

(c) *Mechanical Drawing*.—Drawing to scale in pencil from dimensioned sketches of parts specified in (b) above. Skill in mechanical drawing will be regarded as of secondary importance compared with skill in freehand sketching, and questions will not be set in the written examination which involve accurate scale drawings of machine parts. Every candidate will be required to forward to the examiner his portfolio of drawings for inspection.

2. *Calculations and Graphs.*

Advantages and disadvantages of fractional and decimal methods of calculation; idea of accuracy of calculated results; significant figures; degree of accuracy of data obtained by various methods of measurement, with emphasis on the importance of the percentage error; meaning of 2", 2'0", 2'00"; metric fractional and decimal notations.

(a) Mensuration—areas and volumes as prescribed for the Intermediate Examination. Mid-ordinate method for finding area of curvilinear figures. Methods of finding weights of typical sections of iron and steel.

(b) Ideas of variable and variability; formulæ, indices. Use of algebraic symbols and logarithms, where advisable, in evaluating simple formulæ. A knowledge of algebraical operations sufficient to change the dependent variable in formulæ.

(c) The straight-line graph and its uses. Use of curvilinear graphs to obtain continuous values of one variable in terms of the other.

(d) In all calculations economy of labour and neatness of setting-out are to be emphasized. Particularly will it be insisted on that "rough checks" of calculations must be made, and that no calculations may be carried past the point where the data cease to be reliable.

3. *Elementary Mechanics and Physics.*

Mass; weight; force; work; relative density and specific gravity; measurement of volumes by displacement; principle of Archimedes; vectors; vector composition; vector triangle and parallelogram, principal of work, leading to an elementary treatment of parallel forces; moments; elementary mechanical devices such as levers, wedge, simple pulley-blocks.

SYLLABUS OF COURSE FOR THE INTERMEDIATE EXAMINATION FOR MOTOR MECHANICS.

1. *Drawing.*

The main objects of the course will be to enable the student (i) to produce a dimensioned sketch from which the part could be constructed, and (ii) to read mechanical drawings correctly. The course will include—measuring and sketching machine parts and electrical parts and appliances, with explanations of their functions; conventional methods of representation of details in electrical and mechanical work; lists of material and part numbers.

2. *Mechanics, Applied Mechanics, and Practical Mathematics.*

A fuller treatment of the syllabus for the preliminary examination, with the following additions: polygon of forces; equilibrium of bodies; further applications of the principle of work to simple machines such as Weston and other geared pulley-blocks, inclined plane, screw, and screw gearing; displacement, velocity and acceleration; mass, force, momentum, inertia; relations of force, mass, and motion; energy and work; moment of inertia; rotation and rotational energy; mechanical, thermal, and electrical units of energy and their ratios for conversion; friction and lubrication; efficiency; power of engines, brakes, motors, and their mechanical efficiency; transmission of power; properties of belts; slip of belts; effective diameters of pulleys; care of belts; speeds; fastenings; gearing; velocity-ratios of wheel trains; screw-cutting; pitch; diametral pitch; module; rules for pitch and outside diameter; distance between centres.

Mechanical properties of materials commonly used in motor engineering.

3. *Theoretical and Practical Course.*

For the intermediate examination a candidate will be required to have a practical knowledge of—

- (1) The principles governing the mechanical construction throughout the car.
- (2) The more general construction and adjustments necessary to expeditiously dismantle, repair, and replace parts for the efficient upkeep of the car.
- (3) The localization and correction of common faults in the electrical system.