

CITY AND GUILDS OF LONDON INSTITUTE

PAPER NUMBER 055-1-01/02	EXAMINATION RADIO AMATEURS' EXAMINATION	Tuesday 1 December 1970
SERIES DECEMBER 1970	PAPER	6.30 to 9.30 pm 3 hours
<p>YOU SHOULD HAVE THE FOLLOWING FOR THIS EXAMINATION</p> <p>one answer book – mathematical tables (you may use a slide rule)</p>		

The maximum mark for each question is shown.

Answer EIGHT of the following ten 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. Operators of Amateur (Sound) Stations are required to keep a log.

- (a) What entries must be made in the log?
(b) When and how are entries to be made?

Where reference is made to the operator of an Amateur (Sound) Station, what persons or classes of person are understood to be referred to? May any other person speak into the microphone?

(15 marks)

2. Describe with the aid of diagrams the construction of a variable frequency oscillator suitable for use in an Amateur (Sound) Transmitter.

List the factors which you consider important in maintaining frequency stability.

(15 marks)

PART II – ANSWER SIX QUESTIONS IN THIS PART

3. Explain why the current through a coil of wire does not instantly achieve a steady value when a source of d.c. is connected to it.

A 6 ohm resistor is connected in parallel with a coil of inductance 1 henry and resistance 12 ohms. If this combination is connected to a 12 volt battery of negligible internal resistance what current will flow

- (a) at the instant of connection
(b) when the current has settled down to its steady state?

(10 marks)

4. With the aid of diagrams describe the operation of a frequency multiplier stage suitable for use in a low-power amateur sound transmitter.

(10 marks)

5. What is the peak value of the current that would flow if an alternating voltage of 10 volts peak value at 10,000 Hz is applied to a perfect capacitor of 0.1 μ f?

What power, if any, is dissipated in the capacitor? Give reasons for your answer.

(10 marks)

6. Describe the construction of EITHER
a semiconductor device,
OR
a thermionic valve
suitable for use as an amplifier.
Draw the circuit diagram of an amplifier stage using the device described and briefly describe its operation.
(10 marks)
7. Describe ONE form of interference to radio reception that may be caused by a radio receiver. Explain what precautions can be taken to minimise the effect.
(10 marks)
8. What are the requirements for an artificial aerial?
Describe the construction of such a device.
In the case of low power transmitters what simple everyday device can be used as an artificial aerial?
What are the uses of an artificial aerial?
(10 marks)
9. What is meant by an ELECTRO—MAGNETIC WAVE?
What is the velocity of propagation of electro-magnetic waves in free space and how are the velocity, frequency and wavelength related?
(10 marks)
10. With the aid of diagrams describe a complete aerial system, including aerial tuning unit and feeders, suitable for use in one of the amateur hf bands.
State the function of each component in the system.
(10 marks)