MOTOR VEHICLE TECHNICIAN

Core Qualification File Syllabus

Details of Theory Syllabus

Sl. No.	CONTENT	DETAILS
1.	Safety in the Workplace (6 hrs)	1.1. Personal protection in the workplace 1.2. Personal safety and prevention of accident 1.3. Basic First Aid 1.4. Safety sign for Danger, Warning, caution and personal safety message 1.5. Use of fire extinguisher 1.6. Concept of Standard in safety
2.	Maintenance Management (6hrs)	2.1. Purpose of maintenance management 2.2. Types of maintenance management 2.3. Preventive maintenance system. 2.4. Breakdown maintenance system 2.5. Comparison between Preventive & Breakdown maintenance 2.6. Practical example of different maintenance in automobile.
3.	Maintenance of Multi-cylinder Engine (20hrs)	3.1. Name of different parts of an IC engine with proper location & function 3.2. Dismantling of a Petrol/Diesel engine 3.3. Tune-up Petrol/Diesel engine with Tappet & slow running setting 3.4. Tune-up 2 wheeler engine 3.5. Inspection of cylinder liners for taperness and ovality and their removal 3.6. Inspection of crankshaft – for taperness and ovality, checking of crank pins and main journals and free play of crankshaft 3.7. Injector testing chart of various vehicles 3.8. Removal of Injectors – testing, adjusting and refitting 3.9. Fuel Injection Pump- Common faults finding and their remedies 3.10. Removal of Petrol fuel injector of MPFI system, cleaning, leakage testing and refitting 3.11. Advantage of MPFI over carburettor 3.12. Periodic maintenance of IC engine used in two wheeler
4.	Maintenance of gear box & steering (6hrs)	4.1. Dismantle of gear box 4.2. Different gear train, shifter and lever used in gear box 4.3. Synchronous gear box- elementary idea 4.4. Use of gear oil
5.	Maintenance of Brake (6hrs)	5.1. Components of brake drum and brake shoe assembly 5.2. Brake oil and master cylinder 5.3. Disc brake assembly 5.4. Layout of hydraulic brake system 5.5. Brake system used in two wheeler
6.	Maintenance of Tyre (4hrs)	6.1. Types of tyre, factors affecting tyre life. 6.2. Tyre pressure of various types of vehicles, maintenance & repairing of various tyres
7.	Maintenance of Font Axle, Rear axle & Differential (8hrs)	7.1. Location and functions of different components of rear axle assembly 7.2. Location and functions of differential 7.3. Dismantling of differential, cleaning and refitting.

		7.4. Location and function of different components of front axle assembly 7.5. Location and functions of different parts of steering assembly
8.	Electrical minor Maintenance (6hrs)	8.1. Checking connection of starting motor 8.2. Replacement of damaged headlight, tail light, indicator light 8.3. Checking connection of wiper motor 8.4. Soldering done in electrical connection
9.	Hand tools used for overhauling & Maintenance of motor vehicle (10hrs)	9.1. Elementary idea and functions of commonly employed tools &equipments like – Feeler gauge, torque wrench, spark plug tester, tachometer, air-compressor, ring expander, ring compressor, combination pliers. Valve seat cutter set, dial gauge & hydraulic jack, soldering iron, testing lamp, screw driver, wire and cable cutter. 9.2. Elementary idea and functions of commonly employed measuring instruments like - Out-side micrometer, inside micrometer, vernier calliper, telescopic gauge

Detail of Practical Syllabus

SL NO	CONTENT (Any Eight)	DETAILS
1.	Removal of Injectors – testing, adjusting and refitting(8hrs)	1.1. Dismantling of injector fro engine 1.2. Cleaning of injector 1.3. Testing of injectors 1.4. Adjusting the parts of the injector 1.5. Refitting with the engine
2.	Inspection of cylinder liners for taperness and ovality and their removal (8hrs)	2.1. Dismantling of cylinder block, piston, gudgeon pin, connecting rod Cleaning of injector 2.2. Washing and Cleaning of different parts with kerosene oil and compressed air 2.3. Checking of ovality & taperness of cylinder bore with dial gauge 2.4. Checking of ovality & taperness of Piston 2.5. Replacing of cylinder liner in cylinder bore, if required 2.6. Replacing of "O" ring and compression ring of the piston, if required 2.7. Refitting all parts
3.	Tune-up Petrol/Diesel engine with Tappet & slow running setting (8hrs)	3.1. Dismantling cylinder head 3.2. Remove the valve & Tappet assembly 3.3. Clean the components by kerosene and compressed air 3.4. Replace loosening spring with new one if required 3.5. Check power transmission system cam shaft, rocker arm, tappet and valve 3.6. Tuning valve timing with cam shaft 3.7. Refitting cylinder head
4.	Overhauling of semi-elliptical type leaf spring (TATA/ Ambassador car) (8hrs)	4.1. Dismantling semi-elliptical leaf spring assembly from the frame 4.2. Dismantling all spring leaf 4.3. Washing & cleaning all components 4.4. Check distortion of each leaf 4.5. Replace/add leaf if instructed by supervisor 4.6. Refitting the leaf spring assembly with frame
5.	Overhauling of steering assembly (Rack & pinion	5.1. Dismantling steering assembly from steering wheel and front axle assembly

	type).(8hrs)	5.2. Dismantling steering column, intermediate shaft, steering pinion 5.3. Washing & cleaning all components 5.4. Oiling/ greasing moving joints, gear pinion, rack and pinion. 5.5. Refitting steering assembly
6.	Overhauling of master cylinder (8hrs)	6.1. Dismantling brake drum and brake shoe assembly 6.2. Dismantling master cylinder 6.3. Washing & cleaning all components of master cylinder 6.4. Pouring brake fluid in to the master cylinder refitting it with brake shoe assembly. 6.5. Refitting brake drum assembly
7.	Overhauling of synchronous gear box assembly (8hrs)	7.1. Dismantling gear box assembly 7.2. Dismantling gear wheel, synchronizer ring, ring spring, locking element (strut), synchronizer hub (body), sliding sleeve 7.3. Washing & cleaning all components of gear box 7.4. Refitting all components of synchronous gearbox 7.5. Pouring gear oil to the gear box.
8.	Overhauling of differential gear assembly (8hrs)	8.1. Dismantling rear axle housing & cover 8.2. Dismantling differential housing assembly fitted with hypoid gear 8.3. Dismantling axle shafts from differential gears 8.4. Washing & cleaning all components of differential gear and pinion assembly 8.5. Refitting of differential assembly and rear axle assembly 8.6. Replacing worn out gasket 8.7. Pouring lubricating oil in rear axle housing 8.8. Refitting cover of rear axle assembly
9.	Overhauling of gear type oil pump (8hrs)	9.1. Dismantling oil pump assembly from engine 9.2. Dismantling all components of gear type oil pump assembly 9.3. Washing & cleaning all components of oil pump assembly 9.4. Refitting all components of oil pump assembly
10.	Replacing head/Tail light of the vehicle (8hrs)	10.1. Dismantling glass cover of head/tail light 10.2. Remove defective light from the holder/circuit 10.3. Replacing it with new bulb and completing the circuit with proper soldering 10.4. Refitting glass cover of head/tail tight
11.	Projects (16 hrs)	Any two projects each of 8 hr.
Total		**96 hr.**

Details of Project (Any two)

Sl. No.	Content (Any two, each 16 hrs.)	Details
1.	Project I (8 hrs)	Dismantling, Complete reconditioning and refitting of a differential unit (Bus/Truck).
2.	Project II (8 hrs)	Use of first Aid/ Fire Extinguisher in a dummy accident along with PPE
3.	Project III (8 hrs)	Starting of a two-wheeler repairing shop
4.	Project IV (8 hrs)	Case study on preventive/shut down maintenance of a motor vehicle having starting problem/braking problem/ tyre puncture.

OUTCOMES

Outcomes to be assessed	Assessment criteria for the outcome
1. Use safe working Practices	(1.1) Assessor will note whether the trainee is maintaining procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements according to site policy. (1.2) Assessor will judge the trainee on his ability to recognize any unsafe situations according to site policy, and assess his report accordingly. (1.3) Assessor will ask the trainee to demonstrate use of different bandages and medicines commonly present in a first aid box. (1.4) Trainee will be asked to demonstrate basic first aid & CPR and use them under different circumstances. (1.5) Assessor will ask the trainee to demonstrate Safety sign for Danger, Warning, caution and personal safety message accurately. (1.6) Assessor will assess the report/record submitted by trainee to supervisor/ Competent of authority in the event of accident or sickness of any staff, including accident details according to site accident/injury procedures. (1.7) Trainee will be asked to identify different fire extinguishers and to use the same as per requirement in a mock drill. (1.8) Trainee will be asked to describe different standard regarding Quality and environmental pollution.
2. Describe brief idea about different maintenance system	(2.1) Trainee will be asked to explain the purpose of maintenance management. (2.2.) Trainee will be asked to classify different major maintenance system along with proper examples. (2.3) Assessor will ask the trainee to explain preventive maintenance. (2.4) Trainee will be asked to explain breakdown maintenance. (2.5) Assessor will ask the trainee to compare preventive maintenance with breakdown maintenance. (2.6) Trainee will be asked to identify proper maintenance system against particular failure of a subassembly in a motor vehicle.
3. Demonstrate routine maintenance of multi-cylinder engine.	(3.1) Trainee will be asked to identify different parts of an IC engine with proper location & function. (3.2) Assessor will ask the trainee to demonstrate dismantling of a Petrol/ Diesel engine. (3.3) Assessor will ask the trainee to demonstrate to tune-up Petrol/ Diesel engine with Tappet & slow running setting. (3.4) Assessor will ask the trainee to demonstrate to Tune-up 2 wheeler engine. (3.5) Trainee will be asked to inspect the cylinder liners for taperness and ovality. (3.6) Trainee will be asked to inspect the crankshaft – for taperness, ovality and free play, crank pins and main journals. (3.7) Trainee will be asked to interpret Injector testing chart of various vehicles. (3.8) Assessor will ask the trainee to demonstrate overhauling of an injector. (3.9) Assessor will ask the trainee to demonstrate common faults finding and their remedies regarding Fuel Injection Pump.

	(3.10) Assessor will ask the trainee to demonstrate overhauling of an MPFI. (3.11) Trainee will be asked to discuss on advantages of MPFI over carburetor. (3.12) Trainee will be asked to discuss on periodic maintenance of an IC engine of a two wheeler.
4. Demonstrate routine maintenance of different major items of a motor vehicle like gear box, steering assembly, brake system, tyre, rear axle and differential	(4.1) Assessor will ask the trainee to demonstrate to Dismantle of gear box. (4.2) Trainee will be asked to discuss on different gear train, shifter and lever used in gear box. (4.3) Assessor will ask the trainee to describe elementary idea about synchronous gear box. (4.4) Assessor will ask the trainee to describe the use of gear oil for a gear box. (4.5) Assessor will examine whether the trainee can able to describe components of brake drum and brake shoe assembly. (4.6) Trainee will be asked to explain location and function of brake oil and master cylinder. (4.7) Trainee will be asked to explain components, their location and function of a disc brake assembly. (4.8) Assessor will examine whether the trainee can able to describe the layout of hydraulic brake system. (4.9) Trainee will be asked to explain brake system used in two wheeler. (4.10) Trainee will be asked to explain the effect of air pressure in the life of a tyre of a vehicle. (4.11) Trainee will be asked to explain the effect of different steering geometry components on tyre life. (4.12) Trainee will be asked to state different tyre pressure is required in different types of vehicles. (4.13) Trainee will be asked to demonstrate different routine repairing and maintenance carried on for various types of tyre. (4.14) Trainee will be asked to demonstratethe location and functions of different components of rear axle assembly. (4.15) Trainee will be asked to explain the location and functions of differential. (4.16) Trainee will be asked to demonstrate to dismantle, cleaning and refitting of differential subassembly. (4.17) Trainee will be asked to demonstrate the overhauling of steering system. (4.18) Trainee will be asked to demonstrate the overhauling of master cylinder. (4.19) Trainee will be asked to demonstrate the overhauling of synchronous gear box assembly. (4.20) Trainee will be asked to demonstrate the overhauling of differential gear assembly. (4.21) Trainee will be asked to demonstrate the overhauling of gear type oil pump.

5. Demonstrate electrical minor maintenance	(5.1) Assessor will examine whether the trainee can verify connection of starting motor. (5.2) Trainee will be asked to demonstrate to replace damaged headlight, tail light, indicator light. (5.3) Trainee will be asked to verify connection of wiper motor. (5.4) Assessor will examine whether the trainee can able to demonstrate soldering operation in electrical connection.
6. Demonstrate use of hand tools used for overhauling & Maintenance of motor vehicle	(6.1) Trainee will be asked to describe name, functions and examples of hand tools, measuring tools/devices used in motor vehicle maintenance. (6.2) Trainee will be asked to demonstrate proper use of the hand tools, like, Torque wrench, ring expander, ring compressor, combination pliers. Valve seat cutter set. (6.3) Assessor will examine whether the trainee can able to demonstrate proper use of the measuring tools/devices/gauge, like, Out-side micrometer, inside micrometer, vernier caliper, telescopic gauge, tachometer, feeler gauge.