

**INDIRA TECHNICAL EDUCATION SOCIETY,
NASHIK**

**CERTIFICATE COURSE
AUTOMOBILE TECHNICIAN (ATT)
PAPER - I**

**EXAM SCHEME: THEORY PAPER – I - 100 MARKS – 3 HRS.
THEORY PAPER – II - 100 MARKS – 3 HRS.
PRACTICAL 100 MARKS – 2 HRS.**

[ATT - I / DATES – I / ADATES – I]

THEORY SYLLABUS

AUTOMOBILE ENGINES

1. SAFETY

Safety precautions to be observed in Automobile workshop or Motor Garage.

2. TOOLS & EQUIPMENT

Tools & Equipment's and different measuring instruments used in repairs of engines on Automobile etc.

3. MOTOR VEHICLE INDUSTRY

General idea of Motor Vehicle, Motor vehicles manufactured in India, Manufacturers of Motor Vehicles.

4. ENGINE

1. General description of internal combustion Engines and External Combustion Engines.
2. Principle & function of internal Combustion Engine.

PETROL ENGINE

1. 4 Stroke Cycle petrol engine.
2. 2 Stroke Cycle petrol engine.
3. Main Parts & their functions, Various types of Gaskets and packing, Engine bearings, valve Timing Diagrams etc.
4. Single and Multi cylinder engine & Classification of Engine.
5. Definitions of – Bore, stroke, Cubic Capacity, Compression Ratio, Power to weight Ratio, Horse Power, Mechanical & Thermal Efficiency.
6. Tappets adjustment, Decarburizing process, Engine Tune-up, Automotive engine overhaul and their maintenance Trouble shooting charts.
7. Types of Two Wheelers and It 's classifications.
8. Function of Two stroke cycle incase of scooters and motor cycles.
9. Introduction of L.P.G. & C.N.G. types of Engine.

DIESEL ENGINE

1. Principle of 4 stroke and 2 stroke cycle diesel engines.
2. Working of Diesel cycle.
3. Difference in the construction and operation of four stroke and two stroke cycle engines.
4. Diesel engines and its parts, function, process of combustion , pre-ignition and detonation.

5. Diesel engines maintenance, Decarburizing, overhauling , parts , assembly inspection, trouble shooting.
6. Advantages and Disadvantages of four stroke and two stroke diesel engine.
7. Engine performance test.

5. FUEL FEED SYSTEM & EXHAUST SYSTEM :

PETROL ENGINE FUEL SYSTEM

1. Functions of fuel supply system, Various parts in the Fuel system and their functions, operations and its maintenance.
2. Carbonization of petrol , Antiknock value and Octane rating , Fuel gauge, Construction.
3. Trouble shooting in case of petrol feed system and its rectification and maintenance vaporization.
4. Construction of fuel tanks for four / two wheelers maintenance.
5. Construction and working of MP F1 system.

DIESEL ENGINE FUEL SYSTEM

1. Diesel Fuel supply and fuel direct and indirect injection system.
2. Fuel tank construction and maintenance.
3. Working of Diesel fuel system , Components and their functions – fuel filters , injectors , fuel injection pumps .
4. Types of each components and maintenance .
5. Injector testing.
6. Bleeding air from fuel line or removing air lock.
7. Fuel feed pump and fuel injection pump tests.
8. Functions, operation of fuel injection pump and its calibration and testing etc.
9. Spill out off tests.
10. Types of Governors on fuel injection pumps, characteristics.
11. Diesel fuel system maintenance, trouble shooting.
12. Study of superchargers and Turbochargers.

EXHAUST SYSTEM

1. Constituents of petrol and diesel smoke.
2. Function and constructional features of silencer , muffler , Tailpipe etc.
3. Types of silencers, mufflers and repair / maintenance.
4. Silencer system on two wheelers.
5. Study of Catalytic converters , exhaust gas analyzers and smoke meters for Diesels.

6. ENGINE COOLING SYSTEM

1. Necessity of cooling the engine - types of cooling system & coolants.
2. Working of Engine Air cooling system.
3. Working of Engine Water Cooling system with construction of all parts incorporated in it.
4. Comparison of Air Cooling and Water Cooling system.
5. Working of Thermostat and its testing methods.
6. Water pump construction , Radiator construction working of Temperature Gauge.
7. Study of De-aeration cooling system, Advantages and Disadvantages of the system.
8. Cooling additives , Anti- Freeze solutions.
9. Cooling system Troubles – Remedies and Maintenance.

7. AIR INTAKE SYTEM

1. Type of air filters and its operations , maintenance.
2. Types of manifolds , its repairs / maintenance.
3. Advantages of divided manifolds.
4. Two wheelers Air intake systems.

8. ENGINE LUBRICATION SYSTEM :

1. Necessity of Lubrication, Types of Lubrication and Lubricants used on MVS.

2. Two stroke engine lubrication, Mist Lubrication, Splash and Pressure types.
3. Parts in engine lubrication system – Oil pump , Oil filters , full flow and by pass types, By pass and pressure relief valve, Oil pressure gauges, Pipelines Oil Seals etc.
4. Crankcase ventilation.
5. Types of Greases , Chassis Lubrication.
6. Chemistry of Lubricating oils, Oils additives.
7. Various types of bearings use on motor vehicles and their maintenance.
8. Trouble shooting and maintenance of lubrication system.

9. AUTOMOTIVE ELECTRICITY :

1. Necessity of Electrical system.
2. Working of Auto Electricity.
3. Various parts and units in Auto Electricity.
4. Construction operation and maintenance of storage battery , Dynamo Alternator , Starter, Ignition system.
5. Working of regulator cut- out and solenoid switch.
6. Dashboard instruments seen on instruments panel their working and maintenance.
7. Trouble shooting and maintenance.

10. PREVENTIVE MAINTENANCE :

1. Necessity of maintenance / preventive maintenance.
2. Benefits from periodic maintenance of motor vehicles / 2 & 3 Wheelers.
3. Preventive maintenance schedule of Vehicles.



(ATT - PAPER – II)

[ATT - II / DATES – II / ADATES - II]

THEORY SYLLABUS

AUTOMOBILE CONTROL SYSTEMS AND PRACTICE

100 Marks, 3 Hours

1. STEERING SYSTEM

1. Necessity of steering system, Parts in the steering system.
2. Construction and working of various type of steering Gear system used on Indian Motor Vehicles.
3. Steering System employed on two / three wheelers.
4. Steering Geometry – Ackerman principle , caster angle , camber angle, Toe-in , Toe- out , Toe-out turns , slip angle, Wheel Alignment and its adjustment.
5. Power steering , Principle , Power steering types employed on Indian Motor Vehicles, Power steering operations and advantages.
6. Trouble shooting adjustment & maintenance of steering system.

2. SUSPENSION SYSTEM

1. Necessity of suspension system.
2. Construction and working of various type of suspension system fitted on Indian motor Vehicles.
3. Conventional semi elliptic and Independent suspension Leaf, Coil, Parallel, Link, Torsion bar, McPherson, Wishbone types etc.
4. Principles and operations of Air suspension and its advantages.
5. Necessity of shock absorbers and bushes.
6. Stub axle or steering knuckle & front axle construction and types.

7. Suspension of two , three wheelers.
8. Trouble shooting , adjustment and maintenance of suspension system.

3. TRANSMISSION SYSTEM

1. Necessity of transmission system.
2. Layout of Automobile transmission system incorporating various units.
3. Various types of Auto power transmission , four wheel and front wheel drive. 4 wheel drive and front wheel drive , Rear wheel drive, Hotchkiss Drive & Torque Tube Drive.
4. Construction details of various transmission system unit such as clutch, Gearbox, Propeller shaft, Universal joint their principle & working.
5. Principle & working operation of Final drive, Rear axle assembly, differential, components of final drive etc. gear ratios.
6. Adjustment of clutch play , free play.
7. Gear & clutch mechanism used on 2 & 3 wheelers.
8. Diaphragm clutch, clutch adjustment, benefits of diaphragm clutch, Hydraulic clutch, Fluid fly wheel.
9. Technical comparison between constant mesh, sliding mesh & synchromesh, Gear boxes, advantage & disadvantages of each.
10. Trouble shooting & maintenance of transmission system.

4. CHASSIS

1. Automobile Chassis in General.
2. Various types of chassis construction for LCVS, MMVS & Heavy duty motor vehicles, body construction Classification of vehicles as per type of chassis & body.
3. Chassis Alignment.
4. Body construction.

5. AUTOMOBILE BRAKE SYSTEM

1. Necessity of breaking system.
2. Various type of brake system used on Indian motor Vehicles.
3. Working of hand break , Operation and maintenance of mechanical hand break.
4. Internal Expanding and External contracting brakes operation.
5. Principles and working of Hydraulic brakes – and functioning of master cylinder assembly , wheel cylinder assembly , brake bleeding process .
6. Tandem master cylinder operation.
7. Working and construction of Air Assisted Hydraulic brakes such as servo, Boosters etc.
8. Working Principle of Air pressure brakes. Types of Air Pressure Brake, Fail safe , Dual Brake systems operation, Brake actuation or foundation brake , accessories like air compressor , air dryer , Brake valve unloader valve , SP valve , Brake chamber and spring brake chambers, Brake shoe liner revetting , Adjustment of Brakes, Adjustment of front / rear Hub bearing.
9. Engine Exhaust brake system, Principle operation, Unites incorporated.
10. Fuel air pressure brake & Dual line brake systems, Benefits / advantages of these systems.
11. Brake system Testing , Tapleymer and Deselometer application in testing.
12. Brake system Trouble shooting repair and maintenance.
13. Introduction of Anti locking break system (ABS)

6. WHEELS AND TYRES

1. Types of wheel rims and wheels.
2. Types of tyres – Conventional & Radial.
3. Construction of Tyres & Material used Rubber, Butyle, Nylon and Rayon cord tyres.
4. Tyre inflation , Tyre Rotation Tyre size, lleffects of over inflation & under inflation.
5. Preventive maintenance of types and wheels.
6. Maintenance record , use of workshop manuals.

7. Tyre and tube repairs.
8. Motor vehicle Repairs and Maintenance.

7. MOTOR VEHICLE ACT – 1988 & VEHICLE INSURANCE

M. V. Act 1988, M. V. rules 1989, topic of chapter / section 8 schedules, definitions of chapters, Licensing of drivers, Registration of M. Vs. control of Transport vehicles, State & interstate contractors , Private & Public Vehicles, Traffic rules, offences & penalties, Speed limits, Signs in 8th 9th schedules.

M.V. Act 1988 with Amendments.

1. Insurance of motor vehicles, comprehensive & 3rd party insurance , procedure & limits.
2. Various papers to be carried with M. V.
3. Licensing procedures.
4. PUC of MVS Two Wheelers.
5. Bharat state I, II, III OR Euro I, II, III

8. GARAGE EQUIPMENTS AND LAYOUT

Layout of model , Equipments used for motor vehicles, greasing equipments spray painting and greasing machinery, Car servicing hoists, Car washing machines, Jib head crane / Electric hoists.

SCHEME OF EXAMINATION :

Theory Two Paper	3 hours	100 Marks each
Practical	2 hours	75 Marks
Journal		15 Marks
Oral		10 Marks
	Total	300 Marks

