1934

Electrical Engineering (1st Year): Technical School Examinations 1934

Department of Education: Technical Instruction Branch

COURSE IN ELECTRICAL ENGINEERING.

(49.)

AN ROINN OIDEACHAIS.
(Department of Education.)

BRAINSE AN CHEARD-OIDEACHAIS.
(Technical Instruction Branch.)

TECHNICAL SCHOOL EXAMINATIONS.
1934.

ELECTRICAL ENGINEERING.
(First Year.)

Wednesday, May 30th—7 p.m. to 9 p.m.

Examiner—PROFESSOR W. BROWN, B.SC., M.I.E.E.

Co-Examiner—J. P. HACKETT, ESQ., B.E., A.R.C.SC.I.

GENERAL INSTRUCTIONS.

You are carefully to enter on the Answer Book and Envelope supplied your Examination Number and the subject of examination, but you are not to write your name on either. No credit will be given for any Answer Book upon which your name is written, or upon which your Examination Number is not written.

You must not have with you any book, notes, or scribbling paper.

You are not allowed to write or make any marks upon your paper of questions.

You must not, under any circumstances whatever, speak to or communicate with another candidate ; and no explanation of the subject of the examination may be asked for or given.

You must remain seated until your answer book has been taken up, and then leave the examination room quietly. You will not be permitted to leave before the expiration of twenty minutes from the beginning of the examination, and will not be re-admitted after having once left the room.

If you break any of these rules, or use any unfair means, you are liable to be dismissed from the examination, and your examination may be cancelled by the Department.

Two hours are allowed for this paper. Answer books, unless previously given up, will be collected at 9 p.m.

INSTRUCTIONS.

Read the General Instructions on page 1.

(*a*) Not more than *six* questions may be attempted.

(*b*) Equal values are attached to the questions.

(*c*) Answers must be written in *ink*; diagrams may be drawn in *pencil*.

(*d*) Write the number of the question distinctly in the margin of your paper before the answer.

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1. What is meant by an electric charge on a body being positive or negative? If you rub a piece of sealing wax on your coat sleeve, the wax may become charged; if so, explain how you would find out whether the charge be positive or negative.

2. You are required to make a permanent magnet 3 inches long out of an ordinary steel knitting needle. Explain how you would (1) temper it, (2) magnetise it, (3) find its north pole. Could you make a two pole permanent magnet 20 inches long out of steel of the same diameter as the 3 inches magnet? Explain.

3. You are given two pieces of similar steel 6 inches long, and you magnetise one piece by means of a solenoid 6 inches long, and the other by means of a solenoid 12 inches long. You then place the pieces of steel on a table and find the positions of their poles by means of a small compass needle. Would the distances between the poles of each magnet be the same? Give reasons for your answer.

4. Explain, with the help of a sketch, the construction of a Leclanche primary cell. Why are these cells used for electric bells and not for lamps? If you had to use 3 storage cells instead of 4 Leclanche cells on the bell circuit, how would you arrange matters? Explain.

5. Define potential drop or fall of potential between two points in an electric circuit. Explain, using a simple diagram, how, by the potential method, you would measure the resistance of a short coil or thick piece of conductor which could not be measured by means of the meter bridge.

6. There are two electric measuring instruments of the same type for measuring current and E.M.F. One instrument has a short thick coil of low resistance, the other a long fine coil of high resistance. Give a circuit diagram showing the positions of these instruments in the circuit and give reasons why they should be so placed.

7. Define the terms *ohm*, *microhm* and *megohm*, and state when they are used.

Discuss the effects of putting one ohm and one megohm (*a*) in series, (*b*) in parallel, between points of 10 volts p.d.

8. Why is an accumulator or secondary cell called a storage cell? What does it store up? What is meant by saying that a battery of such cells has a capacity of so many ampere-hours, or so many watt-hours?

9. Define the terms *Watt*, *Kilowatt* and *Kilowatt-hour*. An electric light installation of pressure 220 volts, consists of 200 glow lamps, each taking 0·15 ampere. Find the total number of kilowatt-hours used if 200 lamps are lit for 5 hours, and 150 lamps for 40 minutes.

10. Describe, with the aid of a simple diagram, the principal parts of a two pole direct current dynamo, and explain clearly the action of each part in the production of E.M.F. and current.