



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

DIESEL TRADE THEORY N2

1 AUGUST 2019

This marking guideline consists of 5 pages.

QUESTION 1

- 1.1 A
- 1.2 B
- 1.3 A
- 1.4 C
- 1.5 C
- 1.6 C
- 1.7 C
- 1.8 C
- 1.9 D
- 1.10 D

(10 × 1) [10]

QUESTION 2

- 2.1
- 1 – Fuel tank
 - 2 – Primary filter /fuel filter
 - 3 – Lift pump
 - 4 – Secondary filter/fuel filter
 - 5 – Priming pump
 - 6 – Injector pump/fuel pump
 - 7 – Injector

(7 × 1) (7)

- 2.2
- More expensive
 - Starting aids often necessary to start the engine
 - Slower acceleration than a petrol engine
 - Heavier than a petrol engine and therefore stronger suspension and mountings must be used
 - Noise and vibration caused by high pressure in combustion chamber

(Any 4 × 1) (4)

- 2.3
- Ignition delay period
 - Flame spread
 - Direct combustion
 - After-burning

(4)

- 2.4
- Carefully dry the injector nozzle.✓ Build up pressure on the tester until 10 bar✓ under injection pressure and examine the nozzle under pressure.✓ It should be dry and free from leakage.✓

(4)

[19]

QUESTION 3

- 3.1 A – Crown wheel
B – Pinion
C – Planetary gear/Spider gear
D – Sun gear/Side-shaft gear
E – Differential housing/casing
F – Cross pin/Cross shaft
(6 × 1) (6)
- 3.2 When a vehicle negotiates a bend or corner the distances travelled by the inner and outer wheels differ.✓ As a result the rolling resistance and the speed of each wheel are different.✓ the inner road wheel has a high resistance and the outer road wheel must speed up.✓ Consequently, the differential housing driven by the engine begins to wind itself around the inner sun wheel.✓ The planet gears are made to rotate and in so doing they also turn the outer sun gear at a faster speed.✓ The same amount of torque is transmitted to each wheel.✓ (6)
- 3.3 • Transmits drive at 90° to the road wheel
• Provides a final gear reduction (2)
- 3.4 • Prevents the pinion from moving in and out under load
• Reduces noise resulting from loose bearings
• Minimises chances of bearing overheating and bearing failure
• Maintains correct tooth contact pattern (Any 3 × 1) (3)
[17]

QUESTION 4

- 4.1 A – Input shaft /Spigot shaft
B – Gear wheel outer cone/Friction cone/synchro cone
C – Selector groove/Groove for selector fork
D – Main shaft/Output shaft
E – Outer sleeve/hub
F – Dog teeth/synchro-ring
(6 × 1) (6)
- 4.2 During the first part of gear engagement, the selector fork moves the complete synchromesh hub towards the selected gear.✓ The first contact is made by the internal cone of the hub and the external cone of the selected gear.✓ The friction between them matches the speed of the hub and the free moving gear in a few moments.✓ Further movement of the gear lever overcomes the detent and slides the sleeve on its splines towards the gear.✓ The splines on the sleeve slide over the dog teeth on the selected gear, locking it to the gear to the output shaft.✓ (5)
- 4.3 Ball bearing
Needle roller bearing
Tapered roller bearing (3)
[14]

QUESTION 5

- 5.1 A – Front universal joint
 B – Front propeller shaft
 C – Centre bearing/Centre bearing hanger/Bracket
 D – Rear propeller shaft
 E – Rear universal joint
 F – Rear axle
(6 × 1) (6)
- 5.2 • To maintain the same torsional circumferential strength per length
 • To reduce vibrations at high revolutions
 • To reduce the risk of sagging and whipping at high speed (Any 2 × 1) (2)
- 5.3 A – Rubber boot
 B – Body/Housing
 C – Needle bearing
 D – Companion flange
 E – Compensating spring
(5 × 1) (5)
- 5.4 • Semifloating axle
 • Three-quarter floating axle
 • Fully floating axle
(3)
- 5.5 A – Rebound clips
 B – Axle assembly/rear axle
 C – Leaf spring
 D – Shock absorber
 E – U-bolts
 F – Swinging shackle
(6 × 1) (6)
[22]

QUESTION 6

- 6.1 A – Brake disc
 B – Brake caliper
 C – Master cylinder
 D – Brake pedal
 E – Drum brake/Back plate
 F – Brake line
(6 × 1) (6)
- 6.2 • Better heat dissipation
 • Cleaner disc surface
 • Simple construction and easy to service
 • Self-adjusting
(4)
- 6.3 Make sure that you have sufficient brake fluid and ensure that the brakes are adjusted correctly.✓ Determine if the master cylinder is fitted with a return valve. If the master is fitted with a bleeding nipple, air must first be bled from the master cylinder.✓ Connect a bleeding pipe to the bleeding nipple furthest from the master cylinder with the free end of the pipe immersed in a glass jar filled with brake fluid.✓ When a return valve is fitted to the master cylinder the bleeding nipple is opened and the brake pedal is repeatedly applied and released slowly until no air bubbles are discharged through the bleeding pipe.✓ The bleeding nipple is then closed with the brake pedal in the applied position.✓ When no return valve is fitted the brake pedal is first applied and only then is the nipple opened. The bleeding nipple is again closed before the brake pedal is released✓. The procedure is repeated until no air bubbles are discharged through the bleeding pipe.✓ Repeat the procedure as you work your way closer to the brake master cylinder.✓
(Any relevant 8 × 1) (8)
- TOTAL: 100**
- [18]**