

MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION, MUMBAI

1	Name of Syllabus	Certificate course in Driver cum mechanic (306108)																																								
2	Max.Nos of Student	25 Students																																								
3	Duration	6 Month																																								
4	Type	Part Time																																								
5	Nos Of Days / Week	6 days																																								
6	Nos Of Hours /Days	4 hrs.																																								
7	Space Required	1) Workshop = 400 sqfeet 2) Class Room = 200 sqfeet ----- TOTAL = 600 sqfeet																																								
8	Entry Qualification	5 th Passed																																								
9	Objective Of Syllabus/ introduction	Successful candidate would be able to Repairing of vehicle and drive it.																																								
10	Employment Opportunity	After completing the training the candidate will be able to drive the car and does the necessary mechanic work.																																								
11	Teacher's Qualification	Diploma in Automobile, / I.T.I. With N.C.V.T. With 1 yr. exp.																																								
12	Training System	<table><tr><th colspan="7">Training System Per Week</th></tr><tr><td>Theory</td><td>Practical</td><td colspan="5">Total</td></tr><tr><td>6 hrs</td><td>18 hrs</td><td colspan="5">24 hrs</td></tr></table>						Training System Per Week							Theory	Practical	Total					6 hrs	18 hrs	24 hrs																		
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Theory - I - Maint. and repair of vehicle

- 1 Knowledge on health & safety precautions to be observed in the workshop / garage (health hazard of asbestos dust to be emphasized)
 2. **TRANSMISSION** - Power flow from engine to wheels
 3. Units & Definition of force, work, power, torque & pressure
 1. . Description of single plate clutches. Functions of different parts of the clutch assembly. Clutch linings material. Power flow in clutch plate.
 2. . Clutch operating mechanisms- manual & hydraulic Clutch faults
 3. . Type of gears and their application-advantages and disadvantages-gear ratio
 4. . Working principle of constant mesh, synchromesh gear boxes
 8. Working principle of differential Faults in differential & C.V. Joints
 9. Gear box faults
 10. Types of bearings, maintenance, their characteristics & application
 11. **BRAKE** – Forces & moments acting on vehicle, brake slip, braking force co-efficient, time element of braking operation
- Classification of brake systems, factors affecting the braking distance
- 12 Working principle of brake components – brake booster tandem master cylinder, caliper assembly, wheel cylinder & different braking force control valves
 13. Introduction to anti-lock braking system (ABS).
 14. **STEERING** – Introduction, basic types of steering, steering geometry (necessity, types & effects), steering characters (over steer, under steer & neutral steer) & steering linkage
- ☐ Types of steering gear, power assisted steering (hydraulic & electronic)
 - ☐ **SUSPENSION** – Introduction, requirement, types, McPherson strut, shock absorber,
 - ☐ **WHEELS & TYRES**- necessity, functions, designation & defects analysis
 - ☐ Final road test procedure – observation of Noise, Vibration & harshness from different part of chassis – observation of transmission, brake, clutch, steering & suspension systems for their satisfactory working
- . Study of Road sign.

Practical - I - Assembly and disassembly of 4 wheeler

Remove clutch plate from vehicle, check for defects & rectify/replace & refit

- ☐ Remove gear box from vehicle, dismantle, check, rectify, fill lubricating oil & assemble
- ☐ Align gear selector fork
- ☐ Remove CV Joint, Dismantle, lubricate & refit
- ☐ Remove crown wheel, pinion and bearings, clean parts. Check tooth contact in the crown and pinion and adjust backlash & Assemble rear axle assembly
- ☐ Check and adjust parking brake and service brakes. Dismantle wheel brake assembly– remove old lining and fit new one
- ☐ Remove and refit vacuum boosters
- ☐ Overhaul – master cylinder, Wheel cylinder & caliper pistons, wheel drum
- ☐ Bleed vacuum assisted hydraulic brakes
- ☐ Remove & clean brake drums. Check disc/drum run-out, Fit new cups and brake hoses –assemble, adjust all four-wheel brakes and test for brake concern.

Remove and refit steering boxes from vehicle, checking and top-up oil in steering box. Check and adjust steering wheel play and backlash.

Overhaul hydraulic power assisted steering system – pump, control valve & cylinder

- ☐ Remove and refit a leaf spring as an assembly in a vehicle, changing rubber bushes of shock absorbers and independent front suspension. Lubricate suspension units.
- ☐ Re-camber the leaf spring

Practical - II - Driving practice of 4 wheeler

Lubrication:

- ☐ Checking & topping up oil , Lubricating moving parts, Greasing via nipples

Tyres:

- ☐ Jacking & supporting the car , Checking tyre inflation , Rotating tyres , Replacing punctured tyres.

Oil & Filters:

- ☐ Draining engine oil. Changing engine oil. , Changing fuel & air filters.

Spark Plug:

- ☐ Removing the spark plug. , Cleaning the spark plug., Replacing the spark plug.

Petrol Smell:

- ☐ Checking the fuel tank. , Checking the fuel lines. , Checking the fuel pump.

Curing Starting Problems:

- ☐ Checking the battery. , Checking the HT leads. , Checking the spark-plug.' Checking the distributor cap.
- ☐ Cleaning the points. , Replacing the points.

Engine Overheating:

- ☐ Checking the cooling system. Checking the water pump. Flushing the cooling system.
- ☐ Cleaning the radiator. Checking the timing.

Battery Maintenance:

- ☐ Cleaning and applying petroleum jelly. Topping up the distil water.
- ☐ Checking the charging.

Cleaning & Polishing:

- ☐ Cleaning the interior. Cleaning & washing the exterior.
- ☐ Polishing the metal parts.

☐ **Performing safety checks.**

- ☐ Identifying controls & Instruments.
- ☐ Driving Away & Stopping.
- ☐ Safe Positioning.
- ☐ Adjusting & using the mirrors.
- ☐ Giving the correct signals.
- ☐ Anticipating & Planning.
- ☐ Use of Speed.
- ☐ Interacting with other traffic.
- ☐ Negotiating junctions.
- ☐ Negotiating roundabouts.
- ☐ Pedestrian crossing.
- ☐ Driving on a highway.
- ☐ Driving at night.
- ☐ Turning the vehicle around.
- ☐ Reversing.
- ☐ Parking.
- ☐ Operation of Remote & Child lock.
- ☐ Emergency stop.

. Driving Practice

TOOLS & EQUIPMENTS (Suggested)

s.no	Item	s.no	Item
1	Hammer ball peen 0.75 kg	28	Mallets (wooden/plastic)
2	Screw driver 20 cm. x 9 mm blade	29	Spanner, ring offset set of 6 (S A E)
3	Screw driver 30 cm x 9 mm blade	30	Spanner, adjustable 20 cm.
4	Spanner D E set of 12 pieces (6 to 32 mm)	31	Spanner for spark plugs 14 mm
5	Pliers combination 15 cm	32	Socket Spanners with handle, T bar & ratchet
6	Hand file 20 cm. Second cut	33	Oil can 0.5 liter cap
7	Centre punch 10 mm dia x 100 mm	34	Cleaning Tray 45 x 30 cm.
8	Chisel cold flat 20 mm	35	Work bench each 250 x 120x60 with 4 bench vices 12 cm jaw
9	Ring spanner set of 12 pieces (6 to 32 mm.)	36	Pullers screw powered 2 mm with bearing puller attachment
10	Feeler gauge 20 blades (metric)	37	Vice grip pliers
11	Steel tool box with lock & key (folding type) size 400x200x150mm .	38	Circlip pliers Expanding and contracting type 15 cm and 20 cm each
12	Allen Key set of 12 pieces (2 mm to 14 mm)	39	Inspection lamp with guard and wandering lead of 100 ft.
13	Philips Screw Driver Type set of 5 pieces 100 mm to 300 mm	40	Hollow punch set of seven pieces 6 mm to 15 mm
14	Steel Rule 30 cm, English and metric	41	„V“ Block 75 x 38 mm pair with Clamps
15	Prick punch 15 cm	42	Spanner off set double ended set of 7 pieces.(6 mm -17 mm) Set of 12 nos.
16	Scriber 15 cm with scribing block universal	43	Spark Plug Spanner
17	Hacksaw frame adjustable for 30 cm blade	44	Different types of Injectors
18	Hand vice 37mm	45	Tachometer - to read upto 5000 rpm
19	Drill Twist (assorted)	46	Battery 12 V
20	Hand reamer adjustable	47	Hydrometer
21	Drilling machine	48	Air compressor
22	Electric pedestal grinder with two wheel	49	Water pump / Washer
23	Portable electric drill 6 mm	50	Fire Extinguisher
24	Spark plug cleaner and tester similar to Bosch / champion	51	Tyre repair kit
25	Battery charger 6v- 18 v	52	Torque wrench 0 – 50Nm
26	Latest 4 Wheelers of different make (one LMV & one HCV) along with workshop manuals	53	Tyre Pressure gauge
27	Grease gun	54	Tread depth gauge

55. One dedicated training car fitted with a dual brake & a dual clutch.

56. Assorted hand tools.

57. Road sign charts.
