



City and Guilds of London Institute

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55

Radio Amateurs' Examination

For Examinations in 1969

76 Portland Place, London, W.1

**The Advisory Committee of the
City and Guilds of London Institute**

55. RADIO AMATEURS' EXAMINATION

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55. *Radio Amateurs' Examination*

The Postmaster-General requires that *every* applicant for an Amateur (Sound) Licence or an Amateur (Television) Licence must have passed the Radio Amateurs' Examination as evidence of his possessing the requisite theoretical technical knowledge. Every applicant for an Amateur (Sound) Licence must also have passed the Post Office Morse Test within one year of applying for the licence.

The Radio Amateurs' Examination is held twice a year, normally in May and December, and is a Pass examination, consisting of a single question paper of three hours' duration. Each paper is divided into two parts. Part I contains only two questions, each of them compulsory. These questions are drawn from items 1 and 2 of the syllabus. Part II consists of eight questions, drawn from the remaining items of the syllabus, of which six only should be attempted. Candidates are expected to achieve a Pass in each of the Parts separately; failure in either Part entails failure in the examination as a whole. Each candidate will receive a record of performance giving the class of result (Pass or Fail) in the examination as a whole and an indication of performance (Pass or Fail) in the separate parts of the examination.

The examination is open to all candidates, whether they have attended a course of tuition or not, and a certificate will be awarded to successful candidates.

Where courses are provided, it is recommended that theoretical lectures should be accompanied, wherever possible, by simple practical demonstrations and students should be encouraged to regard practical work as an integral part of their training. Unauthorized radiation must, of course, be avoided.

No Full Technological Certificate is awarded in this subject.

SYLLABUS:

PART I

1. Licensing Conditions

Conditions (terms, provisions and limitations) laid down by H.M. Postmaster-General in the Amateur (Sound) Licence A, including the Notes appended, covering the purpose for which the transmitters may be used; types of signals permissible; types of emission; power, frequency control and measurements; avoidance of interference to other stations, particularly in bands shared with other services; qualifications of operators; log-keeping and use of call signs.

2. *Transmitter Interference*

Frequency stability. Avoidance of harmonic radiation and of interference by shock excitation; use of key-click filters and other means of preventing spurious emissions. Dangers of over-modulation. Devices for reducing interference with nearby radio and television receivers.

PART II

3. *Elementary Electricity and Magnetism*

Elementary theory of electricity; conductors and insulators; units; Ohm's Law; resistors in series and parallel. Power. Permanent magnets and electro-magnets and their use in radio work. Primary cells. Self and mutual inductance; types of inductors used in receiving and transmitting circuits. Capacitance; construction of various types of capacitors and their arrangement in series or parallel.

4. *Elementary Alternating Current Theory*

Alternating currents and voltages. Alternating current theory incorporating circuits with inductance, capacitance and resistance. Impedance, resonance, coupled circuits, acceptor and rejector circuits. The transformer.

5. *Thermionic Valves and Semiconductors*

Characteristics and essential construction of semi-conductor diodes, transistors, thermionic diodes, triodes and multi-electrode valves. Use of semi-conductor devices and valves as oscillators, amplifiers, detectors and frequency-changers. Distortion: harmonics. Push-pull. Power rectification; stabilization and smoothing; typical power packs for low-power transmitters and receivers.

6. *Radio Receivers*

Typical receivers; principles and operation of T.R.F. and super-heterodyne receivers. C.W. reception. Interference caused by receivers.

7. *Low Power Transmitters*

Oscillator circuits; use of quartz crystals to control oscillators; frequency multipliers, power amplifiers. Methods of keying transmitters. Methods of modulation and types of emission in current use.

8. *Propagation*

Nature and propagation of radio waves. Ionospheric and tropospheric conditions and their effect on propagation. Relationship between wavelength, frequency and velocity of propagation.

9. *Aerials*

Common types of receiving and transmitting aerials. Transmission lines. Directional systems. Aerial couplings to lines and transmitters. Matching.

10. *Measurements*

Measurement of frequency. Operation of simple frequency meters, including crystal-controlled types. Use of verniers and other interpolation methods. Artificial aerials and their use for lining-up transmitters. Measurement of the power input to the final stage(s) of a transmitter. Measurement of current and voltage at audio and radio frequencies. Use of cathode-ray oscilloscope for the examination and measurement of waveform.

Textbooks

"How to Become a Radio Amateur" (Radio Services Dept., G.P.O. London, E.C.1).

Radio Society of Great Britain publications (R.S.G.B.):

"A Guide to Amateur Radio"

"The Morse Code for Radio Amateurs"

"The Radio Amateurs Examination Manual"

"The Amateur Radio Handbook"

"Foundations of Wireless". M. G. Scroggie. (Iliffe.)

"Basic Electricity". R.A.F. A.P.3372. (H.M.S.O.)

"Basic Electronics", Parts 1-6. (Technical Press Ltd.)

"Radio and Line Transmission", Parts I and II. Danielson and Walker. (Iliffe.)

"Radio", Vol. 1. Tucker and Wilkinson. (English Universities Press.)

"Radio Servicing". L. Butterworth. (English Universities Press.)

Philip's Paperbacks (Iliffe):

"Direct Current"

"Alternating Current"

"Radio Valves"

"Measuring Instruments"

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