higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

DIESEL TRADE THEORY N2

(11040192)

25 November 2024 (X-paper)
09:00–12:00

Drawing instruments may be used.

This question paper consists of 8 pages.

092Q1E2425

Copyright reserved

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
DIESEL TRADE THEORY N2
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Use only a black or blue pen.
5. Write neatly and legibly.

Copyright reserved

QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question number (1.1.1–1.1.6) in the ANSWER BOOK.

1.1.1 … smoke from a diesel's engine's exhaust generally indicates too much fuel is injected into the engine.

A Green
B Blue
C Grey
D Black

1.1.2 A … is a type of axle whereby a shaft can be removed without removing the wheel.

A full-floating
B three quarter floating
C quarter floating
D semi floating

1.1.3 The boiling point of a diesel fuel is in the range of …

A 70 °C to 100 °C
B 25 °C to 135 °C
C 150 °C to 200 °C
D 230 °C to 375 °C

1.1.4 … is when balance weights are evenly and equally distributed about axis of rotation in a single plane, so that wheel may come to rest in any position.

A Dynamic balancing
B Static balancing
C Imbalance
D Stick on wheel weight

1.1.5 Tracking refers to …

A alignment of front wheels with one another
B alignment of rear wheels with one another
C alignment of direction of two front wheels in relation to the two-rear wheel
D front axle

1.1.6 The main purpose of an engine's air filter is that it …

A controls the engine's air intake volume
B reduces the engine's air intake noise.
C prevents air from entering combustion chamber
D prevents dust and other foreign matter from entering the engine

(6 × 1) (6)

1.2 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.2.1–1.2.9) in the ANSWER BOOK.

1.2.1 In terms of the law all tyres must be replaced if less than one millimetre of tyre tread is measured over the total width of the tyre.

1.2.2 Master cylinder converts foot-pedal force to hydraulic pressure within brake system pipes.

1.2.3 Steering Axis Inclination angle (SAI), assist with the directional stability of a vehicle.

1.2.4 Wheel alignment indicate the correct adjustment of the pinion depth and differential carrier bearings.

1.2.5 Judder when braking is a symptom cause as a result of brake disc runout.

1.2.6 A correct tooth contact pattern between the pinion gear teeth and crown wheel gear teeth, is one located at the centre line of gear teeth.

1.2.7 Universal joint turns at a constant speed, it is smooth in operation with less vibration and kick back to the steering.

1.2.8 A collapsible spacer is a device for pre-loading a pinion bearing, and it cannot be re-used.

1.2.9 Coil springs are firmly fixed at the front end of the spring by a shackle pin or bolt to the chassis frame.

(9 × 1) (9)

Copyright reserved

1.3 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–I) next to the question number (1.3.1–1.3.7) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.3.1	Provide a smooth ride	A	brake calliper
1.3.2	A brake system part found only in a disc brake	B	shock absorber
1.3.3	A small space between crankshaft and bearing which allow thin film of oil to lubricate the surfaces	C	back leakage
1.3.4	Wear between needle valve and its holder allowing fuel to leak back into injector body	D	oil clearance
1.3.5	Fuel is injected into the combustion chamber above the piston in a cylinder	E	synchroniser
1.3.6	It synchronises the speed of gear prior to selection	F	interlock mechanism
1.3.7	Prevent TWO gears engaging at the same time	G	seat tightness
		H	indirect injection
		I	direct injection

(7 × 1) (7)

[22]

QUESTION 2

2.1 State TWO functions for each of the following:

2.1.1 Final drive assembly

2.1.2 Differential

(2 × 2) (4)

2.2 Sketch FIVE diagrams to distinguish the tooth contact patterns of a crown and pinion. (5 × 2) (10)

2.3 List any TWO suspension system components. (2)

2.4 State difference between *CV joint* and *universal joint*. (2)

2.5 How many CV joint to be fitted in a front wheel drive vehicle with a trans-axle? (1)

2.6 State ONE function of the slip joint on a prop shaft. (1)

[20]

Copyright reserved

QUESTION 3

3.1 List TWO types of steering boxes used on modern vehicles. (2)

3.2 List FIVE fundamental angles on wheel alignment. (5)

3.3 State SIX preliminary checks before wheel alignment can be checked or adjusted. (6)

3.4 FIGURE 1 below shows a diagram of a steering. Study the diagram and answer the questions that follow.

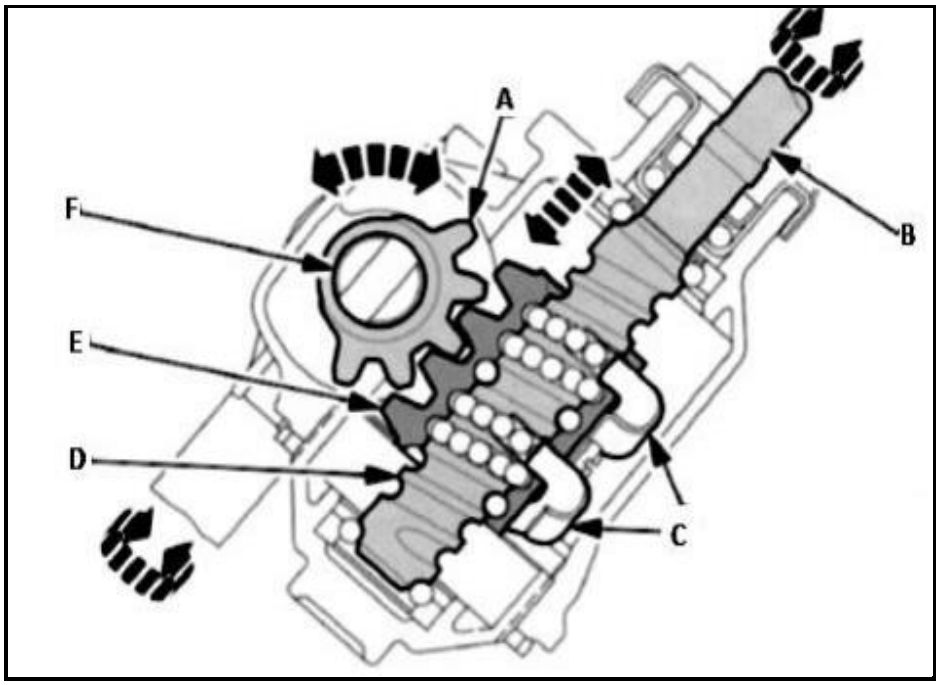


FIGURE 1

3.4.1 Name the parts indicated in the diagram by writing only the answer next to the letters (A–F) in the ANSWER BOOK. (6)

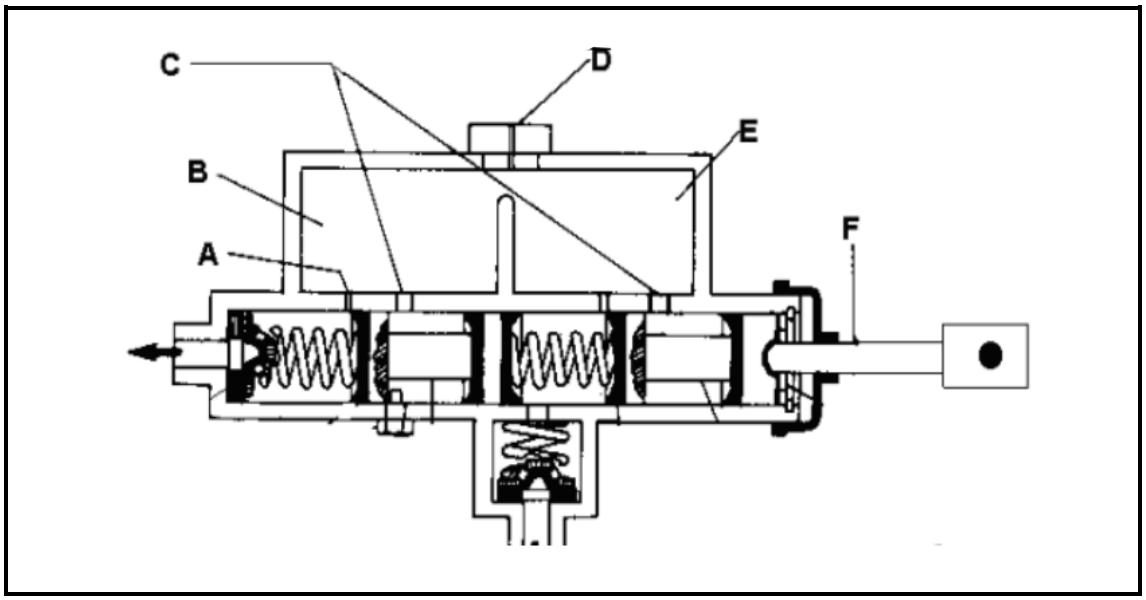
3.4.2 Identify the type of steering box shown in FIGURE 1 below. (1)

[20]

QUESTION 4

4.1 State the function of the brake booster in hydraulic brake system. (2)

4.2 FIGURE 2 below shows a diagram of a tandem master cylinder. Name the parts indicated by writing the answers next to the letters (A–F) in the ANSWER BOOK.



(6)

FIGURE 2

4.3 Explain TWO reasons for each of the following brake problems:

4.3.1 Spongy brake

4.3.2 Braking pulling to one side

4.3.3 Hard brake, but poor braking

(3 × 2) (6)

4.4 List TWO types of brake shoe arrangement used in a motor vehicle. (2)

4.5 What is meant by the term *hygroscopic* when referring to brake fluid? (2)

[18]

QUESTION 5

5.1 Sketch a diagram of a diesel fuel system and indicate the position of the following components in the correct sequence: fuel tank, fuel lift pump, fuel filter, injection pump, and injector. (6)

5.2 Explain the operation of a glow plug. (2)

5.3 State TWO functions of an injector in a diesel engine. (2)

5.4 State TWO methods used to improve turbulence or swirling motion of air during intake stroke. (2)

5.5 Arrange the following parts in the correct sequence, to indicate power flow through a 5-speed gearbox, when third gear is selected:

Third gear, main shaft, cluster gear, input shaft, synchro hub, synchro sleeve. (6)

5.6 List TWO types of gears used in a conventional synchromesh gearbox. (2)

[20]

TOTAL: 100

Copyright reserved