Technical Schools:Examination Papers   City of Dublin Technical Schools

1934

Electrical Engineering (2nd Year): Technical School Examinations 1934

Department of Education: Technical Instruction Branch

Recommended Citation

COURSE IN ELECTRICAL ENGINEERING.

AN ROINN OIDEACHAIS.
(Department of Education.)

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

TECHNICAL SCHOOL EXAMINATIONS.
1934.

ELECTRICAL ENGINEERING.
(Second Year.)

Wednesday, May 16th—7 to 10 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.

Three hours are allowed for this paper. Answer books, unless previously given up, will be collected at 10 p.m.

INSTRUCTIONS.

Read the General Instructions on page 1.

(*a*) Not more than *seven* questions are to be attempted.

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

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

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

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1. Explain the terms *magnetomotive force, permeability* and *reluctance* as applied to the magnetic circuit of a dynamo. On what does the total magnetic flux in a dynamo depend? Explain the terms or symbols you use. What part of the flux path has the greatest reluctance? Give reasons.

2. Describe, with the help of a clear diagram, the construction of the commutator of a dynamo.

An armature in a four pole field has 172 conductors in series and a speed of 750 r.p.m., the E.M.F. on open circuit being 100 volts. Find the magnetic flux per pole.

3. A direct current generator has sparking at the commutator. State the various possible causes of this, and the remedy you would apply in each case.

4. A shunt wound direct current dynamo fails to excite when run up to its proper speed. State the possible causes of failure and explain how you would find out and remedy them.

5. What is meant by saying that the speed of an electric motor is controlled more by the back E.M.F. in the armature than by a rheostat in the circuit?

The torque on a motor is found to be 35 ft. lbs. when supplied with 110 volts and 25 amperes. If the motor has an efficiency of 75 per cent., find the speed.

6. Explain clearly why it is that a direct current motor requires a starting resistance in the circuit.

The back E.M.F. in a four pole wave wound motor armature is 90 volts, the armature has 240 conductors, and speed 600 r.p.m. Find the flux per pole which threads the armature.

7. Explain the following terms, with respect to alternating current and E.M.F.: *period, frequency, maximum value, average value*, and *effective* or *root-mean-square (R.M.S.) value*. Name any ammeter which measures R.M.S. values of current. Explain why it does so.

8. In an alternating current circuit with a non-inductive load, the current and E.M.F. are in phase. What change takes place when the load is (1) inductive, (2) when the circuit contains a capacity? Illustrate your answers by the help of vector diagrams.

9. Explain how resonance may occur in an alternating current circuit which contains inductance and capacity. A condenser is put in series with a coil of 10 ohms resistance and inductance 0·25 henry, and a pressure of 100 volts at frequency 50 is put on the circuit. Find the capacity of the condensor required to produce resonance.

10. Describe, with the help of a clear diagram, the principle on which the working of a three-phase induction motor depends. How would you start such a motor which had (1) a wound rotor, (2) a squirrel cage rotor?