higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

DIESEL TRADE THEORY N2

27 November 2023

This marking guideline consists of 5 pages

.

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QUESTION 1

1.1	1.1.1	D		
	1.1.2	D		
	1.1.3	B		
	1.1.4	D		
	1.1.5	C		
	1.1.6	D		
			(6 × 1)	(6)
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		
	1.2.7	False		
	1.2.8	True		
	1.2.9	False		
			(9 × 1)	(9)
1.3	1.3.1	B		
	1.3.2	A		
	1.3.3	D		
	1.3.4	C		
	1.3.5	I		
	1.3.6	E		
	1.3.7	F		
			(7 × 1)	(7)
				[22]

QUESTION 2

2.1 When the vehicle takes a turn, the inner wheel turns slower than the outer wheel.✓ This action allows the sun gears to rotate at different speeds.✓ This difference in speed activates the planetary gears to rotate on the cross shaft✓ and also rotate around the sun gears.✓ (4)

2.2 Coil springs, leaf springs and torsion bars (3)

2.3
- The axle shaft carries no mass and only drives the wheels.
- Two bearings set far apart from each other allow the load to be distributed over a large area thus enabling the hub to carry more of the mass.
- The axle can be removed without lifting the vehicle or removing the wheel.
- The vehicle can still be towed on all four wheels, should the axle fracture.

ANY POSSIBLE ANSWER IS ALLOWED. (4)

2.4
- Provides a permanent neutral position
- Provides a means of forward and reversing the vehicle
- Controls the speed and torque of the vehicle in different driving conditions
- Allows the engine torque to be increased in stages
- Different gears increase the leverage that the engine has over the driving shaft

ANY POSSIBLE ANSWER IS ALLOWED. (4)

2.5 Helical gear and spur gear (2)

2.6 To reduce end float, absorb heat, reduce shock (3)
[20]

QUESTION 3

3.1
- Worm and wheel
- Cam and peg
- Screw and nut
- Recirculating ball type
- Rack and pinion (Any 2 × 1) (2)

3.2
- Caster angle
- Camber angle
- Toe in or toe out
- Kingpin or Steering axis inclination angle
- Included angle
- Ackerman angle (Any 5 × 1) (5)

3.3
- Check wheel tracking when vehicles drive straight along.
- Check suspension and steering parts front and rear: ball joints, control arm, bushings, strut mountings and rubbers.
- Check wheel bearings play, check all torsion bar stabiles.
- Check tyres for bulging uneven tyre wear or any damages.
- Spin the wheels and check for bent rims, dragging brakes and loose wheel nuts or lugs.
- Tie-rod ends, steering box play and whether secure on chassis.
- Check kerb mass also curb height and compare with manufacturers' specifications.

ANY POSSIBLE ANSWER IS ALLOWED. (7)

3.4 A – Tie rod end
B – Outer and inner tie rod
C – Rubber boot
D – Steering shaft/pinion
E – Steering rack
F – Locking clip (6)
[20]

QUESTION 4

4.1 4.1.1 A – Piston
B – Connecting rod
C – Inlet/Intake valve
D – Exhaust valve
E – Crankshaft (5)

4.1.2 DIAGRAM 1: Direct injection
DIAGRAM 2: Indirect injection (2)

4.1.3
- Direct injection: fuel is directly injected into the combustion chamber on top of the piston.
- Indirect injection: fuel is injected on a pre-combustion, just before the inlet valve. (4)

4.2
- Atomise the liquid fuel as thoroughly as possible
- Deliver the correct spray pattern
- Inject the atomised fuel with sufficient penetration into the combustion chamber
- Inject the atomised fuel in the direction of the required section of the combustion chamber.

ANY POSSIBLE ANSWER IS ALLOWED. (4)

4.3
- Breaking pressure
- Seat tightness/Dribbling
- Back leakage test
- Spray pattern (4)

4.4 Cetane rating (1)
[20]

QUESTION 5

5.1
- Smoother in operation with less vibration and kickback reactions at the steering when cornering.
- Can operate through a large range of angles.
- Inner CV joint acts like a slip joint.
- CV joints protected from dirt and water by rubber boots.

ANY POSSIBLE ANSWER IS ALLOWED. (3)

5.2 It allows each wheel's brake shoe or pad to receive the same effort, irrespective of the lining. Should any joint or cable break, the emergency handbrake will be partially or completely disabled. (2)

5.3
- It maintains pressure, above atmospheric pressure in the system to prevent air from entering the system.
- It ensures immediate reaction when brakes are applied.
- It prevents leakage of the brake fluid by keeping the washers in the wheel cylinder firmly against the cylinder wall.

ANY POSSIBLE ANSWER IS ALLOWED. (3)

5.4
- Greater heat dissipation. The disc surface is directly exposed to the cooling air stream.
- Cleaner disc surface, centrifugal force flings water and dust/dirt away.
- Simple construction and easy to service.
- Self-adjusting arrangement.

ANY POSSIBLE ANSWER IS ALLOWED. (4)

5.5 5.5.1
- Drum brake
- Brake shoes
- Wheel cylinder piston/plunger

5.5.2
- Brake calliper
- Brake pads
- Brake rotor/disc
- Cylinder
- Piston

(2 × 3) (6)
[18]

TOTAL: 100

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