Mechanic Motor Vehicle (MMV) Trade theory Syllabus


3. Systems of measurement, Description, care & use of - Micrometers- Outside and depth mirometer, Micrometer adjustments, Vernier calipers, Telescope gauges, Dial bore gauges, Dial indicators, straightedge, feeler gauge, thread pitch gauge, vacuum gauge, tire pressure gauge.

4. Fasteners- Study of different types of screws, nuts, studs & bolts, locking devices, Such as lock nuts, cotter, split pins, keys, circlips, lock rings, lock washers and locating where they are used. Washers & chemical compounds can be used to help secure these fasteners. Function of Gaskets, Selection of materials for gaskets and packing, oil seals. Cutting tools :- Study of different type of cutting tools like Hacksaw, File- Definition, parts of a file, specification, Grade, shape, different type of cut and uses., Off-hand grinding with sander, bench and pedestal grinders, safety precautions while grinding. Limits, Fits & Tolerances:-Definition of limits, fits & tolerances with examples used in auto components.


7. Description of Chemical effects, Batteries & cells, Lead acid batteries & Stay Maintenance Free (SMF) batteries, Magnetic effects, Heating effects, Thermo-electric energy, Thermisters, Thermo couples, Electrochemical energy, Photo-voltaic energy, Piezo-electric energy, Electromagnetic induction, Relays, Solenoids, Primary & Secondary windings, Transformers, stator and rotor coils.

8. Basic electronics: Description of Semi conductors, Solid state devices- Diodes, Transistors, Thyristors, Uni Junction Transistors ( UJT), Metal Oxide Field Effect Transistors ( MOSFETs), Logic gates-OR, AND & NOT and Logic gates using switches.

9. Introduction to welding and Heat Treatment Welding processes – Principles of Arc welding, brief description, classification and applications. Manual Metal Arc welding -principles, power sources, electrodes, welding parameters, edge preparation & fit up and welding techniques; Oxy –
Acetylene welding - principles, equipment, welding parameters, edge preparation & fit up and welding techniques; Heat Treatment Process – Introduction, Definition of heat treatment, Definition of Annealing, Normalizing, Hardening and tempering. Case hardening, Nitriding, Induction hardening and Flame Hardening process used in auto components with examples.


14. Description and function of the fly wheel and vibration damper. Crank case & oil pump, gears timing mark, Chain sprockets, chain tensioner etc. Function of clutch & coupling units attached to flywheel Description of Cylinder block, Cylinder block construction, and Different type of Cylinder sleeves (liner).

15. Engine assembly procedure with aid of special tools and gauges used for engine assembling. Introduction to Gas Turbine, Comparison of single and two stage turbine engine, Different between gas turbine and Diesel Engine.

16. Need for Cooling systems, Heat transfer method, Boiling point & pressure, Centrifugal force, Vehicle coolant properties and recommended change of interval, Different type of cooling systems, Basic cooling system components- Radiator, Coolant hoses, Water pump, Cooling system
thermostat, Cooling fans, Temperature indicators, Radiator pressure cap, Recovery system, Thermo-switch. Need for lubrication system, Functions of oil, Viscosity and its grade as per SAE, Oil additives, Synthetic oils, The lubrication system, Splash system, Pressure system, Corrosion/noise reduction in the lubrication system. Lubrication system components - Description and function of Sump, Oil collection pan, Oil tank, Pickup tube, different type of Oil pump & Oil filters Oil pressure relief valve, Spurt holes & galleries, Oil indicators, Oil cooler.

17. Intake & exhaust systems – Description of Diesel induction & Exhaust systems. Description & function of air compressor, exhauster, Super charger, Intercoolers, turbo charger, variable turbo charger mechanism. Intake system components- Description and function of Air cleaners, Different type air cleaner, Description of Intake manifolds and material, Exhaust system components- Description and function of Exhaust manifold, Exhaust pipe, Extractors, Mufflers- Reactive, absorptive, Combination., Catalytic converters, Flexible connections, Ceramic coatings, Back-pressure, Electronic mufflers.

18. Diesel Fuel Systems- Description and function of Diesel fuel injection, fuel characteristics, concept of Quiet diesel technology & Clean diesel technology. Diesel fuel system components – Description and function of Diesel tanks & lines, Diesel fuel filters, water separator, Lift pump, Plunger pump, Priming pump, Inline injection pump, Distributor-type injection pump, Diesel injectors, Glow plugs, Cummins & Detroit Diesel injection. Electronic Diesel control- Electronic Diesel control systems, Common Rail Diesel Injection (CRDI) system, Hydraulically actuated electronically controlled unit injector (HEUI) diesel injection system. Sensors, actuators and ECU (Electronic Control Unit) used in Diesel Engines.

19. Marine & Stationary Engine:- Types, double acting engines, opposed piston engines, starting systems, cooling systems, lubricating systems, supplying fuel oil, hydraulic coupling, reduction gear drive, electromagnetic coupling, electrical drive, generators and motors, supercharging


21. Description of charging circuit operation of alternators, regulator unit, ignition warning lamp troubles and remedy in charging system. Description of starter motor circuit, Constructional details of starter motor solenoid switches, common troubles and remedy in starter circuit.


23. Introduction: Study of different major components & assemblies of heavy vehicle, and different make (indigenous). Name plate-constructional differences and their merits. leading manufacturers in Heavy vehicle Industry Clutches & Manual Transmissions-Clutch principles, Single-plate clutches, Multi-plate clutches, Dual mass flywheels, Operating mechanisms


25. Final Drive & Drive Shafts - Basic layouts Front-wheel drive layout, Rear-wheel drive layout, Four-wheel drive layout, All-wheel drive layout, 4WD v/s AWD Front-wheel drive, Front-wheel drive shafts, Front-wheel final drives, Front-wheel differentials Rear-wheel drive- Propeller shaft, Type of Universal joints, Type of Constant velocity Joints, Rear-wheel final drives, Salisbury axles, Rear-wheel drive differentials, Limited slip differentials. Four-wheel drive Four-wheel drive shafts, Four-wheel final drive, Four-wheel drive transfer case, Freewheeling hubs, Four-wheel drive


29. Wheels & Tyres-Wheel types & sizes Wheels, Rim sizes & designations, Types of wheels Tyre types & characteristics- Tyres, Radial ply tyres, Radial ply tyre sidewalls, Tyre pressure monitoring systems, Run flat tyres, Space-saver tyres, Tyre distortion, Center of gravity. Tyre construction-Tyre construction, Types of tyre construction, Tyre materials, Hysteresis, Tyre sizes & designations, Tyre information, Tyre tread designs, Tyre ratings for temperature & traction. Descriptions Tirewear Patterns and causes Nitrogen vs atmospheric air in tyres

& shoes, Back plate, Wheel cylinders Disc brakes & components -Disc brake system, Disc brake operation, Disc brake rotors, Disc brake pads, Disc brake calipers, Proportioning valves, Proportioning valve operation, Brake friction materials
Antilock braking system & components- ABS brake system, Antilock braking system operation, Principles of ABS braking, ABS master cylinder, Hydraulic control unit, Wheel speed sensors, ABS with EBD electronic control unit. The construction and operation of heavy vehicle Anti-Slip Regulation / Traction Control (ASR) system.


33. Carburetor operation-Carburation, Carburetor systems, Metering jets, Accelerating, Carburetor barrels Carbureted system components The carburetor, Mechanical fuel pumps, Electric fuel pumps, Tanks & lines, Fuel lines, Charcoal canister, Carburetor filters.

34. Introduction to Electronic fuel injection (EFI) fuel supply system, Basic EFI principles, Air supply, Air volume, Multi-point injection systems (MPI/MPFI), Simultaneous injection, Efficient combustion EFI fuel supply system components - Fuel pumps, Fuel filters, Tanks & lines, Fuel lines, Fuel rail, Fuel pressure regulator, Injectors, Tachometric relay, Thermostat time switch, EFI sensors, Potentiometer, Auxiliary air valves, Idle speed control devices, Inertia sensors.

35. Introduction to EFI Engine Management - EFI operation Modes of EFI, Electronic fuel injection, Idle speed control systems, Feedback & looping, Cold start systems, Air measurement, Air-flow monitoring, Variable intake manifold system, Electrical functions, EFI wiring diagram Electronic control unit (ECU) - EFI system ECU, Electronic control unit settings, Engine speed limiting, Malfunction indicator lamp. Importance of Diagnostic Trouble Code (DTC) & its general format. Use of scan tool and retrievals of codes. EFI sensors- Intake Temperature sensor, Mass airflow sensor, Manifold absolute pressure sensor, Air vortex sensor, Fuel system sensor, Throttle position sensor, Exhaust gas oxygen sensor, Crank angle sensor, Hall effect voltage sensor,

36. Ignition principles and Faraday’s laws, Primary and secondary winding of transformer, Ignition components, Spark plugs, Spark plug components, Vacuum & centrifugal units, Plug firing voltage, Induction, Inductive system operation, Induction wiring, Hall effect sensors, Hall effect operation, Optical type sensors Distributor less ignition systems, Insulated coils, Distributor less ignition system timing.

37. Charging system- The purpose of Charging system, charging system components, charging system circuit, Alternator principles, Alternating current, Alternator components, Rectification, Phase winding connections, Rotor circuit, Voltage regulation, System operating voltage, High voltage charging systems, Rotor, Stator, Alternator end frames, Slip ring & brush assembly, Rectifier assembly, Alternator cooling fan.

38. Starting system- purpose of starting system, Staring system components, Starter motor principles, study of starter control circuits. Starter motor construction, Starter magnet types, Starter motor engagement, Commutation, Switching, solenoid construction.

39. Lighting system, Lamps/light bulbs, Lamp/light bulb information, LED lighting, Headlights-description of standard sealed beam, halogen sealed beam, composite and High intensity discharge (HID) headlights. Headlight & dimmer circuits, Park & tail light circuits,
Brake light circuits, turn signal circuit, Cornering lights, Fog lights circuit, interior lights- courtesy, reading and instrument panel lights, Smart lighting, Reverse lights


42. Locating vehicle information, Obtaining & interpreting scan tool data, Using a repair manual, Using a shop manual, Using an owner's manual, Using a labor guide, Using a parts program, Using a service information program
1. Various chemical substances were tested in the experiment. Results showed that the substances were effective in different ways. For instance, substance A showed promising results, while substance B had no significant effect. Further research is needed to understand the mechanisms behind these results.

2. The experiment was conducted in a controlled environment. The samples were exposed to various conditions and changes were observed. It was found that the substances had different effects, with some showing positive results and others showing negative results. Further analysis is required to understand the causes behind these findings.

3. The results of the experiment were analyzed statistically. The data showed that substance C had a significant impact on the results. Further experiments are needed to confirm these findings.

4. The experiment was conducted using various techniques. The results were consistent across all methods, indicating that the findings are reliable. Further studies are needed to explore the potential applications of these substances.

5. The experiment was conducted in a laboratory setting. The results were consistent and reproducible. Further studies are needed to explore the potential applications of these substances in real-world settings.

7. Devices - Diodes, Transistors, Thyristors, Unijunction Transistors (UJI) metal oxide field effect transistors (MOSFETS) Logic gates OR, AND & Not and Logic gates.


11. Pneumatics, Double acting and double ended cylinder.
12. **DA** or **LDA** transmission body & load, steering transmission body & load, steering transmission body & load.

13. **CI** (Final drive) or **LDA** transmission body & load, steering transmission body & load.

14. **CI** (Final drive) or **LDA** transmission body & load, steering transmission body & load.

15. **CI** (Final drive) or **LDA** transmission body & load, steering transmission body & load.

16. **CI** (Final drive) or **LDA** transmission body & load, steering transmission body & load.


22. 

23. 

24. 

Center plate, through at Bearing. 

25. 

26. 

27. 

Secondary pulley shaft.
28. Shock absorber
- MC person strut suspension, (short/long)
- Rigid axle leaf spring suspension, Rigid axle coil spring suspension, Independent type suspension, Rigid non-drive suspension

29. Exhaust (-Exhaust)
- EHB

30. ABS
- Anti-slip regulation, ABS-EBD control system,
- ABS-MC person strut suspension, ABS-ECAS-CAS

31. Scrub radius, Tumin radius,
- MC person strut suspension, Run Flat Tyre, Space saver tyre, Hysteresis, eÁ£À PÀæªÀÄUÀ¼ÀÄ, Antislip Regulation, (Antislip Regulation), Traction control system,
32. Scavenging counter, weights, \( J_A \) (Intake) \( \Rightarrow \) intake manifold, \( O_2 \) (Exhaust) \( \Rightarrow \) exhaust manifold, \( O_2 \) (Exhaust) \( \Rightarrow \) exhaust manifold.

33. Carburettor or Carburation, manifold, air filter, \( O_2 \) (Exhaust) \( \Rightarrow \) exhaust manifold, manifold, \( O_2 \) (Exhaust) \( \Rightarrow \) exhaust manifold, Charcol canister, carburettor or carburation.

34. \( O_2 \) (Exhaust) \( \Rightarrow \) scavenging manifold, \( O_2 \) (Exhaust) \( \Rightarrow \) scavenging manifold, \( O_2 \) (Exhaust) \( \Rightarrow \) scavenging manifold, \( O_2 \) (Exhaust) \( \Rightarrow \) scavenging manifold.

35. EFI \( \Rightarrow \) injector, atomizer, \( O_2 \) (Exhaust) \( \Rightarrow \) scavenging manifold, manifold, \( O_2 \) (Exhaust) \( \Rightarrow \) scavenging manifold, manifold, \( O_2 \) (Exhaust) \( \Rightarrow \) scavenging manifold.

36. \( O_2 \) (Exhaust) \( \Rightarrow \) Faradays cell, \( O_2 \) (Exhaust) \( \Rightarrow \) Faraday's cell, \( O_2 \) (Exhaust) \( \Rightarrow \) Faraday's cell, \( O_2 \) (Exhaust) \( \Rightarrow \) Faraday's cell.
37. Alternator (Alternator) Recification, phase winding Rotor, stator Communication, switching solenoid

38. Slipring - Recifier, sealed-beam, Communication, halogen sealed beam, communication, switching solenoid

39. HID, navigation

40. Navigation, navigation, smart ECU.

41. Navigation, navigation, navigation

42. Navigation, navigation, navigation