BREAK UP OF TRAINING PERIOD OF 2 YEARS FOR THE TRADE OF MECHANIC
MOTOR VEHICLE UNDER CTS

Period of Training : 2 Years (104 Weeks)

(A) The syllabus for the 1st year of 52 week :
Break up of 52 week of training

1. ADMISSION FORMALITIES	2WEEK
2. INDUCTION AND SAFTEY TRAINING	2WEEK
3. Allied trade fitting	3week
4. Allied trade sheet metal work	2week
5.Identification of vehicles unils, use of fasleners & locking devifce	2week
6. Preliminary Engine work	10 week
7. Transmission work	10week
8. Suspension and steering work	7week
9. Brake work	6week
10. Basic Electrical and Electronics work	5week
11. Revision	3week
Total	52week

(B) The syllabus for 2 year of 52weeks:
Brake up of 52 weeks training:

1. Further practice on petrol Engine repair work	8week
2. Trouble shooting in cooling lubrication fuel feel and ignition systems	2week
3. Diesel Engine Repair work	10week
4. Industrial visit	
6. Driving practice	7 week
7. Synchromesh Gear box and transfer case 4 wheel drive repair work power drive	4week
8. Engine fault diagnosis including engine scanning	4week
9.Service station equipment and wheel balancing and servicing & lubrication work	3week
10. Car a\c system repair and maintenance	3week
11. Revision and all Indian trade test	3week
Total	52 weeks

DRAFT SYLLABUS FOR THE TRADE OF "MECHANIC MOTOR VEHICLE" UNDER C.T.S.

SYLLABUS FOR 1ST YEAR OF TRAINING (52 WEEK) – TRADE PRACTICAL AND RELATED INSTRUCTIONS

WEEK NO.	practical	**Theory**	Engineering	Workshop calculation & Science
1 & 2	1.**Admission formalities**			
3 & 4	2. Induction with institute. Importhance of the Trade Machinery used in Trade. Types of work done by the students in the shop floor. Description of safety equipment, their use, safety rules to be observed in Automobile repair shop. Accident their causes. Up keep of fire extinguishers. Familiarisation of the tools and machinery available in the shop their use and up-keep. Importance of cleanliness of work spot, tools, jacks, trays and horses etc.	General Introduction to the Course contents. Study of the syllabus. General rules pertaining to the Institute. Facilities available – Hostel, Recreation, Medical & Library – Working Hours – Time Table. Importance of safety general precautions to be observed in the shop. Fire extinguishers used for different types of fire. Storing and handling of inflammable materials. Elementary First Aid.		

5	3. ALLIED Trade – Fitting Demonsration and use of fitters, hand tools- marking off with steel rule, callipening of Chipping in marked lines. Sharpening of Chisels, center punch, dot punch for correct angle. Hacksavwing and filing to given dimensions. Filing true and and square. Different types of filing operations.	Systems of measurement, conversion of English into metric measurements & vice- versa. Marking material – Chalk, mechanic's Blue or Red lead. Tools used in marking steel rule, try square. Calipers, dividers, scriber, prick and center punch, hammer and chisel. Their uses and maintenance, safety precautions in handling grinding machines. Types of hacksaw frames & blades files and their uses. Types of files and their uses. Care & maintenance of files.	Introduction to the subject c engineering drawing and blu print reading. Freehand sket of lines, rectangles, squares circles. Freehand sketching with dimensions and proportiona Sketching of circles rectang squares, parallelograms. Rh & polygons.
6	Marking and drilling clear & blind holes, safety precautions to be observed while drilling. Adjustment of Two – piece die – reaming a bush to suit the given the pin/shaft scraping a given machine surface.	Types & size of Drills. Cutting angles and speed and feed of drills. Calculation of Tap drill sizes. Tap &dies - Description and use of different types of taps & dies. Use of 'v' threads. Precautions while using taps & dies. Description and use of different type of scrapers, reamers & emery papers.	Reading of simple Blue prir sketching of simple solids s cubes, prisms, cylinders, co etc.

Week No.	Practical	Theory	Engineering Drawing
7	Measurement by Micrometer (Out side and inside), venire caliper and protractor	Construction and method of reading Micrometers (Internal & External) & venire calipers. Correct handling of Micro	---do---

	head.	meters and venire calipers. Reading of venire scale. Description and use of combination set venire bevel protector. Care and maintenance of Micrometers, venire calipers, combination ser etc.	
8 & 9	4. Allied trade - Sheet Metal Work Joining of metal parts by soil soldering. Simple marking out on sheet metal, cutting, bending and folding. Practice of silver soldering, Pipe bending Annealing of pipes . Fitting nipples unions in pipes. Soldering and Brazing of Pipes.	Sheet metal worker's hand tools-their description & uses. Description of simple soldering and brazing. Fluxes used for common joints. Types of sheet metal joints-their uses. Sheet and wire gauges. The blow lamp and its uses. Pipe fitting Explanation of various common metal sheets used in sheet metal shop.	Free hand sketching of bolts, studs, with dimer from samples. Sketchin solid bodies-such as sq and Rectangular block,holiow cylinders,rings,cones et

Achievement after 7 weeks of Training

Trainees should be able to:

(i) be familiar with shop tools, equipments etc.

(ii) be aware of safety precautions and use of safety equipment and use of first aid

(iii) do marking, simple hacks awing filing, drilling, taping, reaming, scraping, measuring operations

(iv) do simple sheet metal joints, soldering , brazing, pipe bending, operations and use of sheet metal tools.

Week No.	Practical	Theory	Engineering Drawi
10& 11	5. Identification of vehicles, units, use of fasteners and locking devices identify different types of vehicles, units on vehicles. Tighten all the loose nuts & bolts on vehicle. Practice and use	General description of motor vehicles. Major assemblies their location and function of each. Details of diesel , petrol, CNG & battery operated	Free hand sketching of rivets, screws, washers samples. Sketching of riveted joints.

	of common locking devices such as lock nuts, cotter and split pins, rivets, keys, circles, lock rings, lock washer , wire locking and locating where these are used. Use of modern locking device such as engineering adhesive and chemicals.	vehicle. Different locking methods and devices used in vehicles. Different fasteners used in vehicles.	
12&13	6. Preliminary Engine Work Dismantling unserviceable engine. Cleaning & studying parts .Measuring cylinder bore, crank pins, main journals , pistons, studying valve operating mechanism. Practice in the use of correct tools & right procedure.	Description of internal and external combustion engines. Different types of I.C. Engines , important working parks in the engine -the 4 stroke cycle. Two stroke cycle, difference between 4 stroke and 2 stroke cycle engines. Description of valve operating mechanism and valve timing. Description and function of valve spring, guide, tappets , valve seals and locks.	Free hand sketching of stroke cycles and 2 stro cycles. ---do---
14	Checking compression pressure in a running engine, dismantling the cylinder head from the engine, decarbonising the cylinder head, removing the valves, cleaning, reassembling.	Description and function of cylinder block, cylinder head, cylinder liners. Reconditioning of cylinder heads.	Drawing of 3 views ste and taper blocks in 3rd projection.
15	Removing piston and connecting roo assembly from e3ngine – dismanting, cleaning, inspecting, checking clearances, installing rings and piston pins. Removing crank shaft from engine.	Description and functions of different types or pistons, piston rings and piston pins – common troubles and remedy.	-----do-----

16	Removing connecting rod assembly – cleaning, checking bearing clearances, and bearing crush/spread, replacing bearing shells, setting correct clearances, measuring wear in crank pins and main journais in crank shaft.	Description and functions of connecting rod, materials used for connecting rods – Big end and main bearings shells – piston pins and bocking methods of piston pins. Crank Shaft – description, function and types. Common troubies and remedies.	Drawing of plan, elevat and side views of tapered hollow obje
17	Assembling crankshaft main bearings, connecting rods and piston assembly in the engine. Fitting cylinder head on engine block and setting ignition timing.	Firing order of the engine. Crank Shaft balancing. Description of the fly wheel and its function, Crank case and oil sump.	----do-----
Week No.	Practical	Theory	Engineering Drawi
18	Checking cooling system for overheating, cleaning radiators, dismantling, cleaning, assembling and testing water pumps, reverse flushing the system and adjusting the fan belt tension. Check thermo stat valve.	Engine cooling methods, Air and water cooling - radiators, pump thermo stats and fans – their description, care and maintenance. Reasons for engine overheating. Types of coolants.	Drawing the 3 views in angle projection of a cu object.
19	Trace the Lubrication oil flow system in engine. Overhauling oil filters, oil pump and setting the pressure release valve for correct oil pressure. Main6tenance and repairs in the lubrication	Need for lubrication of engine parts – friction. Lubricant and its properties, lubrication system. Types – full flow and by-pass flow system, components in lubrication system, oil filters and pumps – types, their special features and	Free hand sketching of filters – oil flow circuit oil pumps.

	system in engine.	uses. Types of lubricants and their properties.	
20	Simple repairs in fuel feed system – overhauling of petrol pump, carburetors, fuel filters and air cleaners. Repair to a car carburetors – adjusting float level and slow speed adjustments – studying the fuel flow circuit in carburetor.	Fuel feed system in motor vehicles – description and layout of the system. Types, description, operation, maintenance of petrol pump, petrol filters and carburetors. Types of fuels and their properties. Types of carburetors, special features – advantages, different adjustments and their purpose.	----do---- Reading of simple blue prints.

Week No.	Practical	Theory	Engineering Drawi
21	Practice in engine tune up in a vehicle – testing, vacuum and compression of engine, adjusting tappets setting ignition timing and adjusting carburetor for slow speeds.	Explanation of engine tune up, job description of compression and vacuum testing – description of ignition timing setting and slow speed adjustment. Function of different sensors on engine.	Exercises in Blue print reading.

Achievements for 10 weeks of training from 12th to 21st week :

(i) dismantling and assembling of different components of the engine.
(ii) repair operations of engine, valve refacing seat cutting , decarbonising , fitting of bearings, piston rings, gudgeon

pins.

(iii) overhauling of water pump, oil pump and petrol pump.

(iv) follow safety precautions while doing the above repairs.

(v) locate troubles and rectify in cooling, lubrication and fuel feed system of the engine.

Week No.	Practical	Theory	Engineering Drawi
22	7. Transmission work: Adjusting clutch pedal play-removing gear box and clutch assembly from vehicle Dismantling clutch assembly cleaning and inspecting parts. Servicing clutch master cylinder.	Layout of transmission system, description of single plate clutches- functions – difference – types of clutches used in their description, special features and advantages. Different types of clutch actuation mechanism.	Isometric drawing of si objects such as square a rectangular blocks. Wh groves and key, ways.
23	Removing and fitting of new pilot bearing. Removing fitting of ring gear in fly wheel. Relining a clutch plate-checking condition of flywheel and pressure plate surface for refacing.	Clutch lining – types-materials use –bonded and riveted lining clutch plate construction. Purpose of damper spring – precaution while relining a clutch plate.	Isometric view of clutc pedal- clutch release be – ork and clutch plate - hand sketching Of clutch assembly .
24	Assembling of pressure plate – adjusting the fingers-checking run out of flywheel and aligning clutch assembly with flywheel	Fluid coupling – description operation and advantages o using fluid coupling – common troubles and remedy	-----do-----
25	Dismantling a four speed sliding Mesh gear box. Cleaning,	The purpose of gear box in vehicle description and functions of a sliding mesh	Free hand sketching of arrangement of gears ir the sliding mesh gear b

	inspection of parts for wear damage. Assembling the gear box and filling in oil.	gear box - common troubles in gear box and their remedies.	different gear positions

26	Dismantling, Cleaning and Assembling of gear shift Mechanism - changing oil in gear Box, studying gear ratios in the Gear box.	Lubrication of gear box, Constant mesh gear box – description and advantages.	Free hand sketching of Shifter mechanism and gear shift lever.
27	Removing open type propeiler Shaft from vehicle. Removing Universal joints – cleaning, inspecting – replacing of wornout parts, reassembling fitting to vehicle. special precautions while removing torque tube drive shaft.	Universal joints and propeller shaft open and closed type propeller shaft. Types-of universal joints – Care and maintenance, constant velocity joints- Special features and advantages.	Use of drawing instrum T – Squares and drawing bo Construction of Simple figures.
28	Removing rear brake drums and Adjusting the wheel bearings in full floating rear axles and semi-Floating axles- replacing oil seals in rear axles.	Description and purpose of different type of rear axles- special features and advantages of each type, Lubrications of rear axles- Reasons for oil in brake drums.	Construction of simple figures with dimension And titles-use of Different types of Scales.

29	Removing rear axles assembly From vehicle, dismantling, cleaning,inspecting parts for wear and damage, cutting packing/gaskets, removing tail pinion and bearings- cleaning and inspection of oil seals and bearings.	Description and functions of final drive assembly – crown wheel and tail pinion - hypoid gear and its lubrication. Description of differential and its principle of operation.	Free hand sketching of different types of rear a
30	Checking tooth contact in crown and Pinion and adjusting backlash, adjusting Pre load of crown and pinion assembling the rear axle and fitting rear Axle assembly on vehicles and testing.	Description and function of differential Gear types- tooth Contact and backlash. Pre loading adjustment. Common troubles and Their remedy in rear assembly.	Free hand sketching of universal joints, Silencer brackets and s shackles.
31	Trouble shooting in the transmission System of vehicles- detecting noises from clutch, gear box, universal joints, and rear axles assembly.	Description and purpose of optional fittings such as transfer Case- free wheel- power take off- common troubles in these units and their Remedy – care and maintenance.	…do…

Achievements for 10 week of training from 22nd to 31st week:

Trainees should be able to:

(i) do relining the clutch plate and adjust clutch paddle free play
(ii) repair defects in clutch assembly, gear box, universal joint and rear axle
(iii) identify defects and noises in the transmission system and rectify
(iv) overhaul differential and able to adjust and check blacklash and do pre load bearings
(v) observe safety precautions.

Week No.	Practical	Theory	Engineering Drawing
32	**8. Suspension & Steering work** Removing wheels from vehicle dismantling tyres and tubes Checking and repairing punctures in tubes, assembling inflating to correct pressure, rotating the wheel in a vehicle. Minor repairing of wheels and tyres.	Description of Wheels and tyres-tyres –Section of Tyres, Ply rating, inflation pressure and carrying capacity, storage of tyres. Different types of rims.	Explanation of simple orthographic-lst angle & llll angle. Free hand sketching tyres and wheels.
33	Inspecting the Frame-checking alignment of Frame-Servicing of spring – replacing new bushes for shackle pins – changing bushes in shock absorbers – cleaning and lubrication of wheel bearing, adjusting wheel bearing.	Frames – description and function – common trouble in conventional suspension system. Types of leaf springs. Different types of shock absorbers – their description, operation and maintenance.	Exercises in simple orthogra projection –lst angle, free ha sketching of front spring ass and shock absorber.
34	Removing king pins and bushes, replacing new bushes and pins after rearming and lubrication of king pin bushes; changing rubber bushes in the front, independent suspension system.	Description of different types of independent suspension system special features in each system. Maintenance and lubrication of front suspension system.	Exercises in simple orthogra projection- lllrd angle free h sketching of front axle asse
35	Inspect and overhaul front and rear suspension rear springs, coil spring – torsion bars. Check-up of dead axle for alignment.	The front axle – description and function; types of steering kunckies, arrangement of steering knuckle joint, general lay out of steering linkages.	Views of simple hollow and bodies with dimensions, ske of steering linkages.
36 & 37	Inspect and overhaul steering boxes – adjusting. Gear back-lash and play.	Description of Ackerman's angle, caster, camber, Ton-in and Toe-out on turn, purpose and effect of these	Free hand sketching of caste camber, king-pin inclinatior Ackerman's angle, toe-out.

	Check and adjust Ton-in, camber angles.Checking king-pin inclination and Caster angle with special gauges.	angles.	
38	Inspect and adjust steering linkages, after replacement of worn parts. Alignment of steering wheels with respect to front wheel.	Description of Different types of steering boxes- special features of each, adjustments repair and maintenance of steering boxes. Power steering- description and its advantages.	Free hand sketching of diffe types of steering boxes.
39	**9. Brake Work** Adjusting brake pedal play checking brake binding. Dismantling wheel brake assembly cleaning and inspecting adjusting brake shoes for proper clearances. Bleeding Hydraulic Brakes.	Arrangement of brakes in cars and trucks description of hand brake and its purpose. Layout of mechanical and hydraulic braking system cars.	Free hand sketching of brak linkages, brake assembly se view of master cylinder.
40	Removing master cylinder dismantling cleaning and inspection of parts- assembling and testing bleeding the braking system after cleaning the pipe lines.	Master cylinders types including the Tandem master cylinder, special features of each functions common troubles and remedy.	**do**

Week No.	Practical	Theory	Engineering	Workshop Calculation & Science
41	Dismantling wheel break assembly removing old lining and fitting new lining on the brake shoe.. Removing & cleaning of brake drums. Inspecting Wheel cylinders and brake drums- fitting new cups and brake hose pipes - re -	Brake linings types, uses -relining the brake shoes- precautions to be observed . Wheel cylinders - description, function and types, Brakes fluids -description and uses, types of fluids used.	Free hand sketching of brake wheel cylinders - cam adjuster, brake shoe assembly and anchor pins.	Meaning of friction- examples of useful and wasteful friction in vehicles - coefficient friction, simple problem onfriction.

	assembling adjusting Wheel bearings and testing & adjusting all 4 wheel brakes.			
42	Removing and refitting of vacuum boosters - repairs to pipelines - adjusting the brakes in vacuum assisted hydraulic brakes.	Description and advantage of vacuum assisted hydraulic barkes - special features -common troubles in vacuum assisted hydraulic brakes.	Free hand sketching of vacuum boosters - sketching the layout of vacuum assisted hydrallic braking system.	Properties of matter, molecules and atoms - atomic symbols and atomic number - simple chemical formulae.
43	Adjusting air brakes - repairs to tank unit, air-compressor, brake valve assemblies. Wheel brake adjusters - locating air leaks in the brake lines and rectifying general maintenance and care.	Descrpition of air brake system - major components in system, description and purpose of each part, their care and maintenance - troubles in air brake assembly and their remedy.	Free hand sketching of the layout of the air brake system and sketching of slack adjuster.	Definition of mass, unit of force-weight of a body-energy and poewer.
44	Trouble tracing in braking system of a vehicle - adjusting brakes, precautions. To be observed while testing brakes. Points to remember while preparing the vehicle for brake certificate.	Brake testing - efficiency of brakes - braking distance, weight transference during braking a vehicle - common troubles in brakes and their remedy.	-----do-----	Applied problem in forces - work done energy and power.

45	10. Basic elctical & Work Practice in joining wires & soldering. Forming of current Voltage and measuring of current voltage and Resistence.	Simpal electrical Circuits and parallel circuite. Identification of ac. & dc meter insulator,conductors, type of resistance. Ohm's law and its application.Common electrical terms & symbols.	Free hand sketching of Electrical symbols and Drawing of simple Electrical circuits.	Electricity and its Effects of state & Dynamic electricity. AC & DC differences.
46	Cleaning and topping up of a lead acid battery With a Hydrometer cell tester, charging Battery.	Primary &Secondary Cells, lead acid battery -description- construction -common troubles and remedies. Care while handling battery. Effects of mishandling batteries on environment.	---do---	Magnets - natural And artificial types. Poles of magnets - Magnetic field.
47	Identification of Electronic control Unit. Testing of Electronic control Circuit. Fault finding in electronic circuit And remedies.	Introduction to electronics. Definition of resistor, capacitor and inductor and their principles of working. Different types of diodesp transistors, power supply for electronic circuit.	Sketching of various electronic devices used in motor vehicle.	Calculation based on ohm's law.
48	Checking instruments & gauges on dash board. Rectifylreplace defective gauges.	Different gauges used in automobiles, their function.	Free hand sketch of gauges and their circut.	Definition of ampere, volt and ohme - units of current , voltage and resistance, ohm's law.

49	Check and replace ignition coil, overhauling Distributor assembly, cleaning and checking spark plug.	Ignition coil function - distributor types, function, spark plugs - function.	Free hand plotting of ignition circuit of a vehicle, sketching the circuit line diagram of magnetic ignition.	Advanced calculations relating to electric circuits.
50,51 & 52	Revision & Test			

Achievement control

Trainees should be able to do :

(i) practice in making wire connections and soldering
(ii) forming series and parallel circuits in the motor vehicle
(iii) maintaining and testing battery
(iv) trace & rectify defects in wiring circuits
(v) overhaul distributor
(vi) identify basic electronic components such as diodes, capacitors, resistors etc. and locate & rectify faults
(vii) follow safety precautions while doing the above repairs.

Week No.	Practical	Theory	Engineering Drawing
53	1. **Further Practice on Petrol Engines Repair Work :** Removing a petrol engine from a motor vehicle - dismantling cylinder head, decorbonising checking valves - cutting valves seats, replacing worn guides and weaksprings, assembling valves and cylinder head and adjusting tappet clearance in angine.	Method of engine repair, fitting new liners - types and advantages of liners, procedure of decarbonising in an engine - common defects in valves - valves reface and seat angles. Reasons for valve bouncing - lmportance of correct tappet clearances.	Drawing of riveted joints lap and Butt joints. A fre hand sketching valve operating mechanism.
54	Removing piston and connecting rods from engine checking cylinder bore wear for ovality and taper.	Reasons for cylinder wear - methods of reconditioning worn out cylinders. Precautions to be observed while removing and fitting	Drawing of locking devic of dinerent types with dimensions. Freehand sketching of piston and connecting rod.

	Checking piston ring groves and cleaning - measuring piston size - removing gudgeon pin and bushes - checking wear - refitting new bushes and pins.	piston and connecting rod assembly in cylinder bore.	
55	Checking main and connecting rod bearing. Checking connecting rod alighment, fitting new bearing shells and setting correct oil clearances. Checking and cleaning oil passages in crank shaft and engine block. Overhauling and testing oil pumps, changing oil filters and oil pump.	Bearing types - their special advantages and special features - bearing metals, their composition, bearing spread - nip and crush - their purpose. Lubricating pumps, types and their special features. By pass and full flow oil filters.	Drawing of different type of couplings. Freehand sketching of oil pumps.
56 & 57	Cleaning fuel tank, checking for leaks in fuel tank. Circuit checking of multipoint fuel injection pump and petrol nozzle. Replacement if necessary, check delivery from fuel pump.	Layout of petrol injection system, its advantages, construction and working of multi point fuel injection pump and petrol injector their maintenance and care.	Drawing of different type of coupling.
58	Removing valve timing - cover - checking and correct setting of valve timing - replacing timing chains. Checking cam-shaft, end play and correcting it.	Valve timing gears - Timing marks, timing chains and chain tensioners - effect of stretched chains - checking backlash in timing gears.	Drawing of bearing pulle with dimensions. Free hand sketches of valve timing diagram.
59	Assembling piston and connecting rod assembly, crank shaft, camshaft and timing gears. Fitting cylinder head checking valve tappet clearance,	Engine Assembly procedure as recommended by makers - precautions to be observed while assembling engine components, checking and adjusting engine idle speed with vacuum gauge.	----do----

	starting and adjusting engine speed.			
60	Removing inlet and exhaust manifold - cleaning carbon and checking for warpage and crack - checking heat control valve on exhaust manifold for proper working. Removing and replacing new manifold gaskets and checking leakage of exhaust gases. Removing and cleaning silencers and tail pipe and refitting.	Inlet and exhaust manifold description and purpose of manifolds, exhaust pipes and silencer box. Constructional details and purpose and types of silencers. Common troubles in exhaust system and their remedy. Catalytic converter, its function and advantages.	Free hand sketching of sectional view of silencer box - exhaust pipes and t pipe.	
61	2. **Trouble Shooting in Cooling Lubrication Fuel Feed And Lgnition Systems** Trouble shooting in cooling and lubrication systems. Checking up and correcting oil and water leaks - changing defective packings and gaskets. Testing radiator for leaks - testing thermostat.	Step by step method of iocating troubles in the lubrication and cooling systems. Reasons for engine overheating. Flow test rate recommended for radiator. Crank case dilution and crank case ventilation.	Free hand sketching of piston and connecting ro	
62	Trouble shooting in fuel feed and ignition system - starting engine - checking air leaks. Repairing of silencer and tail pipes. Adjusting the slow speed of the engine with vacuum gauge.	Systematic procedure of trouble tracing in fuel feed and ignition system in automobile engine - Reasons for excessive fuel and oil consumption.	-----do-----	

Achievement for 10 weeks from 53rd to 62nd week.

Trainees should be able to:

(i) remove petrol engine from vehicle, dismantle cylinder head, piston connecting rod, crank shaft, cam shaft etc.

(ii) decarbonizes cylinder head, to cut, repair and grid valve seat.

(iii) check main and connecting rod bearing. Fit new shell bearing in main and big end, set oil clearance.

(iv) clean ring groves, set piston rings and assemble.

(v) Check and replace oil pumps, oil filters, fuel litter.

(vi) Test & adjust MPFI pump and petrol nozzle.

(vii) set ignition timing and valve timing

(viii) locate troubles and rectify them cooling, lubrication, fuel feed and ignition system

(ix) follow safety precautions.

Week No	Pracitcal	Theory	Engineering Drawing
63	3. Diesel Engine Repair Work Practice on unserviceable diesel engine – removing jammed nuts broken studs and reconditioning damaged Threaded holes – removing cylinder head , connecting rods and pistons, cleaning , inspecting and refitting them.	History and development of Compression ignition engines. Classification of C.l. engines. Advantages and disadvantages over petrol engines – constructional details of singles and multi cylinder engines. Turbo charger and its advantages.	Free hand sketching of combustion chambers c different types.
64	Practice in starting of stationary and a transport vehicle engine. – General maintenance of engines – checking oil, fuel, water levels and accessories of diesel engines.	The four stroke and two stroke diesel ongine – uniflow and loop scavenging constant pressure and constant volume cycles. Dieses cycle indicator diagrams.	Free hand sketching of stroke cycles and two s cycle engines.
65&66	Removing cylinder head, piston connecting rods, cleaning, decorbonising and cylinder head checking, piston clearance, dismantling valve assembly, cleaning checking and reconditioning valves, assembling valves and adjusting tappet clearances, assembling engine parts and staring the engine after repairs and adjusting slow speeds.	Specifications of diesel engines, materials used for different engine parts, working clearances, compression ratios – valve timing of diesel engines crank shaft, connecting rods, pistons valves and valve operation. The combustion chambers – types, advantages and disadvantages. Heater plugs types and their uses.	Free hand sketching of feed system in diesel engines and diesel fuel filters.
67.	Bleeding fuel lines for	Fuels used in diesel engines	Free hand sketching of

	air locks. Repairing fuel leaks in the pipe-lines in diesel engines.	specification of diesel fuels;importance of clean fuel,genral layout of the fuel feed system in the stationary and transport engines.	diesel fuel system and f filters.
68.	Cleaning and servicing of primary fuel filter and pressure stage filters-removing feel pump-dismmantling; cleaning; reassembling refitting and testing; the feed pump.	Type of fuel injection .fuel feed pumps –description – common troubles and remedies.	Free hand sketching of diesel fuel feed system fuel filters.
69.	Dismating an unserviceable fuel injection pump clearing;inspecting;parts andreassembling removing f.i pump from running engine changine oil in it-fitting back to engine-testing the governor and setting injection timing.	Need for governors –types pneumation and mechanical governors-types; Their description and operation.	Free hand sketching of componets from assem
70	Testing injectors for missing on the vehicle – removing , dismantling, cleaning , inspecting-replacing defective parts- reassembling the injectors and testing them.	Injectors nozzles- types, description, operation testing of injectors. Special features of pintle nozzles.	Free hand sketching of injectors of different ty
71	Servicing & testing rotary fuel injection pump adjusting tappet & setting injection timing.	Rotary fuel injection pump, flange type pump and their special features. Care and maintenance of single cylinder pump.	Free hand sketching of single element flange mounted pump.
72	Trouble shooting with special references to adjustments in the fuel feed system checking	Need for governors types pneumatic and maintenance of governors, reasons for black, white and blue smoke	Freehand sketching of f injectors of different ty

	exhaust gases and adjusting the governor slow speed adjustment and venture control adjustments. Checking oil, fuel, water and exhaust gas leaks and correcting them. Checking exhaust gas by free acceleration method.	in exhaust.	
73	**4. Visit to local garages and industries-demonstration of service station equipn**		

Achievements for 11 weeks from 63rd to 73rd weeks:
Trainees should be able to:

(1) Bleed air in the diesel fuel system, check and correct fuel leak and service diesel fuel filters.
(2) Remove clean and test fuel injector and find out the defective/missing injector.
(3) Overhaul fuel feed pump.
(4) Check and correct injection timing in single and multi-cylinder engine and know service station equipments.
(5) Follow necessary safety precautions.

Week No	Practical	Theory	Engineering Drawing
74	**5. Electrical/Electronic Accessories Repair Work** Trace the light circuit - test bulbs align head lamps, find out short and open circuits in the light wiring replacing fuses testing the tail and brake lights in vehicle. Check function of malfunctioning indicating lamp.	Description of light circuits- different components in light circuits Description and function of each. Prefocused bulbs and sealed beams. Fuses and their importance. Layout of different sensors and malfunctioning indicating lamp in a vehicle.	Freehand sketching of l circuit of a vehicle witl electrical symbols.
75	Removing an electrical horn from vehicle - dismantling, cleaning point, testing wires, assembling the horn and	Electrical horn circuit -m description of electric born - operation of relay and horn switches. Common troubles and their remedies.	Free hand sketching of circuit, drawing the sectional view of horn.

	adjusting the horn for correct sound, tuning double horn, repairing of horn relay and horn switches.		
76	Removing a wiper motor dismantling, cleaning, inspecting, and repairing electrical wiper motors, assembling and fitting, setting blades for correct functioning.	Description and operation of an electric wiper motor, care and maintenance. Common troubles and remedies.	Free hand sketching of wiper motor circuit.
77	Trace the wiring circuit of traffic signal flashers light circuit-tracing defects in the flasher circuits, replacing fuse bulb. Removing, dismantling magnetos adjusting gap in points-testing magnetos.	Flasher circuit, its description and operation, common troubles in the circuit and remedies. Magneto ignition system description and operation, advantages-rotating armature and flywheel magnetos-special features.	Sketching the flasher li circuit with symbols. Freehand sketching of magneto ignition circui
78	Removing and rectifying alternator/dynamo in a vehicle,precautions while connecting battery in. alternator circuit. General maintance, adjusting fan belt play tension.	Description of charging circuit. Difference between dynamo & alternator, their operation common trouble and remedies. Regulator unit ignition warning lamp.	Free hand sketching of circuit of vehicle with electrical symbol of charging unit.
79	Removing starter motor from vehicle , overhauling and testing of starter motor.	Description of starter motor circuit . Constructional details of starter motor. Solenoid switch common troubles and remedies in starter circuit. Positive and negative earthing of battery.	Sketching starter motor circuit and solenoid sw circuit.Free hand sketcl of tracer plate assembly advance and retard plat

80	Trouble tracing in electrical wiring of the vehicle. Use of resistance meter voltmeter and ammeter. Attending mechanical repairs to electric accessories such as fuel gauge, temperature gauge, brake light switch, solenoids switch. Tracing fault in different electronic ignition systems and rectification.	Lucas-colour code for wiring in the motor vehicle. Binary numbers logic gates, amplifiers and multi vibrators. Principle of electronic ignition, advantages, types of electronic ignition system as capacitor discharge ignition system, thyristor based ignition system and microprocessor based contactless ignition system.	Free hand sketching of complete wiring of the vehicle.

Achievements for 7 weeks from 74th to 80th week :

Trainees should be able to :

(i) trace fault in electrical wiring and accessories and rectify them.

(ii) trace faults in electronic circuits and accessories and rectify them.

(iii) Follow necessary safety precautions.

Week No.	Practical	Theory	Engineering Drawing	Workshop Science & calculation
81 to 87	6. Driving Practice Practice in straight driving on wide roads. Driving through lanes and curves. Practice in reversing. Practice overtaking another vehicle. Practice in driving through sand and wet surfaces. Practice in parking and diagonal parking.	Motor vehicle Act- Driving road rules –road traffic signals- hand signals. Precautions to be taken while over taking, reversing driving through narrow lanes, curves and slopes.	Free hand sketching of different traffic signals.	Applied workshop problems calculation fuel average, gear ratios.

	Practice in driving over slopes and down hill. Practice in driving over narrow bridges.			

Achievement for 7 weeks from 81 to 87 week:

Trainees should be able to:

(i) Drive and road test a motor vehicle
(ii) Follow necessary safety precautions.

Week No.	PARCTICAL	THEORY	ENGINEERING DRAWING
88.	**7. Synchromesh Gear Nox and Transfer case 4 Wheel Drive Repair Work** Dismantling a synchromesh gear box,cleaning,inspecting parts replacing worn out defective parts-assembling and testing for correct performance, indentifying noises from gear boxes and rectifying.	Synchromesh gear boxes advantages- description, operation in different gear position. Common trouble and remedies types of synchromesh gear boxes-their special features.	Free hand sketching of synchromesh units.
89.	Removing transfer case from the vehical-dismatiing, cleaning inspected parts, replacing worn/damaged parts, reassembling, testing and fitting. Repairing of four wheel drive shifter mechanism. Overhauling of front wheel drive propeller shaft unit. Overhaul over drive mechanism.	Description and operation of four wheel drive – the purpose of transfer case and the arrangement of shifting mechanism. Common troubles and remedies. Over drive mechanism its advantages, maintenance & care.	Free hand sketching of intermediate shaft and shifter arrangement.
90 & 91	Trouble shooting in the transmission system indentifying the noises from clutch, assembly, gear box, universal joints – rear axle drive and the differential unit. Checking oil leaks and correcting.	Systematic procedure of locating noises from the transmission units – common troubles in the system and their remedies.	Freehand sketching of intermediate shift and s arrangement.

Achievement for 4 week from 88th to 91st week

Trainees should be able to :

1. Overhaul a synchrnesh gear box
2. Overhaul a transfer case

3. Follow necessary safety precautions

LIST OF TOOLS AND EQIPMENTS
THE LIST INDICATES THE REQUIREMENT OF TWO YEARS PROGRAMME

For a batch of unit of 16 trainees

SI. No.	Quantity	Description
1	2	3
		1.TOOL KIT
1.	16	Hammer bail peen 0.75 Kg.
2.	16	Chisel Cold Flat 19 mm.
3.	16	Center Punch 10 mm. Dia. x 100 mm.
4.	16	Steel Rule 15 cm English and Metris.
5.	16	Screw Driver 30 cm x9 mm. Blade.
6.	16	Screw Driver 20 cmx9 mm. Blade.
7.	16	Spanner DE Set of 12 pieces (10 mm.-mm).
8.	16	Plier Combination 15 cm.
9.	16	Hand File 20 cm second cut.
10.	16	Feeler gauge 20 blades(Metric).
11.	16	Ring spanner set of 12 piecess (10 mm.- 32 mm.)
12.	16	Steel tool box with Lock and Key (folding type) size 400x200x150 mm.
13.	4 sets	Allen Key set of 12 pieces (2MM.-14 mm.)

14. Circlip Plier (Ext. and int.) 160 mm. And 200 (two each)
8 sets
15. Philips screw driver type set of 5 pieces 100 mm.-300 mm.
4 sets

Tools Measuring Instruments and General Shop out fit
1. Rule Steel 300 mm.
2
2. Divider Spring Joint 150 mm.
2
3. Prick Punch cut 15 cm
2
4. Chisel cross cut 200 mm. x 6 mm.
1
5. Hammer Ball Peen 0.5 Kg.
2
6. Hammer Copper 1 Kg. with handle
1
7. Engineering Square 15 cm Biade
2
8. Scriber 15 cm
2
9. Scriber Block Universal
1
10. Marking out tables 90x60x90 cm (high)
1
11. Surface Plate 60x60 cm
1
12. Hacksaw frame for 30 cm blade
4
13. ' V ' -Block 75 x 38 mm pair with clamps
2
14. Punch Hollow 6,7,8,9, 10.5 and 12 mm set
1 set
15. Punch figure set 3 mm
1 set
16. Punch letter set 3 mm
1 set
17. Hand Vice 37 mm
2
18. Screw Driver, Electrician type 15 cm size
2
19. File, Flat 35' cm bastard
2
20. File, Flat 25 cm second cut
2
21. File, Flat 20 cm Smooth
2
22. File, Flt safe edge 25 cm smooth
2

23. File, triangular 15 cm second cut
2
24. File, half round 20 cm secound aut
2
25. File, Square 30 cm round
2
26. File, Square 20 cm second cut
2
27. Twist Drill, Metric 3mm to 12 mm (1 mm step)
1 set
28. Taps and dies complete seoin in box B.A, BSW , BSF< american
2 set
and metric with handles
29. Hand reamer adjustable 10.5 mm to 11.25 mm to 12.75 mm,
1 set
12.75 mm to 14.25 mm and 14.25 mm to 15.75 mm.
30.Scraper flat 25 cm
1
31.Scraper Triangular 25 cm
1
32.Scraper half round 25 cm
1
33. Sets of Morse socket MT-0-1,1-2 and 2-3
1
34. Micrometer outside 25-50 mm
1
35. Micrometer outside 0-25 mm
1
36. Micrometer oitside 50-75 mm
1
37. Micrometer outside 75-100 mm
1
38. Micometer Inside 50 to 75 mm and 150 mm and 25 mm to 50 mm
1 each
39. Vernier Caliper set 250 or 200 mm inside, outside and depth
1
40. Safety goggles
2 pairs
41. Hammer, Planishing
1
42. Setting, Hammer
1
43. Mallet (Wooden)
1
44. Trammel 30 cm
1
45. Blowdamp 0.5 litre
1
46. Soldering iron 120 wotts
2

47. Soldering iron copper 225 gms(fire heated)150 mm & 200 mm
2
48. Pliers Nose (round and straight) 150 mm and 200 mm
2 each
49. Snip Straight 250 mm
1
50. Spanners double set of 12 metric sizes 6 to 32 mm
1 set
51. Spanner off-set double ended set of 7 pds. (6 mm to 17 mm)
1 set
52. Double Open-ended lgnition spanner set of 5(0 to 9 mm)
4 sets
53. Spanners adjustable 20 cm
1
54. Spanner Ring Off-set seft of 6 SAE
1
55. Spanner for sparking plug 14 mm
1 set
56. Magneto Spanner set of 8 spanners
1 set
57. Spanner socket set (6-32 mm sockets)-complete set
2
58. Spanner T.Flex for screwing up and unscrewing in inaccessible position.
1
59. Double open-ended Tappet spanner
1 set
60. Drift copper 10 mm dia x 150 mm
2
61. Spray Gun Kerosene
1
62. Pressure Grease Gun
1
63. Chain Pulley Block-3 ton capacity
1
64. Tray cleaning 45x30 cm
16
65. Drilling Machine(beach) 12 mm dia
1
66. Oil Can 0.5 litre
1
67. Lifter, Valve Spring
1
68. Tool, Valve grinding, suction type (consumable tool)
6
69. Valve set cutting tools complete with Guides and pilot
1 set
bar (all angles) in a Box.
70. Extractor, Stud ‘Ezg Out’ type
1

71. Copression gauge to read 17.6 kg/Sq.cm
1
72. Vacuum Gauge 0 to 75 cm
1
73. Stone Carborandum 15x 53.75 cm rough and smooth
2
74. Cylinder dial gauge
1 set
75. Torque wrench (0 to 67.5 kg./meter) set of 3
1
76. Work Bench 240 x 120 x 75 cm with 4 vices 12.5 cm jaw
4
77. Lockers with 8 drawers (standard size)
2
78. Metal rack 180 x 150 x 45cm
1
79. Fuel Pump - old for practice
2
80. Distributor – old for practice
2
81. Carbauretor (two different types
2 each
82. Water Pump and oil Pump
2(1 each)
83. Filing jig for adjusting the piston ring gap
1
84. Steel almirah 180 x 90 x 50 cm
1
85. Black Board 180 x 90 cm
1
86. Desk or table 90 x 60 cm (for instructor)
1
87. Fire extinguisher
2
88. Fire buckets with stand
4
89. Tachometer
1
90. Jack, hydraulic Hi-Lift type(Trolley type)
2
91. Tester sparking plug ‘NEON’ Type
1
92. Compressor air piston type(vehicular)
1
93. Wheel alignment gauge – magnetic type with turn tables
1
94. Sectionised engine gear box and differential mounted on chassis
1
95. Brake assembly , master cylinder, wheel cylinder and servo
1

96. Vacuum assisted hydraulics brake assembly with vacuum booster
1
97. Air Brake Assembly
1
98. Brake Lining riveting machine(foot operated)
1
99. clutches, different types such as cone type disc type
diaphragm type etc
1
100. axle, Gear boxes, steering boxes front axle, axle assembly
1
Independent front wheel spring assembly. Synchromesh gear box
Assembly, live front axle assembly transfer case
101. Full floating axle and semi-floating axle assembly
1 each
102. Steering assembly – rack and pinion type
1
103. Steering assembly – power steering
1
104. Spring Tension scale – 0-4.5 kg.
1
105. Valve spring compressor
1
106. Carburettor repair tool kit
1
107. Puller set steering wheel universal 1set
108. Puller set universal bearing and bushes
1set
109. lifting jack, screw type
4
110. Coil spring compressor for suspension spring
1
111. Hot patch clamp
2
112. Piston Ring Compressor
2
113. Valve key inserter
1
114. Wall Charts(Driving instructions)
1
115. Connecting rod alignment fixture
1
116. Valve refacer
1
117. Piaton ring expander
1
118. High rate discharge tester
1
119. A.V. O. Meter
1 set
120. Pneumatic tools
1 set
121. Impact screw driver

1 set

122. General purpose puller
1 set

123. Stub extractor
1 set

124. Spring plier 150,200 mm
1 set

125. Torque Wrench(set of 3 numbers)
1 set

126. Growler
1

127. Battery charger
1

128. Timing light
1

129. Hydrometer
1

130. Continuity meter
1

131. Tyre changer
1

132. Fuel injection pump(Diesel) inline
1

133. Fuel Injection Pump(Diesel) rotary
1

134. Multi-point fuel injection pump
2 nos.

135. Petrol nozzle
2 sets

136. A/C Unit(Car)
2 Nos.

GENERAL MACHINERY

1. Grinder with two 7" wheels with twist drilln grinding attachment
1

2. Arbor press hand operated 1/2 ton
1

3. Motor vehicle in running condition (Diesel heavy)
1

4. Motor car in running condition (Petrol)
1

5. Light commercial vehicle-3 ton
1

6. Heavy Commercial vehicle
2(one should be 4x4)

7. Petrol Engine running condition MPFI type
2

8. Petrol engine running condition carburettor type
2

9. Diesel Engine running condition (Vehicle type)
4

10. Petrol Engine(2-stroke) Motor Cycle/Scooter
2

11. Spark Plug cleaning and testing equipment
1

12. Air compressor - 2 stage - 500 litre with 5 HP motor & air receiver
1

13. Mechanical Hoist/Plate Form Type

1

14. Exhaust gas analyser

1

15. Smoke tester

1

LIST OF OPTIONAL TOOLS AND EQUIPMENT, SHOULD BE PRODURED IF POSSIBLE.

1. Car Washer With detergent and steam mixed facility
2. VCR/VCP along with the Video Cassettes in the field of Mechanic Motor Vehicle
3. Engine Tuning Equipment, such as Duel Angle Tester etc.
4. Car Air Conditioning Model
5. Disc Brake Model
6. Engine Model with Petrol Injection
7. Engine Model equipped with Electronic Ignition System
8. Car Scanner
9. Illuminated Magnifier 10 x.

SYLLABUS UNDER A.T.S.

First and Second Year

Syllabus for the First and Second Year should be the same as that for the trade of Mechanic (Motor Vehicle) under Craftsman Training Scheme.

Third Year - Shopfloor Training

SYLLABUS FOR PRACTICAL TRAINING

I. Revision Further practice on front axle, suspension, steering and brake work

II ENGINE REPAIR WORK

1. Removing engine from vehicle, observing all safety precautions
2. Dismantling cylinder head and decarbonising
3. Re-conditioning valves and valve seats
4. Removing piston and connecting rod assembly
5. Dismantling Gudgeon Pins and bushes, Piston rings, cleaning, checking and refitting them.
6. Checking main bearing and crank shaft
7. Checking connecting rod bearings
8. Checking and cleaning of oil passages in the crank shaft and engine block
9. Overhauling oil pump
10. Checking timing chain tension and replacing worn chain
11. Checking and adjusting valve timing
12. Checking alignment of connecting rods for twist and bend
13. Checking warping in the cylinder head
14. Measuring cylinder bores and crank pins.
15. Fitting new bearing shells and adjusting main bearings
16. Re-assembling piston and connecting rod assembly in engine block
17. Fitting cylinder head and torquing to correct specifications
18. Assembling overhead Valve assembly and adjusting tappets
19. Removing exhaust manifold, silencer pipe, silencer box, cleaning and refitting.
20. Overhauling petrol pump and testing
21. Cleaning and testing petrol tank for leaks
22. Overhauling carburetors
23. Checking and correcting air/fuel leaks in petrol lines
24. Reverse flushing radiator and cooling system
25. Adjusting fan belt tension
26. Testing Thermostats
27. Overhauling Water pump
28. Replacing hose pipes and checking leaks
29. Maintenance of lead acid battery
30. Charging a battery from a battery charger
31. Overhauling a distributor assembly
32. Testing induction coil and condenser
33. Cleaning and Testing spark plugs
34. Testing engine compression with compression gauge
35. Starting engine and adjusting slow speed of engine
36. Trouble shooting in engine
37. Trouble shooting in cooling system, lubrication system and fuel feed system
38. Checking circuits and delivery of multi-point fuel injection pump
39. Testing Petrol nozzles
40. Checking exhaust gases and rectifying defects for improper exhaust gas.

III. DIESEL ENGINE WORK

41. Practice starting and stopping a diesel engine
42. General mainlenance of diesel engine
43. Bleeding air from diesel Fuel system

44. Repairing leaks in Diesel Fuel pipelines
45. Servicing Diesel fuel filters and air cleaners.
46. Servicing of oil filters
47. Overhauling Transfer Pumps (feed pumps)
48. Removing fuel injection pump from running engine, cleaning changing Lubrication oil, refitting and setting injection timing
49. Testing fuel injectors on the vehicle for missing
50. Overhauling and injector and testing on testing on test-bench
51. Troubling shooting in Diesel fuel feed system.
52. Trouble shooting in Diesel Engine
53. Maintenance of Log Book
54. Checking exhaust gases and rectifying defects for improper exhaust gas.

IV. ELECTRICAL WORK

55. Repairing of components in lighting circuit
56. Testing bulbs and replacing fuses
57. Overhauling starter motor

THIRD YEAR

1. Trade Theory (3 hours per week or 150 hours per year approximately). The no. of hours to be spent on the different iopics in
the trade theory has beenindicated. The hours indicated are flexible and are only intended as guide.
1. Safety at work - accidents do not happen they are caused.
2. Revision of the work previous two years.
3. Heat treatment of metals and alloys - its necessity definition of terms - hardening, tempering, annealing, normalising and case hardening. Brief description and process employad. Equipment used for heat treatment temper colour charts.
4. Scrapping, lapping and honing operations their applications.
5. Inter changeability,fits, and alllowances
6. Batteru charging -fault finding and service station test including road tests.
7. Machinery and equipment - Air compressor hydraulic hoist, cylinder boring machine crank shaft grinding main bearing
,link bearing, bar honing machine, wheel alignment gauge etc. their description, operation and use. care and maintenance.
8. Further description of tyres and tubes - selection of tyres carrying capdcities, inflation pressures -tubeless tyres emergency
repairs.vulcanising -re -treading.
9. **POWER UNIT** -Reasons for use of multi-cylinder engines, cylinder arragements and construction, combustion chamber,
shapes. Cams and Cam shafts. piston materials and construclion. procedure in de-carbonising and valve maintenance
10. Overhauling a dynamo in the vehicle
11. Repairing and adjusting electrical horns
12. Repairing of wiper motors
13. Tracing trouble in the wiper motor circuit and rectifying them.
14. Studying wiring circuit of traffic signal flasher circuit and rectifying defects in the circuit
15. Removing and fitting of alternators in vehicles
16. Trouble tracing in electrical circuits using AVO meter.
17. Check electronic control unit and its circuit in a vehicle and replace.

V. TRANSMISSION WORK

18. Overhuling a synchromesh gear box
19. Overhauling transfer case assembly
20. Replacing universal joint cups and cross in propeller shaft assembly
21. Identifying noise and rectifying in transmission system
22. Overhauling rear axle assembly, adjusting tooth conract in final drive assembly
23. Checking undercarriage noise in a vehicle

24. Overhaul over drive mechanism
25. Overhaul front wheel drive front axle

VI. SERVICE STATION/GARAGE EQUIPMENT

26. Repairing Jacks(Mechanical and Hydeaulic type)
27. Repairing of Grease Guns and Oil spray guns
28. Care and maintenance of Air compressor and Hydraulic hoist
29. Care and maintenance of valve refacer, injector, tester, spark plug , testre and car washer.
30. Care and maimenance of exhaust gas analyzer/smoke tester.
31. Practice in use special tools

VII. TROUBLE SHOOTING

32. Diagnosis of faults in engine, steering, brakes and transmission system and rectifying them.
33. Diagnosis of fault in engine for improper smoke and rectify them.
34. Towing a sick vehicle.
35. Use, care and maintenance of vacuum/pressure gauges in diagnosis engine troubles.
36. Preventive maintenance.

Including detarmination of cylinder wear , valve guide wear spring strength . Crank shaft - mian bearing alignment - construction crank position in relation to firing gauges in diagnosing engine fauils.

10. Oli film wedge theory. Viscosity- SAE numbers factors governing sesction of correct grade pf oil. Manufacturer"s specification , Crack, case dilution types of lubricant . Oil addititon- by Forced and spash lubrication. Crank case dilution and ventilation- By pass flow and full flow system - servise procedure in relation to lubrication system.

11 COOLING SYSTEM - Thermo syphin system and pump ciculation.
thermastats- Pressurised rediators, Anti freeze and anti- corrosive compounds

12. COMPRESSION IGNITION ENGINES - Types of combustion chamber, effecst of turplenance.
Direct and indirect combustion. The injector pump - methods of calibrating and phasing, spill timing - Types of Governors for compression ignition engines. Methods of metric fuel. Injectors -

13 FUELIAIR SUPPLY SYSTEM -fuels - specification details- calorific values and air fuel ratios for typical fuels. Air cpeaners.

Typical fuels and charateristic for spark ignition and compression ignition engines.Functions of jets, chokes, float and plot chamber. Starting, slow renning and accelerating devices. auses of faulty running with simple adjustments. Exhaust gas, composition and charatistics, intake and exhaust mainfolds, turbo charger.

14.SILENCERS - Essential features in arrangement, construction and mounting procedures for cleaning and re-assembiy, cataytic converter.

15. ELECTRICAL EQUIPMENT -lgition timing, advance and retard by manual and automatic control.

contact briaker cleaning nac adjustments. Construction of coil and distribuor. Lubrication of electrical equipment cleaning \bressing of commuter.Alternators in vehicles transisterised ignition.s

16 Purpose of clutch, limits of clutch adjustments, Lubrucation in gear box-description and operation of special type gear box metal and rubber types if universal joints.Over drive mechanism.s

17. FRONT AXLE, FRONT SUSPENSION AND STEERING GEAR - Ball joint suspension, causes of steering faulfs and vibration - methods of correction, Dynamic wheel balancing.

18. WHEET, TYRES NAD BRAKES -Construction of tyre, rims and split rims- their sizes

and fitting, cover and tube repair , inflation pressures. Wheel brake assembly, Types of brakes and braking systems including air brakes. Servo assisted brakes and air brakes effect of brake action and

operating forces.Relining brakes, cause of noise in operation. Location and rectification of troubles , use

of special tools.

19 FRAMES - Loads to be carried by frame, distortion under normal and abnormal road conditions, drive and brake. reaction. Constructional details - including methods of ensuring strength and rigidity, reinforcement, testing of frame alignment mounting of body. Typical methods of construction for separate and integral body. Chassis combinations, jacks and jacking

20, SUSPENSION - Springs, shock adsoeders, stabiliser rod - different types of independent systems

21 , GENERAL SERVICING AND ROAD TESTING - Typical service station equipment for routine servicing including Air compressor- Car washer - greasing equipment. Lubrication service-Assembly of components after routine overhaul. Importance of cleanliness in relation to chassis details and body fittings. Road testing after routine servicing and overhaul, location and detection of faults, simple testing on fuel consumption. Care and use of tools, eqipment and measuring instruments

22. Use of refence fables and manufaturer hand book

23. Moden development in the trade-new technique etc.

24. Estimation of time and materials.

25. Quality and finish of work, importanse of quality and finish of jods at all stages protection of finished surface etc.

26. Troble shooting sequence.

27. Revision and test.

11. WORKSHOP CALCILATION AND SCIENCE (1 hour per week or 50 hours per year approximately)

1. Revision of the previous two year 's work.

2. Further problems on mensuration, work , power and energy.

3. Elementary principles of parallelogram and tringle of forces application to lifting tackles.

4. Graphs-plotting of points, plotting of graphs of simple equations, reading of graphs.

5. Torque and its relation to forces on engine mounting,, steering gear transmission.

6. Friction- co -efficient of friction, lubrication, ball and roller bearings.

NO. DGET-2(1)/2001-CD
Government of lndia
Ministry of labour
D.G.E.& T

New Delhi dated the 20 th May 2002

To
All the state Directors (dealing with Craftsmen Trainig Scheme)

Subject:- Extension of tiom August 2002 to August 2004 for lmplementation of the revised syllabus for the trade of Mechainc Motor Vehicle under CTS/ATS

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Sir.

I am directed to invite your kind attention to our letter of even number dated 11th /18 th February 2002 intimating you that syllabus of trade Machainc Motor Vehicle has been revised and would come into force 1st August 2002.

It was also intimated that in order to implement the revised syllabus of the trade "Mechanic Motor Vehicle " thew existing facilities as per the pre revised syllabus of Mechanic Motor Vehicle need to be upgraded and a number of additional equipment are required to be purchased by as per the list of the equipment precribed in the revised syllabus .

State Directors have expressed difficulty in up grading the facilities by July 2002 due to varios finanical constraints, therefore some have requsted to extend the date of implementation of the revised syllabus from Augst 2002 to August 2004 .The