



Ref: L2CAM01	Knowledge relating to automotive engine and chassis component maintenance	
Unit Content	Assessment Criteria	
<p>a. Typical workplace processes which would require the use of PPE to include:</p> <ul style="list-style-type: none"><li>i. welding</li><li>ii. sanding and grinding</li><li>iii. filling</li><li>iv. panel removal and replacement</li><li>v. drilling</li><li>vi. cutting</li><li>vii. chiselling</li><li>viii. removal of broken glass</li><li>ix. removal of rubber seals from fire damaged vehicles</li><li>x. servicing activities</li></ul> <p>b. PPE required for a range automotive repair activities to include appropriate protection of:</p> <ul style="list-style-type: none"><li>i. eyes – goggles, glasses</li><li>ii. ears – ear defenders</li><li>iii. head – had hats and caps</li><li>iv. skin – protective overalls</li><li>v. feet – steel toe cap boots/shoes</li><li>vi. hands – protective gloves</li><li>vii. lungs- suitable mask for task</li></ul> <p>c. VPE required for a range automotive repair activities to include appropriate protection of:</p> <ul style="list-style-type: none"><li>i. vehicle floor</li><li>ii. seats</li><li>iii. vehicle bodywork</li><li>iv. steering wheel</li></ul>	1.1	
<p>a. Requirement to maintain work area effectively:</p> <ul style="list-style-type: none"><li>i. Cleaning tools and equipment to maximise workplace efficiency</li><li>ii. Requirement to carry out the housekeeping activities safely and in a way that minimises inconvenience to customers and staff</li><li>iii. Risks involved when using solvents and detergents</li><li>iv. Advantages of good housekeeping</li></ul> <p>b. Spillages, leaks and waste materials:</p> <ul style="list-style-type: none"><li>i. Relevance of safe systems of work to the storage and disposal of waste materials.</li><li>ii. Requirement to store and dispose of waste, used materials and debris correctly.</li><li>iii. Safe disposal of special / hazardous waste materials.</li><li>iv. Advantages of recycling waste materials.</li><li>v. Dealing with spillages and leaks</li></ul> <p>c. Economic use of resources:</p> <ul style="list-style-type: none"><li>i. Consumable materials e.g. grease, oils, split pins, locking and fastening devices etc</li></ul>	1.2.	



<ul style="list-style-type: none"><li>d. Routine maintenance of the workplace</li><li>e. Personal responsibilities and limits of their authority with regard to work equipment</li><li>f. Risk assessment of the workplace activities and work equipment to include:<ul style="list-style-type: none"><li>i. Step 1: Identify hazards, i.e. anything that may cause harm</li><li>ii. Step 2: Decide who may be harmed, and how</li><li>iii. Step 3: Assess the risks and take action</li><li>iv. Step 4: Make a record of the findings</li></ul></li><li>g. Workplace person responsible for training and maintenance of workplace equipment</li><li>h. When and why safety equipment must be used</li><li>i. Location of safety equipment</li><li>j. Particular hazards associated with the work area and equipment</li><li>k. Prohibited areas</li><li>l. Plant and machinery that trainees must not use or operate</li><li>m. Why and how faults on unsafe equipment should be reported</li><li>n. Storing tools, equipment and products safely and appropriately</li><li>o. Using the correct PPE</li><li>p. Following manufacturer's recommendations</li><li>q. Location of routine maintenance information e.g. electrical safety check log.</li></ul>	
<ul style="list-style-type: none"><li>a. Legislation relevant to Health and Safety<ul style="list-style-type: none"><li>i. HASAWA 1974</li><li>ii. COSHH</li><li>iii. EPA</li><li>iv. Manual Handling Operations Regulations 1992</li><li>v. PPE Regulations 1992</li></ul></li><li>b. General regulations to include an awareness of:<ul style="list-style-type: none"><li>i. Legislative duties</li><li>ii. The purpose of a Health and Safety Policy</li><li>iii. The relevance of an initial induction to Health and Safety requirements at your workplace</li><li>iv. Workplace procedure to be followed to report Health and Safety matters</li><li>v. Workplace risk assessment</li></ul></li></ul>	1.3
<ul style="list-style-type: none"><li>a. Engine types and configurations:<ul style="list-style-type: none"><li>i. inline</li><li>ii. flat</li><li>iii. vee</li><li>iv. four-stroke cycle and two-stroke cycle for spark ignition and compression ignition engines</li><li>v. naturally aspirated and turbo-charged engines</li><li>vi. hybrid fuel engines</li></ul></li><li>b. Engine components and layouts:<ul style="list-style-type: none"><li>i. single (OHC) and multi camshaft (DOHC)</li><li>ii. single and multi-cylinder (2, 4, 6, 8 cylinder types)</li><li>iii. Cylinder head layout and design, combustion chamber and piston design</li></ul></li></ul>	2.1a



<p>c. The procedures to assess:</p> <ul style="list-style-type: none"><li>i. serviceability</li><li>ii. wear</li><li>iii. condition</li><li>iv. clearances</li><li>v. settings</li><li>vi. fluid systems</li><li>vii. adjustments</li><li>viii. operation and functionality</li><li>ix. security</li></ul> <p>d. Symptoms and faults associated with mechanical engine operation:</p> <ul style="list-style-type: none"><li>i. poor performance</li><li>ii. abnormal or excessive mechanical noise</li><li>iii. erratic running</li><li>iv. low power</li><li>v. exhaust emissions</li><li>vi. abnormal exhaust smoke</li><li>vii. unable to start</li><li>viii. exhaust gas leaks to cooling system</li><li>ix. exhaust gas leaks</li></ul>	
<p>a. Engine lubrication system:</p> <ul style="list-style-type: none"><li>i. splash and pressurised systems</li><li>ii. pumps</li><li>iii. pressure relief valve</li><li>iv. filters</li><li>v. oil ways</li><li>vi. oil coolers</li></ul> <p>b. Terms associated with lubrication and engine oil:</p> <ul style="list-style-type: none"><li>i. full-flow</li><li>ii. hydrodynamic</li><li>iii. boundary</li><li>iv. viscosity</li><li>v. multi-grade</li><li>vi. natural and synthetic oil</li><li>vii. viscosity index</li><li>viii. multi-grade</li></ul> <p>c. The requirements and features of engine oil:</p> <ul style="list-style-type: none"><li>i. operating temperatures</li><li>ii. pressures</li><li>iii. lubricant grades</li><li>iv. viscosity</li><li>v. multi-grade oil</li><li>vi. additives</li><li>vii. detergents</li><li>viii. dispersants</li><li>ix. anti-oxidants inhibitors</li></ul>	<p>2.1b</p>



<ul style="list-style-type: none"><li>x. anti-foaming agents</li><li>xi. anti-wear</li><li>xii. synthetic oils</li><li>xiii. organic oils</li><li>xiv. mineral oils</li></ul> <p>d. Symptoms and faults associated with lubrication systems:</p> <ul style="list-style-type: none"><li>i. excessive oil consumption</li><li>ii. oil leaks</li><li>iii. oil in water</li><li>iv. low or excessive pressure</li><li>v. oil contamination</li></ul> <p>e. The procedures to assess:</p> <ul style="list-style-type: none"><li>i. serviceability</li><li>ii. wear</li><li>iii. condition</li><li>iv. leaks</li><li>v. system pressure</li><li>vi. operation and functionality</li><li>vii. contamination</li><li>viii. common faults</li></ul>	
<p><b>Cooling, Heating and Ventilation (Heating &amp; ventilation Not Applicable for MC)</b></p> <p>a. The components, operating principles, and functions of:</p> <ul style="list-style-type: none"><li>i. engine cooling systems</li><li>ii. internal heater systems</li></ul> <p>b. Procedures used to maintain cooling system components</p> <ul style="list-style-type: none"><li>i. cooling fans and control devices</li><li>ii. header tanks, radiators and pressure caps</li><li>iii. heater matrix's and temperature control systems</li><li>iv. expansion tanks hoses, clips and pipes</li><li>v. thermostats impellers and coolant</li><li>vi. ventilation systems</li></ul> <p>c. Symptoms and faults associated with cooling systems:</p> <ul style="list-style-type: none"><li>i. water leaks</li><li>ii. water in oil</li><li>iii. internal heating system: efficiency, operation, leaks, controls, air filtration, air leaks and contamination</li><li>iv. excessively low or high coolant temperature</li></ul> <p>d. Specialist equipment used to evaluate system performance</p> <ul style="list-style-type: none"><li>i. system pressure testers</li><li>ii. pressure cap testers</li><li>iii. hydrometer, or anti-freeze testing equipment</li><li>iv. chemical tests for the detection of combustion gas</li></ul>	<p>2.1c</p>



<p>e. The procedures used when inspecting</p> <ul style="list-style-type: none"><li>i. serviceability</li><li>ii. wear</li><li>iii. condition</li><li>iv. leaks</li><li>v. system pressure</li><li>vi. operation and functionality</li></ul>	
<p>a. Fuel systems Petrol (use where appropriate)</p> <ul style="list-style-type: none"><li>i. Carburetted systems</li><li>ii. single and multi-point systems and components</li><li>iii. direct and indirect injection systems</li><li>iv. injectors and injector types</li><li>v. injection system components and sensors operation</li><li>vi. fuel filters</li><li>vii. Governors</li></ul> <p>b. Fuel system diesel (use where appropriate)</p> <ul style="list-style-type: none"><li>i. single and multi-point systems and components</li><li>ii. direct and indirect injection systems</li><li>iii. fuel filters and sedimenters</li><li>iv. injector types (direct and indirect injection)</li><li>v. governors</li><li>vi. fuel pipes</li><li>vii. glow plugs</li><li>viii. cold start devices</li></ul> <p>c. Terms associated with hydrocarbon fuels:</p> <ul style="list-style-type: none"><li>i. volatility</li><li>ii. calorific value</li><li>iii. flash point</li><li>iv. octane value</li><li>v. cetane value</li></ul> <p>d. Procedures used to maintain fuel system components</p> <ul style="list-style-type: none"><li>i. Fuel filters</li><li>ii. Injectors</li><li>iii. Fuel pumps</li><li>iv. Fuel lines and clips</li></ul> <p>e. Specialist equipment used to evaluate system performance</p> <ul style="list-style-type: none"><li>i. single and multi-point systems and components</li><li>ii. direct and indirect injection systems</li><li>iii. system pressure testers</li><li>iv. emission testing equipment</li></ul> <p>f. The procedures used when maintaining</p> <ul style="list-style-type: none"><li>i. single and multi-point systems and components</li><li>ii. direct and indirect injection systems</li></ul>	<p>2.1d</p>



<ul style="list-style-type: none"> <li>iii. serviceability</li> <li>iv. wear</li> <li>v. condition</li> <li>vi. leaks</li> <li>vii. system pressure</li> <li>viii. injection pump timing and bleeding the system</li> </ul>	
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<p><b>Ignition systems (if applicable)</b></p> <ul style="list-style-type: none"> <li>a. The layout and operation of electronic ignition systems, advantages over conventional systems (points).</li> <li>b. Electronic ignition circuits and components and engine management systems             <ul style="list-style-type: none"> <li>i. LT Circuit –battery, ignition switch, electronic trigger devices, capacitors</li> <li>ii. HT Circuit - spark plugs (reach, heat range, electrode features and electrode polarity), rotor arm, distributor and distributor cap (if applicable), ignition leads, ignition coil</li> <li>iii. ignition timing advance system</li> </ul> </li> <li>c. The operation electronic system components:             <ul style="list-style-type: none"> <li>i. amplifiers</li> <li>ii. triggering systems</li> <li>iii. inductive pick-ups</li> <li>iv. hall generators</li> <li>v. optical pulse generators</li> <li>vi. control units</li> </ul> </li> <li>d. Terms associated with ignition systems:             <ul style="list-style-type: none"> <li>i. dwell angle, dwell time and dwell variations</li> <li>ii. advance and retard of ignition timing</li> <li>iii. static and dynamic ignition timing</li> <li>iv. closed and open loop systems</li> <li>v. integrated ignition</li> <li>vi. injection systems</li> <li>vii. sensors</li> </ul> </li> <li>e. The procedures used to maintain             <ul style="list-style-type: none"> <li>i. ignition systems</li> <li>ii. engine management</li> <li>iii. sensors</li> </ul> </li> <li>f. Symptoms and faults associated with ignition system operation             <ul style="list-style-type: none"> <li>i. failure to start hot or cold, erratic running, poor performance, misfire, exhaust emissions misfiring and ignition noise (pinking)</li> </ul> </li> </ul>	2.1e
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<p><b>Air supply and exhaust systems</b></p> <ul style="list-style-type: none"> <li>a. The construction and purpose of air filtration systems</li> <li>b. The operating principles of air filtration systems</li> <li>c. The construction and purpose of the exhaust systems</li> </ul>	2.1f
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<ul style="list-style-type: none"><li>d. The location and operating principles of a diesel particulate filter</li><li>e. Exhaust system design to include silencers and catalytic converters</li><li>f. The procedures used when inspecting induction, air filtration and exhaust systems</li> <li>g. Symptoms and faults associated with air and exhaust systems<ul style="list-style-type: none"><li>i. exhaust gas leaks</li><li>ii. air leaks</li></ul></li><li>h. The preparation, testing and use of tools and equipment used for:<ul style="list-style-type: none"><li>i. dismantling</li><li>ii. removal and replacement of engine units and components</li></ul></li> <li>i. The purpose and operation of:<ul style="list-style-type: none"><li>i. Turbo and super chargers</li><li>ii. construction</li><li>iii. use of inter-coolers</li></ul></li> <li>j. Specialist equipment used to evaluate system performance<ul style="list-style-type: none"><li>i. system pressure testers</li><li>ii. emission testing equipment</li></ul></li></ul>	
<p><b>Steering: 4 wheels (Not for M/C)</b></p> <ul style="list-style-type: none"><li>a. The action and purpose of steering geometry:<ul style="list-style-type: none"><li>i. castor angle</li><li>ii. camber angle</li><li>iii. kingpin or swivel pin inclination</li><li>iv. negative offset</li><li>v. wheel alignment (tracking) (toe in and toe out)</li><li>vi. toe out on turns</li><li>vii. steered wheel geometry</li></ul></li> <li>b. The following terms associated with steering:<ul style="list-style-type: none"><li>i. Ackerman principle</li><li>ii. slip angles</li><li>iii. self-aligning torque oversteer and understeer</li><li>iv. neutral steer</li></ul></li> <li>c. The components and layout of hydraulic power steering systems:<ul style="list-style-type: none"><li>i. piston and power cylinders</li><li>ii. drive belts and pumps</li><li>iii. hydraulic valve (rotary, spool and flapper type)</li><li>iv. hydraulic fluid</li><li>v. the advantages of power assisted steering</li><li>vi. the operation of hydraulic power steering</li><li>vii. the principles of electronic power steering systems</li></ul></li> <li>d. The procedures used for inspecting the serviceability and condition of:<ul style="list-style-type: none"><li>i. manual steering</li><li>ii. power steering</li></ul></li></ul>	<p>2.2a</p>

<p>e. Steering system defects to include:</p> <ul style="list-style-type: none"> <li>i. uneven tyre wear</li> <li>ii. wear on outer edge of tyre</li> <li>iii. wear on inner edge of tyre</li> <li>iv. uneven wear</li> <li>v. flats on tread</li> <li>vi. steering vibrations</li> <li>vii. wear in linkage</li> <li>viii. damage linkage</li> <li>ix. incorrect wheel alignment</li> <li>x. incorrect steering geometry</li> </ul> <p><b>Steering: 2 wheels (Not for LV/ HV/ ATV)</b></p> <p>f. The action and purpose of steering geometry:</p> <ul style="list-style-type: none"> <li>i. castor angle</li> <li>ii. rake angle</li> <li>iii. trail angle</li> <li>iv. wheel alignment</li> </ul> <p>g. The following terms associated with steering:</p> <ul style="list-style-type: none"> <li>i. castor angle</li> <li>ii. trail angle</li> <li>iii. rake angle</li> <li>iv. wheel alignment</li> </ul> <p>h. The components and layout of steering systems:</p> <ul style="list-style-type: none"> <li>i. handlebar</li> <li>ii. conventional steering head</li> <li>iii. leading link</li> <li>iv. wishbone linkage</li> <li>v. bearings</li> <li>vi. steering stem</li> <li>vii. yolk</li> </ul> <p>i. The procedures used for inspecting the serviceability and condition of:</p> <ul style="list-style-type: none"> <li>i. conventional steering head</li> <li>ii. leading link</li> <li>iii. wishbone linkage</li> </ul> <p>j. Steering system defects to include:</p> <ul style="list-style-type: none"> <li>i. uneven tyre wear</li> <li>ii. steering vibrations</li> <li>iii. wear in linkage</li> <li>iv. bearing failure</li> <li>v. damage linkage</li> <li>vi. excessive play</li> <li>vii. incorrect fork alignment</li> <li>viii. incorrect steering geometry</li> </ul>	
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<p><b>Suspension: 4 wheels (Not for M/C)</b></p> <p>k. The layout and components of suspension systems:</p> <ul style="list-style-type: none"> <li>i. non-independent suspensions</li> <li>ii. independent front suspension (IFS)</li> <li>iii. independent rear suspension (IRS)</li> <li>iv. hydraulic</li> <li>v. hydro-pneumatic</li> <li>vi. rigid axle types</li> </ul> <p>l. The operation of suspension systems and components:</p> <ul style="list-style-type: none"> <li>i. leaf and coil springs</li> <li>ii. torsion bar</li> <li>iii. rubber springs</li> <li>iv. Macpherson strut system</li> <li>v. hydraulic</li> <li>vi. hydro-pneumatic</li> <li>vii. hydraulic dampers</li> <li>viii. trailing arms</li> <li>ix. wish bones</li> <li>x. ball joints</li> <li>xi. track control arms</li> <li>xii. bump stops</li> <li>xiii. anti-roll bars</li> <li>xiv. stabiliser bars</li> <li>xv. swinging arms</li> <li>xvi. parallel link</li> <li>xvii. swinging half-axles</li> <li>xviii. transverse link</li> <li>xix. semi-swinging arms</li> </ul> <p>m. The advantages of different systems including:</p> <ul style="list-style-type: none"> <li>i. non-independent</li> <li>ii. independent suspension (IFS)</li> <li>iii. independent suspension (IRS)</li> <li>iv. hydraulic</li> <li>v. hydro-pneumatic</li> <li>vi. rigid axle</li> </ul> <p>n. The forces acting on suspension systems during braking, driving and cornering</p> <p>o. The methods of locating the road wheels against braking, driving and cornering forces</p> <p>p. The methods of controlling cornering forces by fitting anti-roll torsion members</p> <p>q. Suspension terms:</p> <ul style="list-style-type: none"> <li>i. Rebound</li> <li>ii. Bump</li> <li>iii. float</li> <li>iv. dive</li> <li>v. pitch</li> </ul>	<p>2.2b</p>
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- vi. roll
- vii. compliance

**The procedures used for inspecting the serviceability and condition of the suspension system**

- r. Suspension system defects:
  - i. wheel hop
  - ii. ride height (unequal and low)
  - iii. wear
  - iv. noises under operation
  - v. fluid leakage
  - vi. excessive travel
  - vii. excessive tyre wear
  - viii. bounce
  - ix. poor vehicle handling
  - x. worn dampers
  - xi. worn joints
  - xii. damaged linkages
  
- Suspension 2 wheels (Not for LV/ HV / ATV)**
- s. The layout and components of suspension systems:
  - i. conventional telescopic fork and tube
  - ii. upside down telescopic fork and tube
  - iii. hossack/Fior (Duolever) fork
  - iv. springer fork
  - v. leading link
  
- t. The operation of suspension systems and components:
  - i. convention telescopic fork and tube
  - ii. upside down telescopic fork and tube
  - iii. hydraulic damper
  - iv. double swinging arm
  - v. single swing arm
  - vi. mono shock
  - vii. adjustable damper
  - viii. adjustable spring
  
- u. The advantages of different systems including:
  - i. convention telescopic fork and tube
  - ii. upside down telescopic fork and tube
  - iii. hydraulic damper
  - iv. double swinging arm
  - v. single swing arm
  - vi. mono shock
  - vii. adjustable damper
  - viii. adjustable spring

- v. The forces acting on suspension systems during braking, riding and cornering
- w. The methods of locating the road wheels against braking, driving and cornering forces



<p>x. Suspension terms:</p> <ul style="list-style-type: none"><li>i. rebound</li><li>ii. bump</li><li>iii. dive</li><li>iv. sag</li></ul> <p><b>The procedures used for inspecting the serviceability and condition of the suspension system</b></p> <p>y. Suspension system defects:</p> <ul style="list-style-type: none"><li>i. wheel hop</li><li>ii. ride height</li><li>iii. wear</li><li>iv. noises under operation</li><li>v. fluid leakage</li><li>vi. excessive travel</li><li>vii. excessive tyre wear</li><li>viii. poor handling</li><li>ix. worn dampers</li><li>x. worn joints</li><li>xi. damaged linkages</li></ul>	
<p><b>Brakes</b></p> <p>a. The construction and operation of drum brakes:</p> <ul style="list-style-type: none"><li>i. leading and trailing shoe construction</li><li>ii. self-servo action</li><li>iii. automatic adjusters</li><li>iv. backing plates</li><li>v. parking brake system</li></ul> <p>b. The construction and operation of disc brakes:</p> <ul style="list-style-type: none"><li>i. disc pads</li><li>ii. caliper</li><li>iii. brake disc</li><li>iv. ventilated disc</li><li>v. disc pad retraction</li><li>vi. parking brake system</li><li>vii. electrical and electronic components</li><li>viii. wear indicators and warning lamps</li></ul> <p>c. The construction and operation of the hydraulic braking system:</p> <ul style="list-style-type: none"><li>i. single and dual line layout</li><li>ii. master cylinders</li><li>iii. wheel cylinders</li><li>iv. disc brake caliper &amp; pistons</li><li>v. brake pipe</li><li>vi. brake servo</li><li>vii. warning lights</li><li>viii. parking brakes</li></ul>	<p>2.2c</p>



<p>ix. equalising valves</p> <p><b>The principles and components of electronic Anti-lock Braking System (ABS) systems, electrical and electronic components.</b></p> <p>d. The requirements and hazards of brake fluid:</p> <ul style="list-style-type: none"><li>i. boiling point</li><li>ii. hygroscopic action</li><li>iii. manufacturer's change periods</li><li>iv. fluid classification and rating</li><li>v. potential to damage paint surfaces</li></ul> <p>e. Terms associated with mechanical and hydraulic braking systems:</p> <ul style="list-style-type: none"><li>i. braking efficiency</li><li>ii. brake fade</li><li>iii. brake balance</li><li>iv. Anti-lock Braking System (ABS)</li></ul> <p><b>The procedures used for inspecting the serviceability and condition of the braking system</b></p> <p>f. Braking system defects:</p> <ul style="list-style-type: none"><li>i. worn shoes or pads</li><li>ii. worn or scored brake surfaces</li><li>iii. abnormal brake noises</li><li>iv. brake judder</li><li>v. fluid contamination of brake surfaces</li><li>vi. fluid leaks</li><li>vii. pulling to one side</li><li>viii. poor braking efficiency</li><li>ix. lack of servo assistance</li><li>x. brake drag</li><li>xi. brake grab</li><li>xii. brake fade</li></ul>	
<p><b>Wheel and Tyres</b></p> <p>a. The construction of different types of tyre:</p> <ul style="list-style-type: none"><li>i. radial</li><li>ii. cross ply</li><li>iii. bias belted</li><li>iv. tread patterns</li><li>v. tyre mixing regulations</li><li>vi. tyre applications</li></ul> <p>b. Tyre markings:</p> <ul style="list-style-type: none"><li>i. tyre and wheel size markings</li><li>ii. speed rating</li><li>iii. direction of rotation</li><li>iv. profile</li><li>v. load rating</li><li>vi. ply rating</li></ul>	<p>2.2d</p>



<ul style="list-style-type: none"><li>vii. tread-wear indicators</li><li>c. Wheel construction:<ul style="list-style-type: none"><li>i. light alloy</li><li>ii. pressed steel and wire wheels</li><li>iii. flat-edge and double hump rims</li></ul></li><li>d. Types of bearing used for wheel bearing arrangements:<ul style="list-style-type: none"><li>i. roller</li><li>ii. taper roller</li><li>iii. needle</li><li>iv. ball and plain</li></ul></li><li>e. The procedures used for inspecting the serviceability and condition of:<ul style="list-style-type: none"><li>i. tyres &amp; wheels</li><li>ii. bearings</li><li>iii. encoded bearings</li></ul></li><li>f. The defects associated with tyres and wheels:<ul style="list-style-type: none"><li>i. abnormal tyre wear</li><li>ii. cuts</li><li>iii. side wall damage</li><li>iv. wheel vibrations</li><li>v. tyre noise (squeal during cornering)</li><li>vi. tyre over heating (low pressure)</li><li>vii. tread separation</li></ul></li></ul>	
<ul style="list-style-type: none"><li>a. Construction and operation of vehicle lighting systems.<ul style="list-style-type: none"><li>i. Battery, wiring, wiring terminals, fuse, switch, relay, lighting bulb</li><li>ii. Selection of appropriate wiring, terminals and fuses</li><li>iii. Soldering procedures for electrical wiring and terminals</li><li>iv. Weather protection and insulation of electrical wiring and terminals</li><li>v. Construction of lighting circuits</li><li>vi. Use and operation of electrical measuring equipment</li><li>vii. Testing of electrical voltage, resistance and current flow using appropriate testing equipment</li></ul></li></ul>	<p>2.3</p>