

Paper Number

055-1-01-02

**City and Guilds
of London Institute**

December Series 1969 ©

Examination **Radio Amateurs'
Examination**

Date **Wednesday 3rd December 1969**

Time **6.30 to 9.30 p.m. (3 hours)**

You should have the following for this examination
one answer book
mathematical tables (you may use a slide rule).

The maximum mark for each question is shown.

This paper contains ten questions: answer **eight** questions as follows: both questions in Part I (which are compulsory) and **six** questions in Part II. Failure in either part will carry with it failure in the examination as a whole.

Part I—Answer both questions in this part

- 1.** What are the conditions of the Amateur (Sound) Licence A concerning
- (a) operators and access to the apparatus of the station
 - (b) inspection of the station
 - (c) closing down of the station
 - (d) the minimum reception facilities with which the station is required to be equipped?

Write down the recommended phonetic alphabet words for six of following letters:

A B C D E F G H I J (15 marks)

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2. Draw the circuit diagram of the keyed stage of a c.w. transmitter and describe the measures taken to prevent the radiation of key clicks. Why should the keying of an oscillator be avoided? (15 marks)

Part II—Answer six questions in this part

3. State Ohm's Law.

What is meant by the internal resistance of a battery?

A battery of 6 V e.m.f. produces a potential difference of 5.5 V when it is connected to a resistor of 11Ω . What is the internal resistance of the battery? (10 marks)

4. Describe with the aid of a diagram the action of a moving coil meter. In what respects does a voltmeter differ from an ammeter if the instruments have identical moving coil movements? (10 marks)

5. Explain, with the aid of a block diagram and waveform diagrams, the function of each stage of a superheterodyne receiver. (10 marks)

6. A tuned circuit consists of an inductance of $250 \mu\text{H}$ connected in parallel with a variable capacitor of maximum value 160 pF and minimum value 40 pF . What is the tuning range of the circuit? (10 marks)

7. Draw the circuit diagram of the power amplifier stage of a transmitter using a pi-network output coupling arrangement. Explain how the output coupling should be adjusted to match the impedance of the amplifier to the load. (10 marks)

8. Draw the circuit diagram of a simple receiver. Describe the detecting device used and explain its action. (10 marks)

9. Describe changes which usually take place in the ionosphere over a period of twenty-four hours. How do these changes affect the propagation of transmissions on 7 MHz? (10 marks)

10. Describe with the aid of diagrams the operation of a heterodyne frequency meter suitable for use in an amateur station using frequencies between 1.8 MHz and 30 MHz.

Explain how a crystal calibrator can be checked against a standard frequency transmission. (10 marks)