

DETAILED SYLLABUS OF

MECHANIC MOTOR VEHICLE TRADE in



RRB TECHNICIAN

(CEN) No. 02/2024)

WORKSHOP SAFETY PRACTICE

Knowledge of personal safety and safety precautions in handling diesel machines , Concept of house keeping & 5S method, Elementary first-aid, Safety practice – fire extinguishers, Energy conservation process.

ENGINEERING MEASUREMENT

Marking material, Scraper, Surface plates, Try Square, Types of calipers, Dividers, Surface Gauges, Scriber, Engineer's steel rule, Chisel, Hammers, Screwdrivers, Allen keys, Bench vice, Spanners and their uses, Pliers, Outside metric micro meter, Depth micro meter, vernier caliper, Telescope gauge, Dial bore gauge, Dial test indicators, Straight edges, Feeler gauge.

BASIC WORKSHOP PRACTICE

Drilling Machine (Portable Type), Drilling Machines, Cutting speed and RPM, Work – Holding devices, Drill – Holding devices, Drill bits, Hand taps and wrenches, Tap drill size, Die and die stock, Reamers, Hole size for reaming, Lapping, Lap materials and lapping compounds, Rivets – types and uses, Riveted joints, Brazing, Soldering, Principles of arc welding brief description, classification and applications, Arc-welding machines, Edge preparation, Tool and equipment used in oxy-acetylene gas welding.

ELECTRICAL AND ELECTRONICS

Basic Electricity principles, Earthing and its importance, Ohm's law, Basic types of electric meters, Multimeter, Fuses, Cable color codes and size, Laws of resistances, Resistors in Series circuits, Parallel circuits and Series-parallel circuits, Electrostatic effects, Capacitors and its applications, Capacitors in series and parallel. Description of Chemical effects, Batteries & cells, Electromagnetic induction, Relays, Solenoids, Primary & Secondary windings, Transformers, Stator and Rotor coil, Description of Semi conductors, Diodes, Transistors and classification, Uni Junction Transistor (UJT), Field Effect Transistor, Metal Oxide Semiconductor Field Effect Transistor (MOSFET), Basic Logic Gates.

HYDRAULICS AND PNEUMATICS

Introduction to Hydraulics & Pneumatics: – Definition of Pascal law, pressure, Force, viscosity, Gear pump-Internal & External, single acting, double acting & Double ended cylinder; Pressure relief valve, Non return valve, Flow control valve used in automobile. Pneumatic Symbols, Description and function of air Reciprocating Compressor.



CLASSIFICATION OF VEHICLE AND ENGINE

History & Developments in automobile industry, Ministry of road transport & highways, Classification of vehicle, Uses of hoists, jacks and stands. Internal and external combustion engine, Classification of I.C engines, Function of diesel engine, Function of spark ignition engine, Direct and indirect fuel injection system, Dashboard guages, meters, and warning lights, Guages used in automobiles, Starting and stopping methods of engine, Procedure for dismantling of diesel engine from the vehicle, Petrol engine basics, Scavenging, Description and constructional feature of cylinder head, Effect on size of intake and exhaust passages.

ENGINE COMPONENTS

Description and Function of Engine Valves, different types, materials, Type of valve operating mechanism, Valve constructional features and valve timing. Description of Camshafts & drives, Description of Overhead camshaft, Camshaft drive mechanisms. Description & functions of different types of pistons, piston rings. Description & function of connecting rod, Locking methods of piston pin. Engine bearings- classification and location, Crank-shaft balancing, Firing order of the engine. Description and function of the flywheel and vibration damper, Timing gear drive, Function of clutch & coupling units attached to flywheel. Description of Cylinder block, Cylinder block construction, and Different type of Cylinder sleeves (liner).

COOLING & LUBRICATING SYSTEM

Need for Cooling systems, Different type of cooling systems, Basic cooling system components. Need for lubrication system, Lubrication system components, different type of Oil pump & Oil filters.

FUEL SYSTEM

Diesel Fuel Systems- Description and function of Diesel fuel injection, fuel characteristics, Description and function of Diesel tanks & lines, Diesel fuel filters, Electronic Diesel control systems, Common Rail Diesel Injection (CRDI) system, Sensors, actuators and ECU (Electronic Control Unit) used in Diesel Engines. Engine Performance Testing – Engine assembling special tools, Gas Turbines.

EMISSION CONTROL SYSTEM

Vehicle emissions Standards- Euro and Bharat II, III, IV, V Sources of emission, Combustion, Combustion chamber design. Types of emissions. Characteristics and Effect of Hydrocarbons, Hydrocarbons in exhaust gases. Diesel particulate filter (DPF). Source of Pollutants, Crankcase emission control, Exhaust gas recirculation (EGR) valve, Evaporation emission control, Catalytic converter, Selective catalytic reduction (SCR), EGR Vs SCR.

CHARGING AND STARTING SYSTEM

The purpose of Charging system, charging system components, charging system circuit, Alternator principles, Alternating current, Alternator components. Differences between Alternator & Dynamo. Common troubles and remedies in alternator. Purpose of starting system, Starting system components, Starter motor principles, study of starter control circuits, Starter motor construction.

TRANSMISSION SYSTEM

Study of different major components & assemblies of heavy vehicle, and different make. Clutches & Manual Transmissions-Clutch principles, Single-plate clutches, Multi-plate clutches, Dual mass flywheels, Operating mechanisms Clutch components- Pressure plate, Driven/ centre plate, Throw-out bearing. Manual transmissions, Gearbox layout & operation, Gear shift mechanism. Layout of drive shafts. Automatic Transmissions - Torque converters, Torque converter principles.

STEERING AND SUSPENSION SYSTEM

Description and function of Steering systems, Principles of steering, Rack-and-pinion steering system, Recirculation ball & nut steering system, Four-wheel steering systems,

collapsible steering system. Steering boxes & columns – Description and function of Steering columns. Power Steering. Principles of suspension, Suspension force. Types of suspension–Suspension systems, Solid axle, Dead axle, Description, function. Shock absorber types– Description and function of shock absorbers. Wheels & Tyres –Wheel types & sizes, Wheels, Rim sizes & designations, Types of wheels, Tyre types & characteristics, Tyre construction.

BRAKE SYSTEM

Braking Systems :- Principles of braking, Drum & disc brakes, Lever/mechanical advantage, Hydraulic pressure & force, Brake pad, Regenerative braking.

Braking systems – Brake type – principles, Air brakes, Exhaust brakes, Electric brakes, Parking brakes, Engine brakes, Regenerative braking. Braking system components.

LIGHTING SYSTEM

Lighting system, Lamps/light bulbs, Lamp/light bulb information, LED lighting, Headlights–description of standard sealed beam, halogen sealed beam, composite and High intensity discharge (HID) headlights.

AIR CONDITIONING SYSTEM

Heating Ventilation Air Conditioning (HVAC) legislation, Vehicle heating, ventilation & cooling systems, Basic air-conditioning principles, Air-conditioning capacity, Air-conditioning refrigerant, Humidity Description and function of Fixed orifice, Control devices, Thermostatic expansion valve system, Thermal expansion valves, Air-conditioning compressors, Condensers & evaporators.

NOTE: It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper



THANK
you

