# City and Guilds of London Institute

## DEPARTMENT OF TECHNOLOGY

## 1950

## 55. — RADIO AMATEURS' EXAMINATION

**Friday, May 5th, 7 to 10 p.m.**

*Candidates should attempt as many questions as possible. Use should be made of diagrams where applicable. The maximum possible marks obtainable is affixed to each question.*

**1.** With the aid of a diagram describe the essential features of a crystal controlled radio transmitter suitable for the 14 Mc/s. frequency band, and indicate the method of keying. *(15 marks)*

**2.** Describe a superheterodyne receiver suitable for the reception of C.W. signals over the frequency range 1 to 20 Mc/s. Illustrate your answer with a block diagram. *(15 marks)*

**3.** State what requirements have to be met under the non-interference conditions of the Postmaster-General's licence to establish an amateur wireless station. *(15 marks)*

**4.** Describe a heterodyne frequency meter and explain how it is used to measure the frequency of a transmitter. *(15 marks)*

[SEE OVER]

**5.** What is understood by "radiation characteristics" ?

With the aid of diagrams, describe the radiation characteristics of a horizontal dipole with and without a reflector.

*(10 marks)*

**6.** Explain :—

either (a) the meaning of Class A, Class B and Class C amplification,

or (b) the method of neutralising a power amplifier.

*(10 marks)*

**7.** Two inductors of 10 and 20 microhenrys are connected in series; two others of 30 and 40 microhenrys are also connected in series. What is the equivalent inductance if these series combinations are connected in parallel ? Assume that there is no mutual inductance. *(10 marks)*

**8.** (a) What is the relationship between the frequency and the wavelength of a radio wave ?

(b) What are the frequencies corresponding to wavelengths 30km, 150m and 10cm ?

(c) Why are wavelengths shorter than 5 metres generally unsuitable for long distance communication ?

*(10 marks)*