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Motor Car Engineering (3rd Year): Technical School Examinations 1933

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COURSE IN MOTOR CAR ENGINEERING.

AN ROINN OIDEACHAIS.
(Department of Education.)

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

TECHNICAL SCHOOL EXAMINATIONS.

1933.

MOTOR CAR ENGINEERING.
(Third Year.)

Thursday, May 4th—7 to 10 p.m.

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

You are not permitted to attempt more than SIX questions.

The use of drawing instruments and slide-rules is allowed.

Write the number of the question before the answer.

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1. Sketch and describe an automatic advance magneto coupling suitable for use on a heavy commercial vehicle. State what you consider are the advantages of automatic timing control compared with hand control.

[50 marks.]

2. Assuming that the inlet valves of a six-cylinder engine open 7½ deg. late and close 47½ deg. late and that the exhaust valves open 40 deg. early and close on T.D.C., draw a diagrammatic end view of the camshaft and shew on it the angular relationship of the centre lines of the various cams. Number the cams to correspond with the cylinders and give the firing order you have assumed.

[50 marks.]

3. Describe the Dewandre vacuum servo brake system and include a sectional sketch of the cylinder shewing the piston, valve and linkage.

[50 marks.]

4. Explain what is meant by the calorific value of a fuel and give an approximate figure for present-day petrol. Neglecting the mechanical losses in an engine, what percentage of the energy contained in the petrol would you expect to find available at the crankshaft?

[50 marks.]

5. Make a sectional sketch of a dashboard suitable for a closed car; name the materials used and state the object of each.

[50 marks.]

6. Draw up a lubrication schedule for a heavy passenger vehicle. Include the main units and all the principal points, stating how frequently inspection of the former should be carried out and how often attention should be given to the latter.

[50 marks.]

7. State the type of final reduction gearing most widely used at the present time for (*a*) light cars, (*b*) heavy commercial vehicles. Discuss the reasons for these preferences and give approximate values for the normal efficiency of each of the two types of gearing.

[50 marks.]

8. Assuming that the engine of a car (fitted with coil ignition) runs erratically, describe how you would proceed systematically to locate the cause of the trouble and to remedy it when found.

[50 marks.]

9. Explain the meaning of the terms I.H.P. and B.H.P. Describe and illustrate with a sketch some apparatus for the measurement of B.H.P. and give a formula from which the brake mean effective pressure can be calculated when the B.H.P., the revolutions and the engine dimensions are known.

[50 marks.]