

## **City and Guilds of London Institute**

**1965-6**

### **Radio Amateurs' Examination**

*Thursday, December 9th, 1965, 6.30 to 9.30 p.m.*

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.

You should have the following for this examination:

One answer book, which includes squared paper (inches and tenths).

Mathematical tables (you may use a slide rule).

#### PART I

*Answer BOTH questions in this part*

1. What are the limitations imposed on licensees by the Amateur (Sound) Licence as regards location, class of emission, operators and method of working between stations ?

Name two types of message or communication which may not be transmitted by an amateur sound radio station.

2. What do you understand by key-clicks when referring to c.w. telegraphy transmissions ? Describe two forms of such interference and explain carefully, with the aid of diagrams, how each may be minimised.

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PART II

*Answer SIX questions from this part*

3. What is meant by an alternating voltage of sine waveform ?  
What is (a) the peak value and (b) the r.m.s. value of an alternating voltage or current ?  
What is the r.m.s. voltage of an a.c. supply having a peak value of 340 volts ?  
What is the peak value of an alternating e.m.f. of 6.3 volts r.m.s. ?
4. Define the terms *low frequency*, *medium frequency*, *high frequency* and *very high frequency* as applied to electromagnetic waves.  
Why are V.H.F. waves generally unsuitable for long distance communication ?
5. What is meant by the term *tuned radio frequency receiver* ? With the aid of a diagram describe and explain the operation of such a receiver.
6. Draw a circuit diagram of the power amplifier stage of a transmitter employing a triode valve and indicate typical values for components and supply voltages.  
Explain the need for neutralisation and describe how it is provided and adjusted in the circuit given.
7. An a.c./d.c. receiver has six valves whose heaters are fed in series from the main supply via a dropping resistor. Each heater requires 0.3 amperes at 6.3 volts.  
Assuming a mains supply of 240-volts d.c., what is:  
(a) the value of the dropping resistor,  
(b) the power dissipated by each heater,  
(c) the total power taken from the main supply by the heater circuit ?
8. Describe the internal construction of a pentode or tetrode thermionic valve suitable for use in the power amplifier stage of a typical amateur radio transmitter. What is meant by the anode dissipation of a valve ?
9. Explain with the aid of diagrams how electromagnetic waves are established and radiated from a simple form of aerial.
10. Describe, with the aid of a diagram, a frequency meter capable of checking accurately that a transmitter controlled by a variable frequency oscillator is operating within prescribed bands.