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Leszlo

Revised, March, 1926

# The Institution of Electrical Engineers.

FOUNDED 1871. INCORPORATED BY ROYAL CHARTER 1921.

SAVOY PLACE, VICTORIA EMBANKMENT, LONDON, W.C. 2

## REGULATIONS RELATING TO THE EXAMINATION OF CANDIDATES FOR ASSOCIATE MEMBERSHIP.

*(Subject to Revision.)*

### I. GENERAL.

Every candidate for election into or transfer to the class of Associate Members (A.M.I.E.E.), except as provided in Clause 10, is required\* to pass the Associate Membership examination of the Institution or to present a satisfactory thesis, paper, or other written work on a subject coming within the scope of Electrical Science or Engineering or their applications (a) embodying the results of research by the candidate or (b) dealing in a scientific and critical manner with standard practice and not being a mere record of such practice.

Candidates must also satisfy the requirements of Bye-Law 13 of the Institution (see page 7) to secure admission to the class of Associate Members.

### 2. DATES AND PLACES.

The examination is held in London, Birmingham, Manchester, Newcastle-upon-Tyne, Plymouth, Cardiff, Glasgow, Dublin and Belfast, twice annually, on three days (Thursday, Friday and Saturday) in April and October. Examinations may also be held abroad if the number of entries warrants such arrangements.

A thesis, paper, or other written work may be presented at any time.

\* The Council have power to waive this requirement, but will exercise such power only in the most exceptional cases.

### 3. PERSONS ELIGIBLE FOR EXAMINATION.

Applications to enter for the examination or for the consideration of a thesis can be received only from :—

- (a) Students or Graduates of the Institution.
- (b) Candidates who have lodged with the Secretary of the Institution a duly completed Proposal Form E for election as Associate Member.

### 4. LATEST DATE FOR ENTRY.

Applications to enter for the examination must be made on the prescribed Entry Form, which must reach the Secretary not later than the 1st February for the April examination, and not later than the 1st September for the October examination.

In the case of candidates taking the examination abroad, the Entry Forms should reach the Secretary in London one month earlier than the dates specified.

The Entry Form must be accompanied by the examination fee. Candidates will be informed of the place of examination about the 15th March and the 15th September respectively.

### 5. EXAMINATION FEE.

The examination fee is £2 2s.\* for a first entry. The fee for each subsequent entry is £1 1s. The examination fee for a first thesis is £2 2s.\* and for each subsequent thesis £1 1s.

All remittances for fees should be made payable to "The Institution of Electrical Engineers," and crossed & Co.

Fees will not be returned. Any candidate who withdraws his application, or does not attend the examination, or fails, will be required to pay the fee for a subsequent entry.

Candidates who satisfy the examiners in either Part will be excused from taking that Part at any subsequent entry.

Failure in any subject of Part I will be deemed to be failure in the whole of Part I.

\* In the case of candidates who are Student Members at the time of the examination or submission of thesis and who have paid three or more Annual Subscriptions, the fee for the first entry or thesis is £1 1s.

## 6. PROVISION OF DRAWING INSTRUMENTS, MATHEMATICAL TABLES, ETC.

(a) Candidates must bring with them ordinary drawing instruments, squares, and scales. Candidates may also bring slide-rules.

(b) Mathematical tables, and such other books of reference as may be needed, will be provided in the examination rooms for the use of candidates.

(c) No appliances other than those specified in (a) above and no books or papers may be brought by candidates into the examination rooms.

## 7. SUBJECTS OF EXAMINATION, AND TIME TABLE.

The subjects and order of the examination are as follows :—

Day.	Hours.	Number of Papers.	Subject.
<b>PART I</b>			
Thursday.	10 a.m. } to 1 p.m. }	I	English Essay ; or Translation into English of passages in <i>one</i> of the following Languages, to be selected by the candidate: French, German, Italian, or Spanish.
	2.30 p.m. } to 5.30 p.m. }	I	Applied Mechanics (including Strength of Materials); and <i>either</i> Heat, Light and Sound or Inorganic Chemistry.
Friday.	10 a.m. } to 1 p.m. }	I	Electricity and Magnetism.

### SYLLABUS OF CERTAIN SUBJECTS OF PART I.

#### *Applied Mechanics, including Strength of Materials.*

Statics and kinetics. Laws of motion. Uniform acceleration. Composition and resolution of forces in one plane. Moments. Work and energy. Centre of gravity. Friction. Pulleys, levers and screws. Inclined plane. Young's modulus. Tensile strength. Limits of elasticity.

#### *Heat, Light and Sound.*

(a) Temperature. Thermometers. Expansion of solids. Liquids and gases. Boyle's Law and Charles's Law. Change of state. Specific heat. Latent heat. Mechanical equivalent of heat. Conduction, convection and radiation.

(b) Laws of reflexion and refraction. Photometry. Formation of images by mirrors and lenses. Formation of spectra. The spectroscope. Standard combination of two lenses.

(c) Reflexion and refraction of sound. Vibrations of strings and diaphragms. Tuning forks. The musical scale. Harmonics. Velocity of sound.

#### *Inorganic Chemistry.*

General properties of matter. Physical and chemical change. Laws of chemical combination. Atomic theory. Composition of air. Nature of acids, gases and salts. Preparation and properties of the following substances: Hydrogen; Chlorine, Bromine and Iodine and their compounds with Hydrogen; Oxygen, Ozone, Nitrogen, Ammonia and Ammonium Salts; the

oxides of Nitrogen, Nitrous and Nitric Acids ; Carbon, Marsh Gas, Acetylene and Coal Gas ; Carbonic Acid and the Carbonates ; Sulphur, Sulphuretted Hydrogen ; Sulphurous and Sulphuric Acid and their Salts ; the following elements and their principal compounds ; Sodium, Potassium, Calcium, Zinc, Mercury, Aluminium, Tin, Lead, Iron and Copper.

#### *Electricity and Magnetism.*

Magnets. Magnetic properties of iron and steel. Magnetic induction. Magnetic field. Permeability. Simple magnetic circuit. Permanent magnets. Static electricity, including condensers. Capacity of a plate condenser and a concentric cable. Magnetic field of current. Measurement of current. Electromotive force and potential difference. The standard Weston Cell. The simple potentiometer. Ohm's law. Specific resistance. Measurement of resistance by a Wheatstone Bridge and other methods. Electrolysis and electro-deposition. Heating effect of currents. The electrical equivalent of heat. Electromagnetic induction. The elementary principles of the direct-current dynamo and motor.

#### PART II.

Friday. 2.30 p.m. }  
to 5.30 p.m. }  
Saturday. 10 a.m. }  
to 1 p.m. }

} Two papers on *one* of the following subjects, to be selected by the candidate :—

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|--|---|
| (a) Electricity Supply (Generation, Transmission, and Distribution). | or (h) Electro-Chemistry and Electro-Metallurgy.  |
| or (b) Electric Lighting and Power Installations.                    | or (i) Design and Manufacture of Electric Machinery (Rotating Machinery and Transformers.)                                      |
| or (c) Electric Traction.  |   |
| or (d) Telegraphy.   |   |
| or (e) Telephony.  | or (j) Design and Manufacture of Electric Apparatus (Switch-gear, Control Gear, Measuring Instruments and Domestic Appliances). |
| or (f) Wireless and High-Frequency Engineering.                      |   |
| or (g) Application of Electricity to Mines.                          |   |

No detailed syllabus of the subjects in Part II is published, but some questions on Administrative and Economic Matters will be set.

Candidates must attend in the Examination Rooms five minutes before the time fixed for the examination.

#### 8. THESIS.

Every candidate who presents a thesis, paper, or other written work in lieu of examination shall submit two printed or typed copies. Every such contribution must be accompanied by the examination fee and a declaration signed by the candidate in a form authorized by the Council that it is entirely or mainly his own work, and giving the names of two Corporate Members of the Institution to whom reference may be made in support of such declaration. The contribution will be submitted to examiners, who may if they so desire examine the candidate on the subject thereof either orally or in writing.

## 9. NOTIFICATION OF RESULTS.

(a) A list of the names of successful candidates, in alphabetical order, will be sent to each candidate about one month after the examination.

(b) The Secretary cannot undertake, otherwise than as stated above, to inform candidates of the results, but he will be prepared to answer written inquiries from unsuccessful candidates as to the papers in which they have failed. Information will not be given as to marks gained or marks required for a pass, or as to detailed particulars of the subjects of examination.

## 10. EXEMPTIONS.

*From the Whole of the Examination.*

Any of the following qualifications will exempt a candidate from the whole of the examination :—

(a) An Engineering Degree in Electrical Engineering subjects of any University in the United Kingdom or in the British Dominions over Seas. X

(b) The successful passing of the competitive Civil Service examination for Assistant Engineers in the British Post Office. X

(c) The Diplomas or Certificates (as indicated) granted by the following bodies :—

NAME OF BODY.	QUALIFICATION.
LONDON.	
Battersea Polytechnic.	Full-time Diploma in Electrical Engineering.
City and Guilds (Engineering) College.	Diploma or Second Division Certificate in Electrical Engineering.
Faraday House.	Diploma in Electrical Engineering.
Finsbury Technical College.	Day Course Certificate in Electrical Engineering.
King's College.	Diploma or Certificate in Electrical Engineering.
Northampton Polytechnic Institute.	Four Years' Day Course Electrical Engineering Certificate.
University College.	Diploma in Electrical Engineering.
BRADFORD.	
Technical College.	Diploma in Electrical Engineering (including Power Production and Transmission).
EDINBURGH.	
Heriot-Watt College.	Diploma in Electrical Engineering.
GLASGOW.	
Royal Technical College.	Diploma in Electrical Engineering.
LEEDS.	
University.	Diploma in Electrical Engineering.

NAME OF BODY (continued).	QUALIFICATION (continued).
LIVERPOOL. University.	Certificate in Engineering in Electrical Engineering subjects.
LOUGHBOROUGH. Loughborough College.	Diploma in Electrical Engineering with Honours.
MANCHESTER. Municipal College of Technology.	Day Course Certificate of Technology in Electrical Engineering.
NEWCASTLE-UPON-TYNE. Armstrong College.	Diploma in Electrical Engineering.
SHEFFIELD. University.	Day Course Associateship in Engineering (provided that the candidate has passed in subjects viii, ix and x of the Final Examination).
CAPE TOWN. South African College.	Diploma in Electrical Engineering.
INDIA. Institute of Science, Bangalore.	Certificate in Electrical Technology.
IRELAND. Royal College of Science (now part of the National University).	Diploma in Engineering (including Mechanical and Electrical Engineering).

*From Part I of the Examination.*

The following will be exempted from Part I of the examination :—

(d) Candidates who have passed one of the following examinations or who hold a certificate recognized by the University concerned as exempting them from such examination :—

An "Intermediate" examination, which includes mathematics and physics, of any University in the United Kingdom or the British Dominions.

The "First Science" examination of any Scottish University.

(e) Candidates who possess one of the following qualifications :—

- (i) Diploma in Electrical Engineering of the University College of North Wales, Bangor.
- (ii) A Full-time Course Diploma in Electrical Engineering of the Polytechnic, Regent Street, London, W. 1.
- (iii) Diploma in Electrical Engineering, University College of South Wales and Monmouthshire.
- (iv) Diploma in Electrical Engineering of the University-College, Southampton.

- (v) Diploma of Associate in Electrical Engineering of the Technical College, Sunderland.
- (vi) Higher Grade National Certificate or Diploma in Electrical Engineering, provided the candidate satisfies the Institution in the subject of "English Essay."
- (vii) Whitworth Scholarship or Whitworth Prize, provided the Electrical Engineering subjects have been taken.
- (f) Regular Officers of the Corps of Royal Engineers and of the Royal Corps of Signals.
- (g) Assistant Engineers and Inspectors of the British Post Office.

*From Part II of the Examination.*

The following qualification will exempt from Part II of the examination :—

A Pass in the Final or Honours Grade in Electrical Engineering of the City and Guilds of London Institute.

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*Examination Papers.*

*A pamphlet containing specimens of the Papers set at previous Examinations can be obtained from the Secretary, price 1/- per copy.*

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**EXTRACT FROM THE BYE-LAWS OF THE  
INSTITUTION.**

**ASSOCIATE MEMBERS.**

**13.** Every candidate for election or transfer to the class of Associate Members shall be at least 25 years of age, unless at the time of his application he has been a Student of the Institution for at least three years, and he shall satisfy the Council—

(a) Either that he—

Has been regularly educated as an electrical engineer ;  
 And has had subsequent experience in a responsible position as an electrical engineer for at least two years ;  
 And is engaged in one of the branches of engineering at the time of his application ; provided that temporary unemployment shall not be deemed a disqualification.

(b) Or that he—

Has had experience involving superior responsibility for at least five years in the applications of electricity ;  
 And is engaged in one of the branches of engineering at the time of his application ; provided that temporary unemployment shall not be deemed a disqualification.

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