



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

DIESEL TRADE THEORY N2

30 JULY 2018

This marking guideline consists of 5 pages.

QUESTION 1

- 1.1 A – Single-hole
B – Multihole
C – Pintle
D – Pintaux (4 × 1) (4)
- 1.2 • Break up the stream of injected fuel into minute droplets
• Inject fuel into the compressed air in the combustion chamber with sufficient penetration to form a combustible mixture (2)
- 1.3 • It forms a gastight seal to prevent leakage of pressure during compression and combustion.
• It prevents combustion temperature from reaching the injector unit by conducting the heat away from the injector to the cylinder head and cooling water.
• It provides the correct depth for the injector nozzle in the combustion chamber. (Any 3 × 1) (3)
- 1.4 • Has a longer life
• Is reliable
• Has a lower fire hazard
• Lower fuel consumption
• Less maintenance costs
• No radio interference
• Higher thermal efficiency (Any 6 × 1) (6)
- 1.5 • The inline multi-pumping element type
• The distributor single-element type (DPA pump) (2)
- 1.6 1.6.1 It transfers fuel from the tank ✓ to the fuel inlet connection on the injector pump. ✓ (2)
- 1.6.2 They serve as a heating element ✓ that warms the air in a precombustion chamber to help start a cold diesel engine. ✓ (2)
- 1.6.3 They allow carefully controlled fuel seepage between the injector nozzle and needle to provide lubricants for the sliding pair ✓. The fuel is returned to the tank. ✓ (2)
- [23]**

QUESTION 3

- 3.1 A – Spring eye
B – Centre bolt
C – Rebound clip (3)
- 3.2 3.2.1 • The centre bolt holds the leaves together.
• It locates the leaf spring to the axle. (Any 1 × 1) (1)
- 3.2.2 The swinging shackle allows for the change in length of the leaf spring (1)
- 3.2.3 • Rebound clips keep the leaves in alignment during rebound.
• They distribute the load during rebound and hence protect the main leaf from breaking. (Any 1 × 1) (1)
- 3.3 A – Housing
B – Inner race
C – Clamp
D – Balls
E – Boot
F – Cage (6)
- 3.4 • Smoother operation with less vibration and kickback at the steering wheel
• Can operate through larger range of angles
• Inner CV joints are like slip joints
• Protected from dirt and water by rubber boots (Any 2 × 1) (2)
- [14]**

QUESTION 4

- 4.1 A – Steering gearbox
B – Track rod
C – Steering arm
D – Stub axle
E – Beam axle
F – Ball joints (6)
- 4.2 4.2.1 Camber - outward or inward tilt of the wheel at the top from the vertical
- 4.2.2 Included angle - camber plus kingpin inclination
- 4.2.3 Toe-out on turns - when the inner wheel turns at a sharper angle than the outer wheel as a result of Ackermann's principle (3 × 2) (6)
- [12]**

QUESTION 5

- 5.1 A – Disc brake/brake caliper
 B – Master cylinder
 C – Brake booster/vacuum servo
 D – Brake pedal
 E – Back plate/drum brake
 F – Handbrake compensating mechanism (6)
- 5.2 5.2.1 Component C minimises the driver's effort on the brake pedal.
- 5.2.2 Component F ensures that the same amount of pull is felt on each wheel when the handbrake is applied. (2 × 1) (2)
- 5.3 A – Reservoir /brake fluid
 B – Pushrod/Activator
 C – Piston
 D – Primary cup
 E – Return spring
 F – Check valve (6)
- 5.4 • It keeps pressure in the brake pipes to prevent the entry of air and dirt into the brake system.
 • It keeps the pedal free travel to a minimum.
 • It keeps the wheel cylinder seal lips in light contact with the cylinder bore to avoid entry of air or leakage past the seals.
 • It prevents the re-entry into the master cylinder of fluid pumped into the line during the bleeding operation. (Any 2 × 1) (2)
- [16]**

QUESTION 6

- 6.1 D
 6.2 A
 6.3 C
 6.4 C
 6.5 A
 6.6 C
 6.7 B
 6.8 D
 6.9 B
 6.10 D
- (10 × 1) **[10]**
- TOTAL: 100**