



**higher education  
& training**

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

# **MARKING GUIDELINE**

**NATIONAL CERTIFICATE**

**DIESEL TRADE THEORY N2**

**30 July 2021**

**This marking guideline consists of 6 pages.**

**SECTION A****QUESTION 1**

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

(10 × 1) [10]

**QUESTION 2**

- 2.1 True
- 2.2 True
- 2.3 False
- 2.4 True
- 2.5 False

(5 × 1) [5]

**QUESTION 3**

- 3.1
  - It provides a permanent gear reduction, that is gearing-down the engine speed so that the top gear may be used for cruising speeds.
  - An increase in the torque on the drive shafts or half shaft is obtained by this gear reduction.
  - It provides drive from the prop shaft through a right angle (90°) to drive the shaft.(2)
- 3.2 The purpose of the slip joint is to allow the change in distances between the gearbox and the rear axle. (2)
- 3.3
  - Pinion gear
  - Crown wheel
  - Differential carrier
  - Differential housing(Any 2 × 1) (2)
- 3.4 A dead axle (non-powered axle) only supports the mass of the vehicle✓ e.g.: A trailer axle, caravan axle.✓ A live axle is a driven axle that contains the driving gears✓ and supports the mass of a vehicle, e.g.: rear axle for rear-wheel drive vehicles.✓ (4)

- 3.5      A – side gear.  
             B – thrust washer.  
             C – planet gear.  
             D – pinion gear.  
             E – shim.  
             F – crown wheel.  
             G – casing.  
             H – bearing.  
             I – cross shaft.  
             J – locking pin/cross pin. (10)
- [20]**

**QUESTION 4**

- 4.1      The gears are quieter in operation, ✓ they are stronger than spur gears with the same teeth module. ✓ (2)
- 4.2
  - Input shaft, cluster shaft gear
  - Third gear
  - Synchro cone, synchro hub
  - Output shaft /main shaft(4)
- 4.3
  - Gear lever
  - Gear (selector) fork
  - Shift/selector rod(3)
- 4.4      4.4.1      Baulk ring synchromesh unit (1)
- 4.4.2      A – insert or shift plate.  
                         B – outer sleeve.  
                         C – synchroniser blocking ring (internal teeth).  
                         D – gear dog teeth.  
                         E – gear on output shaft.  
                         F – insert spring (circlip).  
                         G – inner hub.  
                         H – external cone surface.  
                         I – selector fork groove.  
                         J – input gear (10 × 1)      (10)
- [20]**

**QUESTION 5**

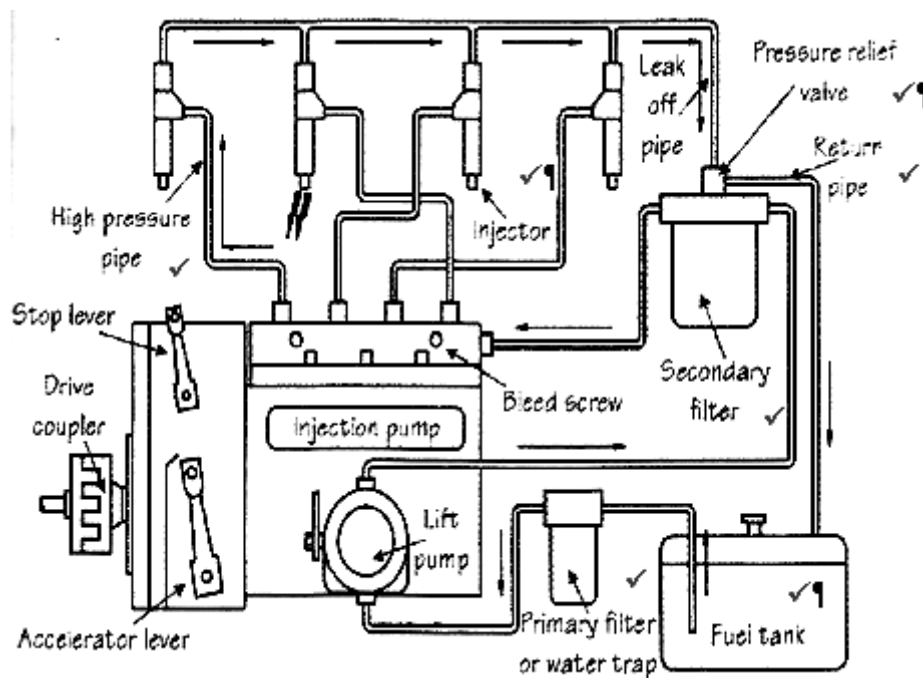
5.1 5.1.1 Engine speed is regulated by an engine governor. The accelerator pedal is linked to the governor, not to the fuel rack. Power and speed are controlled by regulating the fuel supply.

5.1.2 Engine speed is regulated by the accelerator pedal connected directly to the fuel system supply. Power and speed are controlled by regulating air supply.

(2 × 2)

(4)

5.2



ONE mark for a neat sketch

(8)

- 5.3
- Single-hole nozzle
  - Multi-hole nozzle
  - Pintle nozzle
  - Pintaux nozzle

(4)

5.4 To precisely inject and atomise the correct amount of fuel into the combustion chamber at the correct instant according to the engine operating cycle.

(2)

5.5 Swirling or turbulence is achieved by a special design inlet valve, which has a mask or shroud deflection plate on its head. Alternatively, a special design of the inlet ports which can be machined as inclined, tapered or tangential.

(2)

**[20]**

**QUESTION 6**

- 6.1
- Brake shoe and brake linings
  - Returning spring and clips
  - Brake adjuster
  - Backing plate
  - Brake drum
  - Wheel cylinder
- (Any 2 × 1) (2)
- 6.2 The purpose of the compensator is to allow each wheel actuator to receive an equal pull force, irrespective of lining, joint or cable wear. (2)
- 6.3
- Brake fluid must not corrode metal parts or deteriorate rubber parts.
  - It must maintain even viscosity throughout a wide temperature variation and must not freeze on extremely cold temperatures.
  - The boiling point of brake fluid must be above highest operating temperature of the brake system parts ( $\pm 140^{\circ}\text{C}$ ).
  - It must lubricate pistons, seals and cylinder to reduce wear and friction.
- (4)
- 6.4
- 6.4.1
- Air in the system.
  - Shoes not centered in the drum.
  - Hose pipe (soft) swelling like a balloon under pressure.
  - Leak in a brake hose.
  - Brake drums cracked, worn or too thin.
- 6.4.2
- Glazed shoe and/or pads.
  - Dust or metal particles imbedded in lining.
  - Lining rivets loose.
  - Wrong type of lining.
- 6.4.3
- Incorrect brake lining.
  - Master or wheel cylinder frozen or seized.
  - Bad power brake booster.
  - Low brake fluid.
  - Linings contaminated with grease or oil.
- 6.4.4
- Parking brake cable frozen.
  - Parking brake linkage needs lubrication.
  - Broken parking brake mechanism.
- (Any 4 × 2) (8)
- 6.5
- 6.5.1
- Master cylinder transforms applied brake force into hydraulic pressure which is transferred to the wheels.
  - 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)

- 6.5.2      A – Disc brake/rotor  
              B – Brake pads  
              C – Brake calliper  
              D – Master cylinder  
              E – Brake booster  
              F – Brake pedal  
              G – Drum brake

(7 × 1)      (7)  
                  **[25]**

**TOTAL:      100**