

This is a comprehensive **Marking Scheme** for the Motor Vehicle Motor Vehicle Engineering Assessment Paper (Pages 2 to 8).



MOTOR VEHICLE ASSESSMENT MARKING SCHEME

SECTION A: (15 Marks)

1. Multiple Choice Questions (10 Marks, 1 Mark Each)

- (i) B – Activate the fire alarm (*Safety protocol dictates raising the alarm before containing the fire*).
- (ii) B – With one hand on the handle and the other on the tip (*Ensures proper control and balanced pressure*).
- (iii) A – Radiator (*Primary heat exchanger essential for cooling efficiency*).
- (iv) B – Prevent wheel lock-up during braking (*Maintains steering control under heavy braking*).
- (v) B – Ignition system (*Steps up battery voltage to spark plug ignition levels*).
- (vi) B – To stop steering vibration (*Corrects weight distribution imbalances*).
- (vii) A – Cleaning terminals (*Prevents corrosion and maintains proper electrical conductivity*).
- (viii) B – Brake pad thickness (*Determines wear level and service life*).
- (ix) B – A hammer and dolly (*Standard tools used in panel beating and sheet metal forming*).
- (x) A – Changing oil and filter (*Core periodic maintenance for the engine lubrication system*).

2. Matching Items (5 Marks, 1 Mark Each)

Column A	Column B (Correct Match)	Description
(i) Threading	C	Creating internal or external screw threads
(ii) ABS Service	A	Preventing wheel lock-up
(iii) Filing	B	Removing material from a workpiece
(iv) Drilling	D	Creating circular holes

(v) Riveting	E	Permanently joining metal plates
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SECTION B: (70 Marks)

Question 3: Workshop Safety & First Aid (Eye Injury)

- **Safety Failure Analysis:** Operating a drilling machine without Personal Protective Equipment (PPE) / safety goggles.
- **First Aid Procedure for Eye Injury:**
 - Do not rub the eye (can cause the metal fragment to scratch the cornea).
 - Flush the eye gently with clean, lukewarm water or sterile eyewash solution for at least 15 minutes.
 - Cover the eye loosely with a sterile gauze pad or clean cloth.
 - Seek immediate medical attention.

Question 4: Spongy Brake Pedal Diagnosis

- **Suspected Hydraulic Components:**
 - **Brake Lines/Hoses:** Air trapped inside the brake fluid lines (requires bleeding).
 - **Master Cylinder:** Faulty internal seals causing internal pressure loss.
 - **Brake Calipers/Wheel Cylinders:** Leaking seals allowing fluid to escape and air to enter.

Question 5: Engine Overheating & Non-Activating Cooling Fan

- **Troubleshooting Steps:**
 1. Check the cooling fan fuse and relay in the fuse box.
 2. Inspect the coolant temperature sensor (CTS) / fan switch functionality.
 3. Verify the fan motor operation by applying direct battery power.
 4. Check the thermostat to see if it is stuck closed, preventing proper circulation.
 5. Inspect the coolant level and check for airlocks within the radiator.

Question 6: High-Speed Vehicle Vibration (above 80 km/h)

- **Determination:** This relates primarily to **Wheel Balancing**.
- **Explanation:**
 - High-speed vibration that is felt through the steering wheel or vehicle body typically indicates an unequal distribution of mass in the wheel/tire assembly (dynamic imbalance).
 - **Wheel Alignment** issues generally cause steering pull to one side or uneven tire wear pattern (e.g., feathering), rather than severe high-speed

vibration.

Question 7: Parasitic Battery Draw Testing

- **Testing Process:**
 1. Ensure the ignition switch is off and all interior lights/doors are shut.
 2. Disconnect the negative battery terminal.
 3. Set a digital multimeter (DMM) to measure **DC Amperes** (start on the 10A setting).
 4. Connect the meter in **series** between the negative battery post and the disconnected terminal wire.
 5. Read the current draw (normal draw is typically under 50mA). If high, pull fuses one by one until the draw drops to isolate the faulty circuit.

Question 8: Fuel-Injected Engine System Service

- **Professional Procedure:**
 1. Relieve the fuel system pressure safely.
 2. Replace the **fuel filter**.
 3. Inspect and test fuel pressure using a fuel pressure gauge to check the fuel pump and pressure regulator.
 4. Perform a fuel injector flush/cleaning to remove carbon deposits.
 5. Inspect and clean the throttle body and mass airflow sensor (MAF).

Question 9: Soft Pedal After Brake Pad Replacement

- **Common Mistakes:**
 - Failure to **pump the brake pedal** several times before driving to reseat the new pads against the discs.
 - Allowing the caliper pistons to retract without checking the master cylinder reservoir level, or inadvertently introducing air into the lines during caliper manipulation.

SECTION C: (15 Marks)

Question 10 (a): EFI System Hard Starting & Rough Idle Analysis

- **Likely Responsible Components:**
 - **Fuel Injectors:** Clogged or leaking nozzles causing incorrect air-fuel mixtures.
 - **Fuel Pump / Pressure Regulator:** Low fuel delivery pressure or leaking regulator diaphragm.
 - **Mass Airflow (MAF) / Manifold Absolute Pressure (MAP) Sensor:** Sending

incorrect airflow signals to the ECU.

Question 10 (b): ABS Light On After Wheel Bearing Replacement

- **Most Likely Cause:** The ABS wheel speed sensor was damaged during installation, or the tone ring/encoder ring on the new bearing was misaligned, dirty, or incorrect for the application.
- **Diagnostic Equipment & Procedure:**
 - **Equipment:** OBD-II Diagnostic Scan Tool with ABS capabilities.
 - **Procedure:** Connect the scanner to retrieve the specific Diagnostic Trouble Code (DTC) pinpointing which wheel sensor is failing. Visually inspect the sensor tip, wiring harness, and tone ring connection. Clean or replace the sensor/bearing accordingly.

Would you like me to adjust the **mark allocation breakdown** for the written questions or format this as a **ready-to-print PDF file**?