

**MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION, MUMBAI -51**

1	Name of Syllabus	C.C. In Scooter motor cycle servicing (306102)																																								
2	Max. No's of Student	25 students.																																								
3	Duration	6 Month																																								
4	Type	Part Time																																								
5	No Of Days / Week	6 Days																																								
6	No Of Hours /Days	4 Hrs																																								
7	Space Required	Workshop = 800 Sq feet Class Room = 200 Sq feet TOTAL = 1000 Sq feet																																								
8	Entry Qualification	7 <sup>th</sup> passed																																								
9	Objective Of Syllabus/ introduction	1) Trainee should be well conversant with the tool generally used for repair and maintenance of engines 2) Trainee should know the working of engine. 3) Trainee should be able to detect the faults. 4) He should be able to rectify the fault by way of repairing defective part of carry out minor repair and put the engine in working condition. 5) He should know the maintenance of the engine.																																								
10	Employment Opportunity	<b>SELF EMPLOYMENT</b> - To undertake faulty and minor repair work, especially in rural areas where garage facilities are not available <b>Wage-Employment</b> - Will be able to work in private garage , road transport corporation																																								
11	Teacher's Qualification	H.S.C. Vocational Passed <b>OR</b> D.A.E. (AUTO) . <b>OR</b> D.M.E.( MECH.)																																								
12	Training System	<b>Module wise Training System Per Week</b> <table><tr><td>Theory</td><td>Practical</td><td>Total</td></tr><tr><td>6 Hours</td><td>18 Hours</td><td>24 Hours</td></tr></table>						Theory	Practical	Total	6 Hours	18 Hours	24 Hours																													
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## THEORY PAPER – I, ENGINE & DIFFERENT TYPES OF SYSTEM

1. General description of scooter, Motorcycles and mopeds in market engine capacity, Bore, stroke, H. P. No. of gears, compression Ratio, ignition system C. B. Point gap, sparkplug gap. Transmission system, Tyre size, Air pressure in front and rear wheel fuel consumption in term of Km/Liter, Tank capacity weight, frame structure.
2. Engine- Description and construction of I.C. Engines, classification of I.C. Engine Technical term. Study of engine parts (moving & stationary component's) of two stroke cycle/Four stroke cycle single cylinder Air cooled petrol engine their Location, material and function/purpose. Description of the working of two stroke cycle and four stroke cycle petrol Engine. Practical difference between two stroke cycle and Four stroke cycle petrol engine.
3. Valve and valve arrangement used in four stroke cycle single cylinder petrol engine. Valve, arrangement such as Rotary valve, reed valve transfer port used in two stroke cycle engines.
4. Fuel system- study of fuel system- purpose of fuel system. Type's gravity feed fuel system, its components-fuel tank, fuel pipe, and fuel taps/cocks .fuel filter.
5. Lubricants- solid, semisolid, Liquid, selection of commercial Lubricants used for two wheeler, Lubrication system for engine parts in various vehicle, Lubrication system for engine parts in various vehicle, Lubrication system for transmission control and other parts. Lubricating system used in four stroke cycle single cylinder petrol engine, use of oil seals in engine importance of oil filter.
6. Suspension system – purpose of suspension system. Rear suspensions- types of suspension system in various vehicle maintenance and care. Hydraulic shock absorbers, parallel cylinder, opposed cylinder and vane type. Telescope shock absorber.
7. Front suspension- Fork, spring, function of spring types of spring such as coil, care and maintenance and function of each parts.
8. Transmission system;- Purpose of transmission system, methods of power transmission Related to two wheeler (Scooter, Motorcycle & Mopeds).
9. Clutch- Function of clutch location study of various types of clutch used scooter's Motorcycles and mopeds-centrifugal Multiplate dry and wet. Different part's in clutch system their function, defects and remedies. Sequence of disassembling and assembling of clutch.
10. Gearbox:- Function of gearbox , Location, Study of gearbox used. On two wheelers- Constant mesh type, Gear shifting mechanism and their types. Different parts in gearbox, their function, Effect of gear ratio's on torque and power, Defects and their remedies sequence of disassembling & assembling of gearbox. Study of engine cranking system adopted in two wheelers.
11. Cleaning- Valve cleaning, valve seat grinding and matching tappet clearance, Adjustment, cylinder cleaning, cleaning of part's, Bore grinding for next over size piston, cylinder head decarburizing.
12. Steering system:- Function of steering system. Different parts in steering system their functions, steering Lock, Defect's in steering and their remedies.

13. Carburetion:- Definition of carburetion., study of simple carburetor, function of each part's of carburetor, construction and type's of carburetor's used for two wheeler's (Scooter's Motorcycles and Mopeds) Study of carburetor circuit.
14. Adjustment of Air to fuel by setting of Air screw, Idling Adjustment, complete cleaning, repairing and tuning of carburetor Defects in carburetor and their remedies.
15. Electrical system- Low tension system- fundamentals of electricity Magnet generation of Low tension electricity in two wheeler L.T. Cables, Lights, brake Lights wire colour codes circuit diagram, Defects and their remedies.
16. Type of Ignition system- spark ignition- Magneto ignition- types Battery ignition, Electronics ignition.
17. High tension system- H. T. Coil- Types – construction and function contact breaker point function, condenser function. H. I. Cable Adjustment of C. b. Gap. Advancing and retarding of timing circuit diagram, Defect and their remedies.
18. Spark plug- Study of spark plug – construction details Type's of spark plug. Selection of proper spark plug- effect of improper gap Adjustment, proper gap Adjustment Trouble shooting, Testing of spark plug. Maintenance cleaning and resetting of electrode gap. Recommended Life of spark plug.
19. Distributor- study of Distributor, constructional details and their specific function, firing order, can angle Defects and their remedies.
20. Battery- Study of Battery, constructional features of 6 V/12 V Battery. Charging and testing procedure, precautions while charging. Study of voltage and current Regulator as a practiced study of fuses, Junction Box, Terminal Box, Rectifier-its functions.
21. Study of head Lamp, tail Lamp, brake Light, Horn and other auxiliary Lights with reference to operational and Legal requirement, and their circuit diagram, study of electrical circuits with reference to fire, mechanical damage, water Dust, heat and petrol.
22. Wheel, Tyre and Tubes-Types, construction and their sizes. Air pressure in tyre and effects on vehicle performance. Mounting of tyres, Tyre selection, tyre inspection, Tyre removal, tyre rotation, care and Maintenance Repair of tubes, such as vulcanizing, tyre storage.
23. Braking system- Purpose of brakes Types of Braking systems- Mechanical Brakes. Study of raking system-Descriptive working of the parts and function of components of braking system of two wheeler, construction and operation of braking system of two wheeler Brake Linkages. Adjustment of Brakes. Difference parts in Breaking system their defects and Remedies.
24. Study & Engine cooling system- Air cooling – natural-forced function effects of overheating the Engine their Defects and Remedies.
25. Chassis and Frame- Purpose and various functions of chassis types of chassis and frame used for two wheeler's- Scooter's, Motorcycles and Mopeds- Components coming under the name of chassis seats, and their cushioning, tool box and Luggage punches foot rest foot board and crush Bar's. Requirement of chassis to reduce the damage in case of accidents protection of chassis from rust dust and Mechanical damage paints, rubber, rubber coats, electroplating use of non rusting material periodical inspection, servicing of chassis and chassis Lubricating Methods.
26. Overhauling: - Complete disassembling and assembling of a vehicle with proper sequence of operations, inspection of each parts for wear, replacement or for repair. Selection of genuine parts, servicing procedure following manufactures instructions.

27. Maintenance :- Preventive maintenance, Routine Maintenance study of information of Booklet's & service manuals of current two wheelers, Reading of electric circuit diagram fuel, diagram, and Lubrication diagram.
28. Operation of Controls: - Adjustment in various controls Mechanism, periodical inspection of all controls proper operation of clutch, accelerator & Gear control. Selection of proper gear to suit the speed.
29. Vehicle driving: - General rules for driving, safe driving Method, Road sign and signals. R. T. O. acts and Rules i.e. Registration certificate, tax certificate, insurance certificate, driving License Producing the vehicle for inspection, procedure of Transfer of vehicle.
30. Revision on Defect cause and Their Remedies on-ignition and electrical circuit Engine, overheating Engine not start, Engine noise. Engine Misfire

Brakes: - poor brakes, hard brakes, noisy brakes.

Clutch: - Clutch slipping, dragging.

Gearbox:-Noisy gears, gear not engaging properly, gears slipping.

Carburetor: - over flooding of carburetor, starvation and defect in the other various circuits.

## **PRACTICAL – I, FOUR / TWO STROKES**

### **A. FOUR STROKE**

1. To know the construction and working of four stroke cycle single cylinder air cooled petrol engine using sectional model.
2. To know the various parts of four stroke engine
3. To know the construction and working of valve & valve operating mechanism of 4 stroke cycle single cylinder engine. To know the construction and working of Rotary, valve.
4. To know the construction & working of gear box of two stroke engine.
5. Valve Lifter, ignition timing also electronic ignition system
6. To know the valve lapping process & cylinder head checking for the surface.
7. To know the about the process of tappet clearance, taper & ovality of cylinder bore
8. To remove & inspect the piston , piston ring , piston pin
9. Self starter, catalytic convertor , spark plug electrode bending level tool die,
10. To know the construction & working of carburetor
11. To dis-assemble, inspect, clean and reassemble the air clear.
12. To remove, inspect, clean and refit the fuel tank & check the fuel tap.
13. To know the constructional features of Multiplate clutch.
14. To know the component of steering system of 2 wheeler
15. To know the various components of front fork suspension system of scooter.
16. To dismantle inspect, clean reassemble the front fork suspension system of scooter.

17. To know the various components of Telescopic shock absorber & Their function of Motorcycle
18. To dismantle, inspect, clean reassemble and test the Telescopic shock absorber of motor cycle.
19. To dismantle inspect clean reassemble & test the shock absorber fitted at the end of two wheeler.
20. To know about the mechanical brakes used in motor cycle.
21. To know about the disc brakes used in motor cycle.
22. To draw the circuit diagram of ignition system and electrical wiring diagram of scooter Motor cycle and Moped.
23. To remove the flywheel Magnets of two wheelers, inspect clean and refit.
24. Replace the complete wiring harness of two wheeler's (Scooter, Motor Cycle and Moped) and test the Accessories such as horn, and Lights for their proper working.
25. To know the working of battery ignition system.
26. To remove the flywheel Magnets of two wheelers, inspect clean and refit.
27. To know the working of Electronics ignition system C.P.I.
28. To understand the construction and working ignition coil.
29. To identify the components of ignition coil.
30. To know the testing of ignition coil.
31. To understand the construction and working of condenser.
32. To test the given automobile ignition condenser.
33. Remove; inspect clean adjust the gap and refit the contact breaker point.
34. To know constructional of good and bad spark plug.
35. To trouble shoot remove clean, adjust the gap, test and refit the spark plug.
36. Spark plug cleaning and testing machine, coil condenser tester etc
37. To know the working of centrifugal Advance and vacuum advance Mechanism.
38. To Dis-assemble, inspect re-assemble and test the

## **B. TWO STROKE**

1. To know the construction and working of TWO stroke cycle single cylinder air cooled petrol engine using sectional model.
2. To know the various parts of two stroke engine
3. Reed valve , parts like transfer ports , exhaust& intake used two stroke cycle engines
4. To know the construction & working of gear box of two stroke engine.
5. To know the construction & working of carburetor

6. To remove & inspect the piston , piston ring , piston pin
7. To dis-assemble, inspect, clean and reassemble the air clear.
8. To remove, inspect, clean and refit the fuel tank & check the fuel tap.
9. To know the constructional features of Multiplate clutches used on motor cycles.
10. To know the constructional features of centrifugal clutches used on motor cycles.
11. To know the component of steering system of 2 wheeler
12. To know the various components of front fork suspension system of scooter.
13. To dismantle inspect, clean reassemble the front fork suspension system of scooter.
14. To know the various components of Telescopic shock absorber & Their function of Motorcycle
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20. To remove the flywheel Magnets of two wheelers, inspect clean and refit.
21. Replace the complete wiring harness of two wheeler's (Scooter, Motor Cycle and Moped) and test the Accessories such as horn, and Lights for their proper working.
22. To know the working of battery ignition system.
23. To remove the flywheel Magnets of two wheelers, inspect clean and refit.
24. To know the working of Electronics ignition system C.P.I.
25. To understand the construction and working ignition coil.
26. To identify the components of ignition coil.
27. To know the testing of ignition coil.
28. To understand the construction and working of condenser.
29. To test the given automobile ignition condenser.
30. Remove; inspect clean adjust the gap and refit the contact breaker point.
31. To know constructional of good and bad spark plug.
32. To trouble shoot remove clean, adjust the gap, test and refit the spark plug.
33. Spark plug cleaning and testing machine, coil condenser tester etc.
34. To know the working of centrifugal Advance and vacuum advance Mechanism.
35. To Dis-assemble, inspect re-assemble and test the

## **PRACTICAL – II, MAINTENANCE AND FAULT FINDING**

1. To know the constructional features of 6 V/12 V Battery.
2. To know the charging and testing procedure of Battery.
3. To Locate the Defects and their Rectification.
4. Remove inspect refit and test for their proper working :-
  - Head Lamp.
  - Tail Lamp.
  - Brake Light.
  - Speedometer Light.
  - Side indicator.
  - Ignition cut off switch.
  - Horn and horn button.
  - And other auxiliary Light etc.
5. Remove and refit the front & rear wheel of two wheeler (Scooter Motor cycle and mopeds)
6. To Dismantle and Assemble tyre and tube of Motor cycle and mopeds for puncher.
7. To remove, clean, inspect and refit the wheel bearings fitted in the hub of two wheeler both front and Rear.
8. To understand the principle of Air cooling system. Clean and inspect the cylinder head, cylinder block for their choke air fins or cracked air fins.
9. Remove inspect and refit :-
  - Seat.
  - Stand.
  - Rear carrier and Luggage's Patches.
  - Foot rest, Foot Boards and crash bars.
  - Number plates, Mirrors Mudguards chain covers.
10. To remove and Refit or replace, speedometer cable, Clutch cable, front brake cable, cable; choke cable, Accelerator cables, etc.
11. Driving practice following the Rules for driving road sign's and signals.
12. To prepare costing and estimate statement for repair job.
13. Find the trouble shooting of Engine.
14. Find the trouble shooting of suspension system
15. Find the trouble shooting of clutch assembly
16. Find the trouble shooting of gear box assembly
17. Find the trouble shooting of valve arrangement
18. Find the trouble shooting of cooling system

19. Find the trouble shooting of lubrication system
20. Find the trouble shooting of electrical system
21. Find the trouble shooting of ignition system
22. Find the trouble shooting of brake system
23. Find the trouble shooting of front suspension steering system

### **LIST OF TOOLS AND EQUIPMENT**

#### **TWO WHEELER MECH.**

S. no.	TRAINEES KIT	FOR TRAINEES
1.	Hammer Ball pain 1 ½ LBS.	05
2.	Chisel cold Flat 3/4"	05
3	Steel Rule 6"	05
4	Screw Driver 3" X ¼" Blade	05
5	Screw Driver 8" X ⅜ Blade	05
6	Spanner D. E. set of 12 in mm 6-32 mm	2 sets
7	Ring spanner set of 12 in mm 6-32 mm	2 sets
8	Pliers Combination 6"	05
9	Hand file 8" Second cut	01
10	Flat file 10" smooth	01
11	Flat file 10" Rough	01
12	Flat file 10" Bastard	01
13	File Triangular 6" Second cut	01
14	File half Round 10" Second cut	01
15	File half Round 8" Second cut	01
16	File square 10" Rough	01
17	Steel Rule 12" to Read inches & mm	01
18	Prick punch 6"	01
19	Chisel half Round ⅜"	01
20	Hammer ball pen 1 Lb	01
21	Hammer ball pen ½ Lb	01
22	Engineer square 6" blade	01
23	Scriber 6"	01
24	Marking out table 3' X2' X3' high	01 Nos
25	Hacksaw frame Adjustable for 8"-12" blade	05 Nos
26	Punch Hollow ¼" X 5/16" and 3/8", 7/16" & ½ " set	02 Set
27	Hand vice 1 ½"	02 Nos
28	Screw Driver electrician type 6" size	05 Nos
29	Drill twist metric 3 mm to 12 mm X 1 mm	02 Set
30	Drill twist S.S 1/8" to ½" X 1/64" Set	02 Set
31	Tap and dies complete set in Box BA, BSW,BSF, American & Metric.	02 Set



32	Mallet (Wooden)	03 Nos
33	Mallet Plastic	03 Nos
34	Sledge hammer	02 Nos
35	Pliers nose (Round & Straight)	03 each
36	Snip straight	02 Nos
37	Spanner double off set double ended set of 7w/w from 1/8" to 9/16"	03 Sets
38	Double open ended ignition spanner B. A. O. x 1 tp 8 X 9 set of 5	03 Sets
39	Spanner, Clyburn 6"	02 Nos
40	Adjustable spanner 6"	02 Nos
41	Spanner for spark plug (14 mm, 16mm, 19mm,)	01 each
42	Magneto spanner set with 8 spanner 10 mm	02 Sets
43	Double open ended spanner American A/F sizes from 5/16 to 3/8" to 25/32" X 13/16" set of 6	02 Sets
44	Spanner socket set of 8 handled, T bar and Ratchet	02 Set
45	Spanner T-flex for screwing up & unscrewing in inaccessible position	02 Set
46	Double ended open spanner taper spanner from 7/16" X 1/2 " to 11/16" 5/8" set of 4	02 Set
47	Drift copper 3/8" to 6	02 Nos
48	Gun paraffin pressure	01 Nos
49	Gun grease pressure	02 Nos
50	Tray cleaning 18" X 12"	20 Nos
51	Oil can 1/2 Pint	03 Nos
52	Lifter valve spring	01 No.
53	Tool valve grinding suction type	01 No.
54	Valve seat cutting tool complete with guide and pilot bar (all angles)	01 Set
55	Extractor stud "EZY OUT" type and pilot	02 Nos
56	Compression gauge to read 0-250 Lbs/sq in.	02 Nos
57	Vacuum gauge to read 0-30	01 Nos
58	Stone carborandum 6" X 2" 1 1/2 " rough & smooth	02 Nos
59	Cylinder bore Gauge cap 2 1/2 X 6"	01 No.
60	Torque wrench (0-159 Lbs ft.)	01 No.
61	Piston Ring expander and Remover	02 Nos
62	Work bench 8' X 4' X 2 1/2 ' with 4 vices 5" Jaw	05 Nos
63	Lockers with 8 drawers ( standard size )	02 Nos
64	Distributor	02 Nos
65	Carburetor Scooter, Motor cycle & Mopeds	02 each
66	Feeler gauge of various sizes o blade	06 Nos
67	Filling Jig for adjusting the ring gab	02 Nos
68	Steel Almarih	01 No.
69	Black board with easel	01 No.
70	Desk or table	01 No.
71	Fire extinguisher	02 Nos
72	Fire bucket with stands	04 Nos
73	Tachometer ( Counting type )	01 Nos

74	Tester sparking plug Neon type	02 Nos
75	Compressor air piston type 200 PSI Motorized or portable with spray Gun	01 No.
76	Voltmeter 100v	01 No.
77	Ammeter 10 Amp	01 No.
78	Type lever in pair	01 No.
79	Equipment, Puncture in Box	02 Nos
80	Cell tester	01 No.
81	Charging set, Battery	01 Set
82	Hydrometer	01 Nos
83	Battery 6 v j 12 v	01 each
84	Tyre pressure gauge 0-50 and 20-120 Lbs/sq in.	01 each
85	Spring tension scale 0-10 Lbs.	01 No.
86	Valve spring scale 0-200 Lbs.	01 No.
87	Carburetor Repair tool kit	02 Nos
88	Puller set steering wheel universal	01 No.
89	Lifting Jack screw type 3 tons. cap	02 Nos
90	Piston Ring Compressor	02 Nos
91	Hot patch clamp	01 Nos
92	Valve key inserter	02 Nos
93	Wall charts ( driving instructions )	01 Nos
94	Connecting Rod alignment fixture	01 Nos
95	Valve reface	01 Nos
96	Ignition coil condenser tester	01 Nos
97	Spark plug cleaning and testing M/C	01 Nos
98	Ignition timing Light	01 Nos
99	Spark plug Gap Adjusting tool	05 Nos
100	Exhaust Gas Analyzer	01 Nos
101	Clutch Puller for two wheeler of different type	01 each
102	Magneto puller for two wheeler of different types	01 each
103	Circlip expander and Remover	02 Nos
104	Magneto stopper for two wheeler of Different type	01 each
105	Wheel Brake Drum puller for two wheeler of Different types	01 each
106	Bearing pullers for two wheeler of different sizes.	01 each
107	Front suspension Fork Lifting toll For two wheeler ie. Bajaj scooter	01 Nos
108	Grinder with two 7" wheel with twist drill Grinding attachment.	01 Nos
109	Arbor press Round Hand Operated ½ ton cap	01 Nos
110	Arbor press square hand operated ½ ton cap	01 Nos
111	Vehicle in Running Condition one each of the fallowing. 2st – Motor cycle ; 4- stroke-Hero Honda, Bullet Scoter- vespa, chetak,	01 each
112	Motor cycle, scooter, Moped unserviceable (old)	01 Nos each
113	Cut section working Model 4 stoke cycle single cylinder petrol engine, and two stroke cycle single cylinder petrol engine ( with Transmission system )	01 each

**REFERENCE BOOKS :**

- |    |                                            |               |
|----|--------------------------------------------|---------------|
| 1. | Oil Engine Mechanic                        | Vaze          |
| 2. | Yantric Motor Gadi Part – I & II (Marathi) | Shekhar Dalvi |
| 3. | Diesel engine operation and Maintenance    | Malveer V.L.  |
| 4. | Diesel engine Mechanic                     | N.K. Mangal   |

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