combinations are connected in parallel ?

(10 marks)

8. Explain, with the aid of a circuit diagram and characteristic curves, the action of one form of valve detector circuit. *(10 marks)*

9. Define the following and state briefly their uses :–

(a) Auto-bias,

(b) De-coupling. *(10 marks)*

10. What value of inductance is required in series with a capacitor of 500 picofarads to resonate at a frequency of 400 kc/s ? *(10 marks)*