higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

AUTOMOTIVE REPAIR AND MAINTENANCE
NQF LEVEL 3

27 November 2023

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 It is a 14,7:1 air to fuel ratio✓ to completely burn the available fuel.✓ (2)

1.2 1.2.1 Temperature coolant sensor
1.2.2 Oxygen (lambda) sensor
1.2.3 Throttle position sensor
(3 × 1) (3)

1.3
- Petrol engines use spark plugs while diesel engines use glow/heater plugs.
- Diesel engine components are durable, strong and rigid compared to petrol.
- During the intake stroke of a carburettor petrol engine the air/fuel mixture is drawn into the cylinder. On a diesel engine only air is drawn into the cylinder.

(Any 2 × 1) (2)

1.4
- Disable the engine
- Remove the spark plug leads or coil pack
- Remove the spark plugs
- Insert the compression tester in the spark plug hole firmly
- Crank the engine and take readings to compare with the manufacturer's specifications (5)

1.5 1.5.1 True
1.5.2 False
1.5.3 True
1.5.4 False
1.5.5 False
1.5.6 True
1.5.7 True
(7 × 1) (7)

1.6 Cetane rating (1)

1.7 It is the clanking, rattling sound✓ caused by ignition lag-time being too long.✓ (2)
[22]

QUESTION 2

2.1
- Pull in test
- Pinion return test
- Load test
- Hold in test
- Check pinion clearance (5)

2.2 2.2.1 Conductor wire windings that rotate✓ in the magnetic field created by the field coil.✓

2.2.2 When current flows through the solenoid coil, the plunger moves and pulls the shift lever,✓ which in turn pushes the pinion gear forward.✓
(2 × 2) (4)

2.3 Converts AC electric energy (power) to DC✓ for an alternator to be able to charge a car battery.✓ (2)

2.4 A – Drive-end frame
B − Rotor
C − Stator
D − Housing (mounting bracket)
E – Rectifier (5)

2.5 2.5.1
- Battery
- Ignition switch
- Ballast resistor
- Ignition points
- Capacitor (condenser) (Any 3 × 1)

2.5.2
- Rotor
- High tension leads (spark plug wires)
- Distributor
- Spark plugs
- Ignition coil (Any 3 × 1)

(2 × 3) (6)

2.6

HOT TYPE	COLD TYPE
• Long heat flow path. • Maintain insulator nose at a temperature high enough to burn oil and carbon deposits.	• Short heat flow path. • Must avoid pre-ignition and burning of firing end.

(Any 2 × 1) (2)

2.7 No,✓ should the insulator of the high tension leads be damaged, it can shock you.✓ (2)

[26]

QUESTION 3

3.1 A – Upper wishbone
B – Upper ball joint
C – Lower ball joint
D – Lower wishbone
E – Shock absorber
F – Coil spring (6)

3.2 Independent✓ double wishbone suspension✓ (2)

3.3
- Caster
- Camber
- Toe in/out
- Toe out on turns
- SAI or KPI (5)

3.4
- Check for rim and tyre damage
- Check tyre lateral and radial runout
- Remove old wheel weights
- Inspect the condition of threads
- Check the size according to the manufacturer's specifications

(Any 4 × 1) (4)

3.5
- Working condition of the equipment
- Protective cover
- Floor mountings
- Electrical connections
- Monitor/screen
- Storage compartment of wheel weights (Any 5 × 1) (5)

[22]

QUESTION 4

4.1
- Brake calliper
- Brake pads
- Brake rotor/disc (Any 2 × 1) (2)

4.2 A brake booster is designed to create a greater braking force from a minimum pedal effort,✓ using differences in atmospheric pressure and engine intake manifold vacuum.✓ (2)

4.3 4.3.1
- Air in the system
- Low brake fluid level
- Broken line/hose or other leak
- Seal or piston damage (Any 2 × 1)

4.3.2
- Air in the system
- Shoes not correctly centred in a drum
- Brake drum cracked (Any 2 × 1)

4.3.3
- Glazed shoes/pads
- Dust or metal particles embedded in lining
- Lining rivets loose
- Wrong type of lining (Any 2 × 1)

(3 × 2) (6)

4.4
4.4.1 J
4.4.2 C
4.4.3 E
4.4.4 G
4.4.5 H
4.4.6 F
4.4.7 B

(7 × 1) (7)

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4.5	4.5.1	Outside tyre shoulder threaded part		
	4.5.2	Middle centre of tyre threaded part		
			(2 × 1)	(2)
4.6	4.6.1	Aluminium alloy		
	4.6.2	Grey cast iron		
			(2 × 1)	(2)
				[21]

QUESTION 5

5.1
- Be careful not to let the fuel spray out, block the fuel lines.
- Consult the workshop manual and manufacturer's specifications when removing electrical connections.
- When draining oil and coolant, use appropriate containers and clean any spillage on the floor.
- Do not use sharp objects to pry components from one another.
- Use a soft-blow rubber mallet to knock off/remove parts.
- Wear appropriate personal protecting equipment. (Any 4 × 1) (4)

5.2	5.2.1	Valve spring lifter/compressor		
	5.2.2	Telescopic bore gauge		
	5.2.3	Outside micrometre		
	5.2.4	Feeler gauge		
	5.2.5	Straight edge and feeler gauge		
			(5 × 1)	(5)
				[9]

TOTAL: 100

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