CITY AND GUILDS OF LONDON INSTITUTE

PAPER NUMBER	EXAMINATION	
765 – 1 – 01/02	RADIO AMATEURS' EXAMINATION	Monday 4 December 1978
SERIES	PAPER	
DECEMBER 1978	WRITTEN	18 30 – 21 30 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.

Each question in Part I carries 15 marks; each question in Part II carries 10 marks.

Answer EIGHT of the following ten questions as follows : BOTH questions in Part I and SIX questions from Part II.

PART I

1 State clearly the requirements of the Amateur Licence A for the Log with reference to the
(a) form of book or document to be used and method of making entries
(b) manner and time at which entries are to be made
(c) entries to be made when operating from the main address
(d) form of log to be kept by the operator of a mobile station.

2 (a) With the aid of a circuit diagram, describe the action of a low-pass filter suitable for the suppression of harmonics in the output of an h.f. transmitter.
(b) Describe, with the aid of sketches, the construction of such a filter.

PART II

3 (a) What is the relationship between voltage, current and resistance in a d.c. circuit?
(b) What is meant by the resistance of a conductor?
(c) What are the characteristics which determine whether a material should be regarded as a conductor or insulator?

4 (a) Draw circuit diagrams to show two methods of obtaining a steady bias current across the base-emitter junction of a bipolar transistor.
(b) Explain how the bias is obtained.

5 (a) Draw the circuit diagram of the frequency changer stage of a superheterodyne receiver.
(b) Describe its action.

See next page

6 (a) State what is meant by the dynamic resistance of a parallel tuned resonant circuit.

(b) A circuit resonant at 800 kHz has the following component values —

inductance of 200 μH
capacitance of 200 pF
resistance of 10 Ω

Calculate
(i) the dynamic resistance
(ii) the magnification factor (Q).

7 Fig. 1 shows the circuit diagram of a crystal controlled oscillator.
(a) Describe how the crystal controls the frequency of oscillation.
(b) Explain how the circuit of Fig. 1 functions.

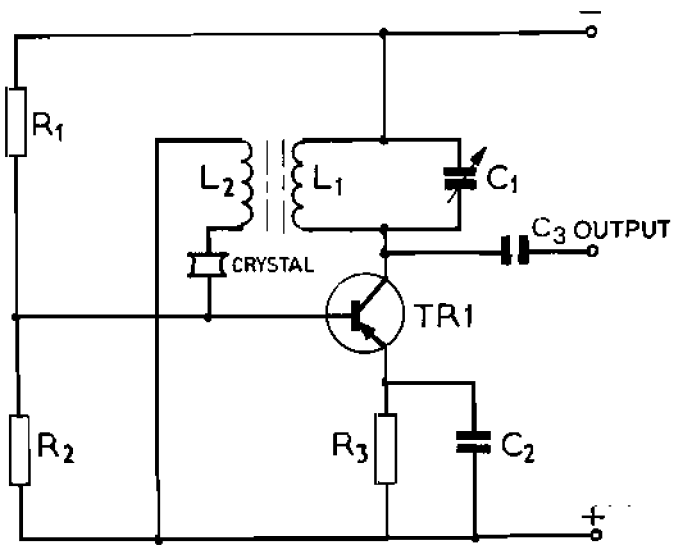

FIG. 1

8 (a) Describe with the aid of sketches the construction of a directional aerial system suitable for use on any one amateur frequency band.
(b) Explain with the aid of polar diagrams how the directional properties are achieved.

9 (a) With the aid of circuit diagrams and constructional sketches, describe carefully the construction of an absorption wavemeter covering the range 1.5 to 30 MHz.
(b) Describe a method of calibrating the instrument.
(c) For what purpose is it required in an amateur radio station?

10 With reference to electromagnetic wave propagation explain what is meant by
(a) critical frequency
(b) maximum usable frequency (m.u.f.)
(c) multi-hop transmission
(d) skip distance.