

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

1	Name of Syllabus	C. C. IN TWO WHEELER MECHANIC (306202)																																																													
2	Max.Nos of Student	25 Students																																																													
3	Duration	1 year																																																													
4	Type	Part Time																																																													
5	Nos Of Days / Week	6 Days																																																													
6	Nos Of Hours /Days	4 hrs.																																																													
7	Space Required	1) Workshop = 800 sq feet 2) Class Room = 200 sq feet TOTAL = 1000 sq feet																																																													
8	Entry Qualification	S.S.C. Appeared																																																													
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>Training System Per Week</b> <table><tr><td>Theory</td><td>Practical</td><td>Total</td></tr><tr><td>6 hrs</td><td>18 hrs</td><td>24 hrs</td></tr></table>						Theory	Practical	Total	6 hrs	18 hrs	24 hrs																																																		
Theory	Practical	Total																																																													
6 hrs	18 hrs	24 hrs																																																													
13	Exam. System	<table><tr><td>Sr. No.</td><td>Paper Code</td><td>Name of Subject</td><td>TH/PR</td><td>Hours</td><td>Max. Marks</td><td>Mini. Marks</td></tr><tr><td>1</td><td>30620211</td><td>ENGINE &amp; CLUTCH</td><td>TH-I</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>2</td><td>30620212</td><td>ELECTRICAL SYSTEM &amp; CHASSIS</td><td>TH-II</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>3</td><td>30620213</td><td>SERVICE MAINTAINANCE &amp; VEHICLE RULES</td><td>TH-III</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>4</td><td>30620221</td><td>ENGINE &amp; CLUTCH</td><td>PR-I</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>5</td><td>30620222</td><td>ELECTRICAL SYSTEM &amp; CHASSIS</td><td>PR-II</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>6</td><td>30620223</td><td>SERVICE MAINTAINANCE &amp; VEHICLE RULES</td><td>PR-III</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td></td><td></td><td>Total</td><td></td><td></td><td>600</td><td>255</td></tr></table>						Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Mini. Marks	1	30620211	ENGINE & CLUTCH	TH-I	3 hrs.	100	35	2	30620212	ELECTRICAL SYSTEM & CHASSIS	TH-II	3 hrs.	100	35	3	30620213	SERVICE MAINTAINANCE & VEHICLE RULES	TH-III	3 hrs.	100	35	4	30620221	ENGINE & CLUTCH	PR-I	3 hrs.	100	50	5	30620222	ELECTRICAL SYSTEM & CHASSIS	PR-II	3 hrs.	100	50	6	30620223	SERVICE MAINTAINANCE & VEHICLE RULES	PR-III	3 hrs.	100	50			Total			600	255
Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Mini. Marks																																																									
1	30620211	ENGINE & CLUTCH	TH-I	3 hrs.	100	35																																																									
2	30620212	ELECTRICAL SYSTEM & CHASSIS	TH-II	3 hrs.	100	35																																																									
3	30620213	SERVICE MAINTAINANCE & VEHICLE RULES	TH-III	3 hrs.	100	35																																																									
4	30620221	ENGINE & CLUTCH	PR-I	3 hrs.	100	50																																																									
5	30620222	ELECTRICAL SYSTEM & CHASSIS	PR-II	3 hrs.	100	50																																																									
6	30620223	SERVICE MAINTAINANCE & VEHICLE RULES	PR-III	3 hrs.	100	50																																																									
		Total			600	255																																																									



## **Curriculum :- TWO WHEELER MECHANICS.**

### **THEORY PAPER – I, ENGINE & CLUTCH**

- a) Introduction and scope of the trade. It may be emphasized that the mechanics will have to deal as much with men as with machines and money that even though honesty will not fetch quick returns it will reward in long turn.
- b) General Construction and the building blocks, of two wheeler-chassis, Engine, transmission, electrical, safety devices decorative and legal requirements.
- c)
  - 1. Description of the working of two and four stroke petrol engine, with reference to Construction and function of piston, ring gudgeon pin, cylinder, cylinder head, crank crank case, spark plug and inlet and exhaust valves / posts, timing gear.
  - 2) Study of carburetors – various types, working principles, functions of several of Components.
  - 3) Magneto and battery ignition systems – study.
  - 4) Study of engine lubricating systems.
  - 5) Study of engine cooling system – air cooling natural and forced.
  - 6) Study of various sealing systems used in engines.
  - 7) Study of fasteners and locking devices used in engines.
  - 8) Study of bearings and various clearances in the engine.
  - 9) Study of systems provided for protection from dust, rust, and splinters from outside and foreign particles from within the system – study of filters.
  - 10) Study of tall-tale instruments to keep a watch on oil pressure, temperature and battery charging etc.
  - 11) Study of the exhaust system

#### **d) Descriptive working of the parts and function of components of transmission:-**

- 1) Clutch – with a special reference to shock damping.
- 2) Gear box – with special reference to sliding mechanisms.
- 3) Chains – Primary and secondary, sprockets and adjusters.
- 4) Lubrication and cooling of gear and clutch chambers.
- 5) Study of engine cranking systems.
- 6) Study of methods of scaling, breathing, fastening and locking as used in two wheels with emphasis on the importance.
- 7) Study of system used for protection from dust, rust etc. of the transmission.
- 8) Study of linkage machines for gear changing clutch break etc.



## **THEORY PAPER – II, ELECTRICAL SYSTEM & CHASSIS**

### **Study of electrical systems:-**

- 1) Working principles of generators / alternators magnetos used in two wheelers as a source of electricity.
- 2) Study of accumulators.
- 3) Study of voltage and current regulation as practiced.
- 4) Study of the switches fuses and junction boxes.
- 5) Study of the wires and cables used.
- 6) Study of head lamp, tail lamp; brook light and other auxiliary lights with reference to operational and legal requirements.
- 7) Study of horns.
- 8) Study of starters / dynameters as used on some machines.
- 9) Study of ignition systems from electrical view point with special reference to Insulation, water and dust proofing, radio interference.
- 10) Study of C – B point and spark plug gaps its importance and methods of adjustments.
- 11) Study of such innovations as transistors, ignition, C – D ignition, spark booster, their merits and demerits.
- 12) Study of electric innovations as transistors, ignition, C - D ignition, spark booster, their merits and demerits.

### **f) Chassis:-**

- 1) Purpose and various functions of the chassis.
- 2) Components coming under the name Chassis.
- 3) Study of wheels: - Spoke and disc wheels tyres – tubes, air pressure, hubs, bearings, break drums break shoes and breaking system. Methods of dismantling And assembling wheels. Wheel alignment with reference to plane of rotation and line of motion. Heating and cooling of tyres and break drums, seats and locking devices as used in wheels, auxiliary drives provided by the wheels – such as speedometer. Care and maintenance of wheels.
- 4) Wheel suspension, cushioning and shock absorption system.
- 5) Steering system and the caster angle.
- 6) Seats.
- 7) Tool box & luggage punches.
- 8) Fuel tanks, oil tank.
- 9) Foot rest, foot boards and crash bars.
- 10) Importance of the mounting methods of various blocks on the chassis with reference to rigidity, vibration, dip, ease of operation, ease of maintenance and servicing riding comforts, vehicle stability.
- 11) Requirements of chassis to reduce the damage in case of accidents.
- 12) Chassis numbers – legal aspects.
- 13) Protection of chassis from dust, rust and mechanical damage – paints, rubber, Rubber coats, electroplating – use of non – rusting methods.
- 15) Study of such auxiliaries as rear view mirror, wind shield, mudguard, splash guard etc.

### **g) Decorative:-**

- 1) Basic concepts of vehicle beauty.
- 2) Disadvantages of decorative fixtures vis-à-vis customer satisfaction.
- 3) Survey of decorative fixture.
- 4) Care to be taken while mounting fixtures so as not to damage vital components.



## THEORY PAPER – III, SERVICE MAINTAINANCE & VEHICLE RULES

### Servicing and maintenance:-

- 1) Description, care and maintenance of hand tools required viz spanners, screwdriver alkenes, centre punch, hammers, drifting vice, drill machine, bearing pullers, pliers, cutter circlip remover, scraper files, hack saw etc. as are required for the trade.
- 2) Description of machines such as bench grinder, piller drill, and air compressor.
- 3) Cleaning and degreasing methods.
- 4) Methods of marking components and positions and storing.
- 5) Special Jigs and fixtures for dismantling of certain components.
- 6) Use of torque wrench.
- 7) Importance of sequence of operation.
- 8) Properties of the metals used in the construction of vehicle from point of view of handling in repairs servicing and maintenance.
- 9) General of information booklets & service manuals of current two wheelers. Reading of electric circuits diagrams fuel diagrams and lubrication diagrams.
- 10) Study of information booklets & service manuals of current two wheelers. Reading of electric circuits diagrams fuel diagrams and lubrication diagrams.
- 11) Effect Cause & Cause-effect-diagnosis of the faults and remedial measures to be taken in current vehicles in consultation with the services manuals and/or as per the trade practice.
- 12) Discipline of the work in relation to disposition of tools, parts and personal movements.
- 13) Shop condition – cleanliness, illumination, ventilation etc.
- 14) Shop lay out.
- 15) Vehicle inspection, storing and protection of finished jobs.

### Legal aspects

- 1) R. T. O.
- 2) Registration certificate, tax certificate driving licensee, Insurance.
- 3) Protection of engine and chassis numbers.
- 4) Producing the vehicle for inspection.
- 5) Procedure of transfer of vehicle.
- 6) Legal requirements of weight, type of luggage, intensity of light and sound and pollution.
- 7) Rules of road safely, signals, parking and general nuisance to others.

### **i) Road performance of the Vehicle.**

- 1) Speed under various road condition.
- 2) Pick up vantages and disadvantages.
- 3) Top speeds in different gears.
- 4) General attentiveness - Overtaking high speeding and other driving hazards.



**Entrepreneurship:-**

- 1) Taking to the clients so as to get the history of the vehicle.
- 2) Preparation of preliminary estimates, final costs, billing, maintenance of accounts registers etc.
- 3) Information on banking procedure and services.
- 4) Information on Government laws – with reference to registration, sales income, tax, excise duty etc.
- 5) Maintaining inventory books for spare parts and vehicle under repairs etc.
- 6) Information of various financing institution –  
M.S.F.C.M.S.S.I.D.C. , N.S.I.D.C., R.D.C. S.I.S.I. etc.
- 7) Sources of information for spare parts and methods of keeping track of prices, rates and commercial practices.
- 8) Budgeting financial planning and saving.
- 9) Systems of wage payment.



## **PRACTICAL - I - ENGINE & CLUTCH**

1. To study the engine parts of two stroke engine
2. To study the engine parts of four stroke engine
3. To study the two stroke petrol engine
4. To study the four stroke petrol engine
5. To study the carburetor & its type
6. To study the different carburetor circuit
7. To study the magneto ignition
8. To study the battery ignition
9. To study the electronic ignition
10. To study the lubrication system & oil pump
11. To study the cooling system
- 12- To study the valve clearances & others
13. To study the clutches
14. to study the engine cranking system
15. To study the linkage machines for gear changing clutch break etc.
16. Repairs to clutch and gear box



## **PRACTICAL - II - ELECTRICAL SYSTEM & CHASSIS**

1. To study the principles of generators / alternators magnetos used in two wheelers as a source of electricity.
2. To study the voltage & current regulator.
3. To study of the fuse , switches, cables, wires etc
4. To study the wiring looms & handle switches
5. To study the all types of lamps such as head lamp , tail lamp, indicators etc
6. To study the AC & DC horn.
7. To study the starters( self starter )
8. To study the C.B.point & spark plug gaps its importance & method of adjustment
9. To study the transistor , CD ignition ,Spark buster
10. To study the spokes , disc & wheels
11. Replace the front & rear brake shoes of motor cycle
- 12.To study the front suspension system
- 13.To study of the vulcanizing process.
- 14.To study the fuel gauges & other gauges on dash board of motor cycle
15. To study the steering system and the castor angle
16. Fuel Tanks cleaning



### **PRACTICAL - III - SERVICE MAINTAINANCE & VEHICLE RULES**

1. Replace the Clutch plate of given motorcycle
2. Find out the noise of gear box from given motor cycle
3. Find out the noise of engine from the given motor cycle
4. Replace the piston rings of four stroke engine
5. Replace the piston rings of two stroke engine
6. Study the cylinder head for lapping of valve
7. Engine over haul of four stroke petrol engine
8. Engine over haul of two stroke petrol engine
9. Replace the handle ball kit ( race bearing kit)
10. Replace the front & rear brake shoes
11. Replace the Chain sprocket kit of motor cycle
12. Find out the electrical problem of given motor cycle
13. Wheel alignment of spoke wheels
14. Servicing & greasing of given two wheeler
15. Procedure of transfer of vehicles
16. Rules of road safely, signals, parking and general nuisance to others
17. Rules of road safely, signals, parking and general nuisance to others



## **TOOLS & EQUIPMENTS**

Tools , Measuring Instrument and General shop outfit.

1.	Rule steel 12" to read inches and mm.	2
2.	Dividers Spring 6"	2
3.	Prick punch 6"	2
4.	Chisel half round 3/8	4
5.	Hammer Ball Pein 1 1b	4
6.	Hammer Ball Pein ½ 1b	4
7.	Hammer Copper 2 lbs. With handle	4
8.	Engineers square 6" blade	4
9	Marking out tables 3'x 2'x 3' ( high )	1
10	Hacksaw frame adjustable for 8" - 12" blades	4
11	Punch, Hollow ¼", 5/16" and 3/8", 7/16"&1/2" set.	2 Set
12	Punch figure set 1/8"	1 Set
13	Punch " letters " set 1/8 "	1set
14	Hand vice 1 ½	2
15	Screw Driver Electrician type 6" size	4
16	File flat 10" second cut	4
17	File flat 8" smooth	4
18	File flat safe edge 10" smooth	4
19	File , triangular 6" second cut	4
20	File , half round 16" second cut	4
21	File , square 8" second cut	4
22	File , square 12" rough	4
23	Drill , twist , metric 3 mm. to 12 mm. x 1mm	2 set
24	Drill , twist S.S. 1/8 " to ½ " x 1/64 " set	2 set
25	Taps and dies complete set in box B.A. , B.S.W. , B.S.F. , American And metric	2 set
26	H.S.S Hand reamers , taper pin 5/16 " to ½ " by 1/16 "	1 set
27	H.S.S. Hand reamers , parallel , 5/16 " to ½ " by 1/16 "	2 set
28	H.S.S. Hand reamer, adjustable 7/16 " to 15/32 " , 15/32 " to 17/32 17/32 " to 19/32 and 19/32 " to 21/32 "	1 set
29	Scraper , triangular , 10 "	4
30	Scraper , bearing	4
31	Dial indicator to read 001 "	1
32	Screw pitch gauge with 22 pitches from 9 to 40 TPI	2
33	Micrometer , outside 0-1	1
34	Micrometer , inside 50 tp 100 mm. with extension rod	1



35	Vernier calliper set 10" or 8" inside outside depth to road Both inches and mm.	1
36	Safety goggles (clear glass)	2 pairs
37	Hammer, planishing	2
38	Setting hammer	2
39	Mallet (wooden)	2
40	Trammel 12"	1
41	Blow lamp	2
42	Soldering iron, copper 10 ozs, (fire heated)	2
43	Fliers nose (round and straight)	2 each
44	Snip straight	2
45	Wing Compass 10"	2
46	Spanner, double ended set of 12 metric sizes 8 to 32mm.	2 sets
47	Spanner, double ended set of 3/8" to 1" x 1/16" (B.S.F. Size)	2 sets
48	Spanners double off-set double ended set of 7 w/w from 1/8" to 9/16"	2 sets
49	Double open ended ignition spanner of B.A. 0 x 1 to 8 x 9 Set of 5	2 sets
50	Spanners, Clyburn 6"	2
51	Spanners adjustable 8"	2
52	Spanner, Ring set of 6 S.A.E.	2 Sets
53	Spanner, for sparking plug 14 mm	2 sets
54	Magneto spanner set with Double open ended, spanner, America a/F sizes from 5/16" x 3/8" to 25/32" x 13/16" set of 6	1 set
55	Spanner, socket, set of 8 handled, T-Bar and Ratchet	2
56	Spanner, T-flex for screwing up and unscrewing in In-accessible position.	1
57	Double open ended tappet spanner from 7/16" x 1/2 to 11/16" x 5/8" set of 4	1
58	Drift, copper 3/8" to 6	2
59	Gun, Paraffin pressure	1
60	Gun, Grease pressure	1
61	Chain and block 1 ton capacity	1
62	Tray cleaning 18" x 12"	15
63	Torque wrench	01

#### **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   |

\*\*\*\*\*