

Fuel-supply Systems.—Details of construction of vacuum, and pressure systems. Rectifying defects.

Valve Mechanism.—Details of valve-operating mechanism; overhead cam-shaft drives; single and double sleeve valves.

Engines.—Eight-cylinder; V-type; sleeve-valve.

Engine Details.—Piston assembly; crank-shafts; harmonic balancers; limit of wear in cylinders and parts.

Cooling.—Thermostats; reasons for most efficient working-temperature.

Lubrication.—Details of pumps, &c.; oil-purifiers; distribution of oil to various parts; oil coolers and rectifiers; details of oil grooves in various systems; adjustment of bearings; prevention of oil leakages; single-unit chassis lubrication; characteristic properties of oils, and definitions of usual terms.

Clutches.—Details of construction and adjustment; power transmitted by clutches.

Change-speed Systems.—Details of operating mechanism of three- and four-speed selective types; epicyclic gears, including Ford system; measurement of gear ratios; lubrication and prevention of oil-leakage.

Back-axle Assembly.—Further details of construction and adjustments; pinion and crown-wheel adjustments; detachable wheels; road-wheel adjustments.

Front-axle Assembly.—Geometrical consideration of turning radius; testing of axle and methods of straightening and aligning; causes of bad steering and wheel "shimmy."

Steering-gear.—Details of construction and adjustment of worm and sector, split nut, screw; variable ratio; Marles and Ross systems, and correction of faults peculiar to each.

Brake Systems.—Mechanical, hydraulic, pneumatic, and servo systems; self-energizing shoes; faults in operation.

Chassis-construction.—Details of engine and gear-box suspension; rubber and pin shackles; systems of individual wheel-springing (Lancia), &c.; method of re-alignment after accident; construction of haulage chassis and tractors.

Magneto Ignition.—Principles of construction, testing, locating faults; adjusting and replacement of defective parts in H.T. and L.T., inductor and rotary armature magnetos, including Ford types; remagnetizing; impulse starters; automatic advance; magnetos using battery current at starting; timing ignition.

Battery Ignition.—Principle of construction, testing, locating faults, adjusting and replacing defective parts, timing of trembler and block coils. Automatic spark advance; changing from magneto to battery ignition. Dual ignition.

Wiring.—Series and parallel circuits and distribution of current and voltage in such. Connecting up from complete wiring diagrams, rewiring, adjusting accessories. Locating and repairing faults.

Batteries.—Rating, testing, charging; polarity, connecting up; precautions when removing; replacing defective plates.

Generators.—Principle of construction; voltage-regulation; brush-setting; regulation of output; defects in commutator; testing, and locating faults in generator circuit; replacements and adjusting; minor repairs; causes of burning out.

Starters.—Mechanical starters; methods of engaging starter motor; principle of construction and characteristics of motors; torque and speed; testing, and locating faults; minor repairs and replacements; brush gear and brushes; switches.

Electrical Vehicles.—Outlines of principles; advantages and disadvantages. Magnetic clutches and selectors; advantages and disadvantages. Petrol electric vehicles; advantages and disadvantages.

2. Workshop Practice.

The syllabus of the intermediate course, with the following additions: Brazing; elementary practice in oxy-acetylene welding; "open-fire" case-hardening; treatment of valves with reference to proper methods of truing, refacing, grinding, &c.; "normalizing" valves; remetalling, fitting and refitting bearings; assembling and aligning pistons, rings, connecting-rods, and crank-shafts.

CARPENTRY AND JOINERY AND BUILDING-CONSTRUCTION.

The following candidates will be exempted from the preliminary examination:—

- (a) Those who have passed the examination for a senior free place in the subjects of freehand and instrumental drawing, trade drawing, woodwork, and mathematics or alternative mathematics.