CITY AND GUILDS OF LONDON INSTITUTE

PAPER NUMBER	EXAMINATION	
765–1–01/02	RADIO AMATEURS' EXAMINATION	Monday 4 December 1972
SERIES DECEMBER 1972	PAPER WRITTEN	6.30 to 9.30 pm 3 hours

YOU SHOULD HAVE THE FOLLOWING FOR THIS EXAMINATION

one answer book

'Castle's Logs'

This examination is divided into two parts; failure in either part will carry with it failure in the examination as a whole.

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.

PART I – Answer BOTH questions in this Part

1. (a) The Amateur Sound Licence A authorises the Licensee to operate an amateur station from
   (i) 'the main address'
   (ii) 'temporary premises'
   (iii) 'temporary locations'
   (iv) 'alternative premises'
   What is meant by each of these expressions and what special conditions, if any, apply to operation from them?
   (b) What are the requirements of the Minister of Posts and Telecommunications for the inspection of an amateur station and the items to be inspected?

   (15 marks)

2. (a) What is meant by the 'keying envelope' (wave-shape) of a morse telegraphy transmission?
   (b) Show, with a diagram, a desirable wave-shape and explain how this is achieved in practice.
   (c) Why is a poor keying system liable to cause a transmitter to radiate key-clicks?

   (15 marks)

PART II – Answer SIX questions in this Part

3. Describe, with the aid of diagrams, the exchange of energy which takes place between the inductance and capacitance of a closed oscillatory circuit (for example, the tank circuit of a transmitter power amplifier stage) when it is in a state of oscillation.

   (10 marks)

4. (a) Draw the circuit diagram of a beat frequency oscillator for a cw receiver and show how the output is mixed with the signal.
   (b) Describe its use for cw reception.

   (10 marks)

5. Draw the circuit diagram of a simple radiotelephony transmitter and describe the modulation method used.

   (10 marks)

See next page

6. (a) What is the principal disadvantage of using a triode valve in a radiofrequency amplifier stage such as that of Figure 1?

(b) Draw the circuit diagram of an amplifier which does not suffer this disadvantage and explain carefully how this arrangement overcomes the difficulty.

(10 marks)

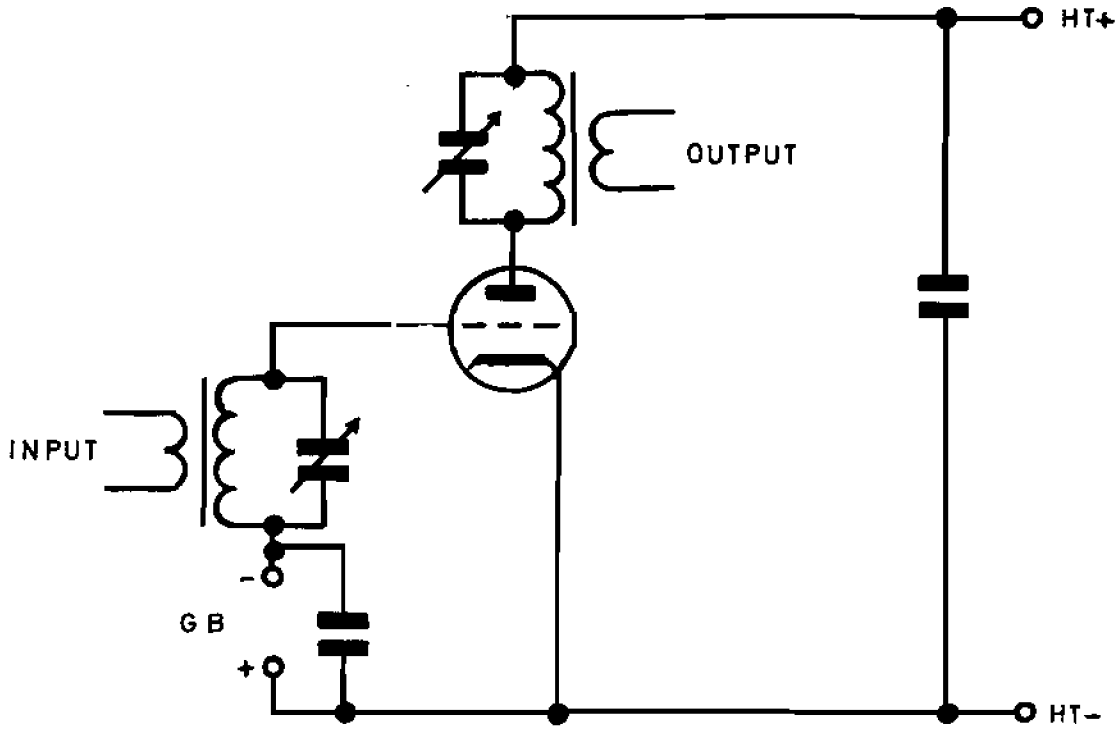

FIG. 1

7. (a) State Ohm's Law.

(b) A battery of four dry cells, connected in series, gives a reading of 6V when measured by a voltmeter of very high resistance. When the battery is connected to a 6V, 6W lamp this voltage falls to 4V and the lamp fails to light to full brilliance.

(i) Why is this?

(ii) Assuming the lamp resistance remains constant what power is actually dissipated by the lamp?

(10 marks)

8. Describe, briefly, the following forms of electromagnetic radiation.

(a) Ground wave propagation.

(b) Ionospheric propagation.

(c) Tropospheric propagation.

(10 marks)

9. (a) What is the purpose of an aerial tuning unit in an hf transmitting system?

(b) Draw a diagram of a complete aerial system and describe how the aerial tuning unit is adjusted for optimum performance of the aerial.

(10 marks)

10. It is a condition of the Amateur (Sound) Licence A that 'Equipment for frequency measurement shall be provided capable of verifying that the sending apparatus comprised in the Station is operating with emissions within the authorised bands'.

Draw the circuit diagram of a frequency meter suitable for use with a vfo controlled transmitter and describe its operation.

(10 marks)