

# City and Guilds of London Institute

DEPARTMENT OF TECHNOLOGY

1946

## 55. — RADIO AMATEURS' EXAMINATION

Friday, May 3rd, 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. A 100-ohm resistor and a 300-ohm resistor are joined in parallel and connected to a battery of e.m.f. 7.5 volts and negligible internal resistance :—

- (a) What is the total current taken from the battery ?
- (b) What power is dissipated in the 100-ohm resistor ?

(10 marks)

2. What do you understand by the term “resonance” ? If an inductance of 100  $\mu\text{H}$  is connected in parallel with a capacitance of 100  $\mu\text{F}$ , what is the resonant frequency of the circuit ?

(10 marks)

3. Draw a diagram of a self-oscillating valve circuit and explain simply its method of functioning.

(10 marks)

4. Why are quartz crystals frequently used in radio transmitters ? Describe, with diagram, a typical crystal-controlled oscillator.

(10 marks)

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5. Explain why “standing waves” are undesirable in a feeder system connecting a transmitter to an aerial. How would you detect their presence and minimise them ? *(10 marks)*

6. Describe an “artificial aerial”. How can an “artificial aerial” be used to measure the power output of a transmitter ? *(10 marks)*

7. In what ways may a low-power transmitter interfere with radio and television reception ? What precautions should be taken to minimise such interference ? *(20 marks)*

8. What are the conditions laid down by the Postmaster-General for the frequency measurement and control of amateur transmissions ? *(20 marks)*