



1934

# Motor Car Engineering (1st Year): Technical School Examinations 1934

Department of Education: Technical Instruction Branch

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# COURSE IN MOTOR CAR ENGINEERING.

(69)

AN ROINN OIDEACHAIS.

(Department of Education.)

BRAINSE AN CHEARD-OIDEACHAIS.

(Technical Instruction Branch.)

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TECHNICAL SCHOOL EXAMINATIONS.

1934.

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MOTOR CAR ENGINEERING.

(First Year.)

*Wednesday, May 9th—7 p.m. to 10 p.m.*

*Examiner*—RICHARD COULSON, ESQ., A.R.C.S.C.I., M.S.A.E.

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

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## 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 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.

You are not permitted to attempt more than SEVEN questions.

Write the number of the question before the answer.

Do not re-write the questions in the answer book.

The use of drawing instruments is allowed.

1. Describe the operations in the cylinder of an internal combustion engine working on the two-stroke cycle and shew by means of a sketch the arrangement of the ports controlling admission and exhaust.

Give the reason why, in your opinion, this type of engine has not been used to a greater extent for motor car propulsion.

[45 marks.]

2. Shew by means of a sketch a form of cam used to operate the inlet or exhaust valves of an internal combustion engine. Indicate roughly on the sketch the points at which the valve opens and closes and the sizes on which the amount of lift depends.

[40 marks.]

3. Give a short description of any well-known make of carburettor and explain how the mixture is controlled so that good carburation is obtained throughout the normal speed range of an engine.

[40 marks.]

4. Make a diagrammatic sketch shewing the arrangement of the shafts and gears in a three-speed and reverse gear-box. Dealing with any one of the intermediate speeds, describe concisely how the engagement of it results in a reduction of the speed of the propeller shaft compared with that of the engine.

[45 marks.]

5. Describe the principal types of radiator construction and illustrate your answer with sketches.

Explain why a fan is usually fitted behind the radiator and shew by a diagram the direction of the air stream set up by it.

[40 marks.]

6. Give a short list of the troubles likely to be encountered in the coil ignition system of a modern car and state the steps you would take to put the system in good running condition if found faulty.

[45 marks.]

7. Sketch the principal types of springing used for motor car suspension. Indicate where shackles are necessary and give reasons for fitting them at the places you shew.

[40 marks.]

8. Make a sketch shewing (in plan) the chassis frame of a car. Shew the various cross-members and state the purpose of each.

What is the object of cross-bracing a frame?

[40 marks.]

9. State concisely the various functions which the live rear axle of a car has to fulfil.

What difference would you expect to find in the method of attaching the axle housing to the springs in the cases where the torque is taken (a) by a torque tube, (b) by the springs?

[45 marks.]

10. Make a sectional sketch of a Schrader tyre valve and indicate the particular parts on which the air-tightness of the valve depends.

Give approximate figures for the air pressures in the 28in.  $\times$  5 $\frac{1}{2}$ in. front and rear tyres of a car weighing 25 cwt.

[40 marks.]