higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

AUTOMOTIVE REPAIR AND MAINTENANCE
NQF LEVEL 3

21 November 2024

This marking guideline consists of 6 pages.

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QUESTION 1

1.1
1.1.1 A
1.1.2 D
1.1.3 D
1.1.4 D
1.1.5 B
1.1.6 C
1.1.7 B
1.1.8 A
1.1.9 C

(9 × 1) (9)

1.2
1.2.1 True
1.2.2 True
1.2.3 True
1.2.4 False
1.2.5 True
1.2.6 True

(6 × 1) (6)

1.3
1.3.1 B
1.3.2 C
1.3.3 E
1.3.4 G
1.3.5 H

(5 × 1) (5)
[20]

QUESTION 2

2.1 2.1.1 Independent suspension is created when two wheels in the same axle✓ can move independently✓ of each other, e.g. MacPherson strut✓or (double wishbone/multilink).

2.1.2 Dependent suspension is created when a solid✓ bar or I-beam connect wheels in the same axle and the movement✓ of the wheels affect each other because of the rigid connection, e.g. solid axle suspension/leaf spring suspension.✓

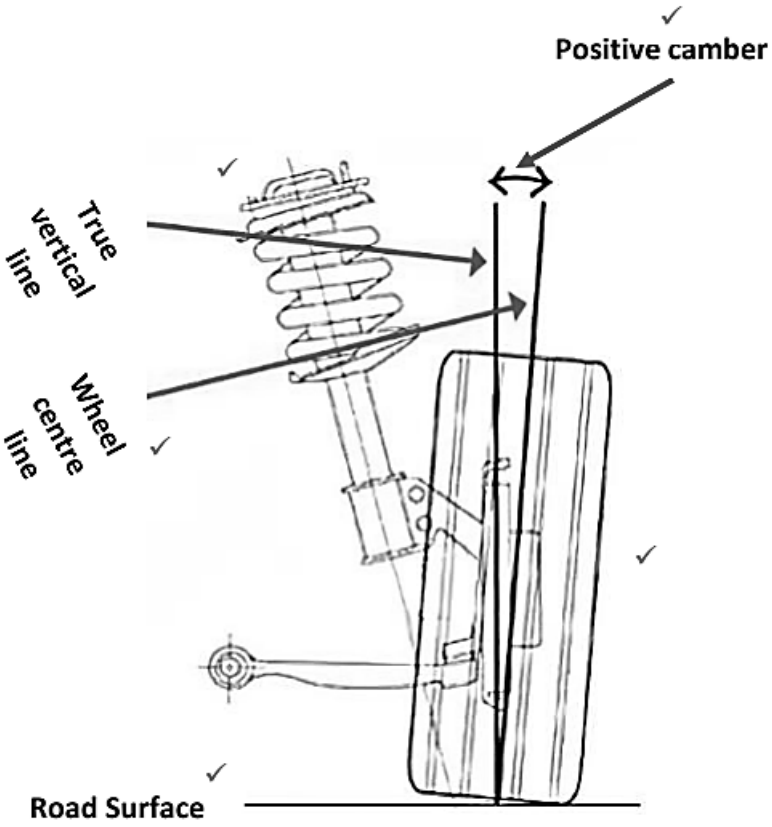
(2 × 3) (6)

2.2
- Check the tyre pressure.
- Check the tyre threads and sidewalls for damage.
- Check the rim for any damages.
- Check for old balancing weights and remove them. (Any relevant 4 × 1) (4)

2.3
- Shaking on the steering wheel
- Vibration through the vehicle body at certain speeds
- Up and down bounce of a tyre
- Premature wear on suspension parts
- Uncomfortable ride
- Abnormal tyre wear (Any 4 × 1) (4)

2.4
- Actual wheel size found on the sidewall of the tyre
- Distance from the balancing machine to the rim
- Tyre width
- Type of tyre – whether a cross-ply or radial-ply tyre
- Type of wheel rim – whether a steel or mag rim (Any 4 × 1) (4)

2.5



(5)
[23]

QUESTION 3

3.1 3.1.1 A stator is a stationary wire winding✓ that converts a magnetic field to electrical current.✓

3.1.2 A rectifier is used to convert alternating current (AC) to direct current (DC)✓ during the charging process.✓

3.1.3 An alternator generates power for electrical systems to charge a battery.✓ A voltage regulator then regulates the power output from the alternator.✓

(3 × 2) (6)

3.2
- Start the engine and let it idle.
- Set the multimeter to a 20 V scale.
- Connect the multimeter and check the reading.
- Note that when revving the engine, the charging voltage should not exceed 14,7 V to 15 V. (4)

3.3
- Battery
- Ignition switch
- Ballast resistor
- Primary ignition coil windings
- Ignition points
- Capacitor (condenser) (Any 4 × 1) (4)

3.4
- Disconnect the cable from the battery's negative terminal and secure it away from the positive terminal.
- Jack up the front of the vehicle and place it on jack stands.
- Remove parts that obstruct access to the starter motor. If the solenoid is mounted on the starter, disconnect the wire.
- Disconnect the battery cable from the starter motor.
- Remove the bolts that hold the starter motor in place and take out the starter motor. (5)

3.5 3.5.1 A: Shift fork mechanism
B: Bendix/Pinion drive (2)

3.5.2 When the current flows through the solenoid,✓ the plunger moves because of magnetic forces generated✓ and pulls the shift lever,✓ which in turn pushes the starter Bendix drive forward✓ to engage with the flywheel ring gear. (4)

[25]

QUESTION 4

4.1
- Seat leakage test
- Back leakage test
- Spray pattern
- Nozzle pressure test
- Opening pressure test
- Sound test (Any 3 × 1) (3)

4.2
- Low engine compression
- Faulty injectors
- Late injection timing
- Injection pump setting – cold-start problem (Any 3 × 1) (3)

4.3
- Due to the high fuel pressure (4 200–5 600 kPa) in the system, never remove components while the engine is running. The diesel fuel will puncture your skin, which could cause blood poisoning.
- Always double check that all fittings are tight before starting the engine.
- Wear safety goggles because if diesel is sprayed into your eyes, it will cause blindness.
- Never attempt to stop a diesel engine by blocking the intake manifold with your hand as there is enough suction for it to cause a serious hand injury. (4)

4.4
- Worn-out compression rings
- Worn or damaged cylinder wall
- Leaking cylinder head gasket
- Leaking or burnt valve
- Loose valve seats (Any 3 × 1) (3)

4.5
- Telescopic gauge
- Bore gauge
- Micrometre
- Vernier calliper
- Dial gauge
- Feeler gauge
- plastigauge (Any 4 × 1) (4)

4.6
- Was the machining work done according to request and specification?
- Are the parts supplied with the reworked components according to the manufacturer specification?
- Is the component clean and free from machine filings or shavings?
- Did the engineering company supply the new sizes and additional parts?
- Did the engineering company coat the components with a rust-preventative substance? (5)

[22]

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QUESTION 5

5.1 To hold vehicle in a stationary position.
To slow down and bring a moving motor vehicle to a stop (any 1) (1)

5.2
- It must maintain viscosity throughout a wide range of temperature variations.
- It must have a high boiling point above the highest operating temperature of the brake system components (±140 °C).
- It must lubricate piston seals and cylinders to reduce wear and friction.
- It must not corrode the metal parts or deteriorate the rubber parts.
- It should be hydroscopic to prevent internal freezing of parts. (Any 3 × 1) (3)

5.3 5.3.1
- Air in the system
- Brake shoes not centred in the drum
- Soft hose (pipe swells like a balloon under pressure)
- Brake drum cracked or worn out (Any THREE)

5.3.2
- Glazed pads
- Dust or metal particles imbedded on lining
- Lining rivets loose
- Wrong type of lining used (Any THREE)

(2 × 3) (6)
[10]

TOTAL: 100

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