CITY AND GUILDS OF LONDON INSTITUTE

PAPER NUMBER	EXAMINATION	
765–1–01/02	RADIO AMATEURS	Thursday 19 May 1977
SERIES MAY–JUNE 1977	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.

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 – Answer BOTH questions in this part. Each question in this part carries 15 marks.

1. (a) State the qualifications required by applicants for the Amateur (Sound) Licence A.
   (b) Give the form of call-sign assigned to a United Kingdom amateur radio station.
   (c) State the prefix letters used to indicate EACH of the following countries
      (i) Channel Islands
      (ii) Northern Ireland
      (iii) Isle of Man
      (iv) Scotland
      (v) Wales.

2. (a) What are keyclicks in a radio transmission?
   (b) What effects may they have on other services and stations?
   (c) How can they be minimised?

PART II – Answer ANY SIX questions from this part. Each question carries 10 marks.

3. (a) Explain what is meant by the term 'capacitance' in an electrical circuit and define its unit.
   (b) A capacitor of 12 microfarads is connected in parallel with one of 6 microfarads. What is the total capacitance?
   (c) What would be the total capacitance when they are connected in series?

4. (a) What is meant by 'resonance' in an a.c. circuit?
   (b) What value of capacitor would be required in series with an inductor of 100 microhenries in order for the combination to resonate at 1 MHz?

5. With the aid of a circuit diagram explain the action of a frequency changer stage for a superheterodyne receiver.

See next page

6. Fig. 1 shows the circuit of a low-power transmitter for use in the 144 to 146 MHz band.

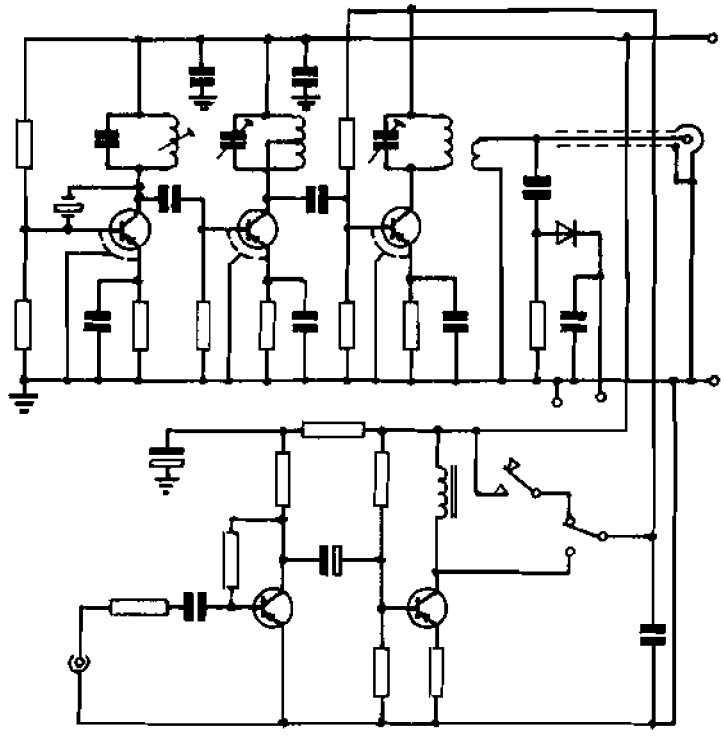

FIG. 1

(a) At what crystal frequency could the oscillator operate and how is this converted to 144 MHz?
(b) What modes of emission are available?
(c) What method of speech modulation is employed?
(d) State the type and impedance of a typical microphone suitable for use with this transmitter.

7. With the aid of a block diagram describe the principles of reception of single sideband suppressed carrier transmissions.

8. (a) What is meant by the skip distance of an *hf* radio transmission?
(b) Describe the part played by the ionosphere in this phenomenon.

9. (a) Describe ONE of the following aerial systems (i.e. aerial, feeder and tuning unit)
(i) half wave dipole
(ii) half wave folded dipole
(iii) zeppelin
(iv) loaded whip.
(b) Describe the polar diagram of the aerial chosen in (a) and state its advantages and disadvantages for use in an amateur station.

10. (a) Describe the use of a cathode ray oscilloscope for
EITHER (i) monitoring depth of modulation of an amplitude modulated wave (including over-modulation)
OR (ii) monitoring the keying wave-form of a morse telegraphy continuous wave transmitter.
(b) Why is monitoring advisable?