higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T440**(E)**(A4)T

NATIONAL CERTIFICATE

DIESEL TRADE THEORY N2

(11040192)

4 April 2018 (X-Paper)
09:00–12:00

This question paper consists of 8 pages.

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. Start each question on a page.
5. Write neatly and legibly.

QUESTION 1

1.1 FIGURE1 shows a suspension system used on a truck.

Label items (A–F) in your ANSWER BOOK.

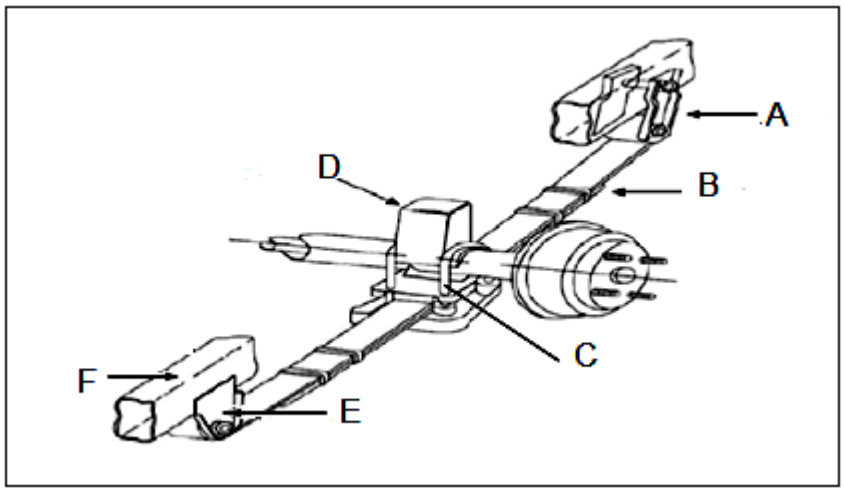


FIGURE 1

(6)

1.2 List THREE advantages of the suspension system shown in FIGURE 1 (3)

1.3 Give THREE functions of hydraulic dampers. (3)

1.4 List THREE reasons for excessive tyre wear on a heavy motor vehicle. (3)

1.5 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.5.1–1.5.5) in the ANSWER BOOK.

1.5.1 The input shaft gear is in constant mesh with the cluster gear.

1.5.2 During gear selection the synchroniser brass ring is moved over a conical surface towards the dog teeth of the selected gear.

1.5.3 Direct power flow does not occur via the cluster gear.

1.5.4 The reverse idler gear does not change the direction of rotation.

1.5.5 When brakes are applied on a heavy vehicle the differential tilts upward.

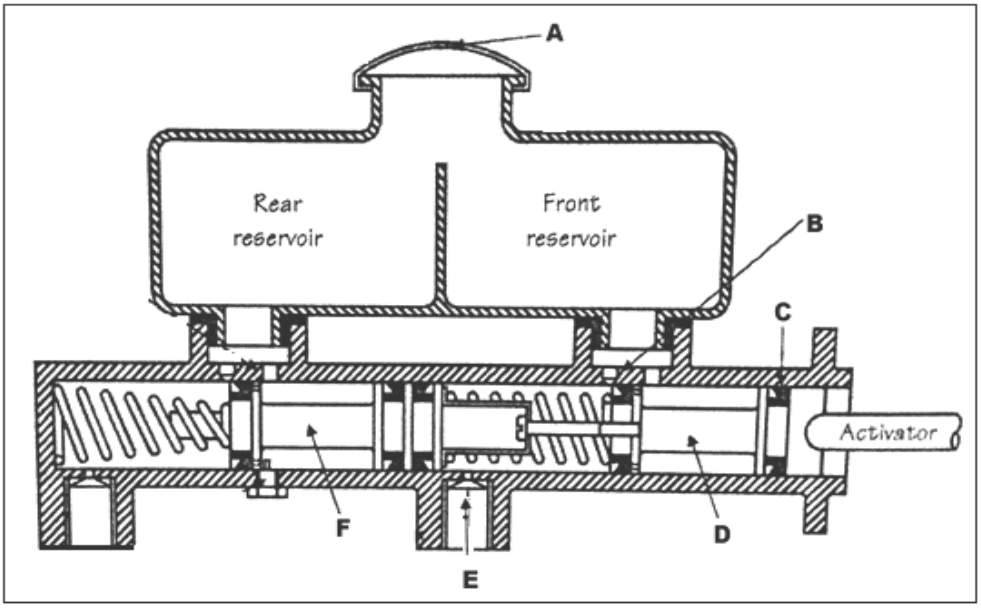
(5 × 1) (5)

[20]

QUESTION 2

2.1 FIGURE 2 shows a brake master cylinder.

Label items (A–F) in your ANSWER BOOK.



(6)

FIGURE 2

2.2 Explain the operation of the master cylinder when brakes are applied. (5)

2.3 List FIVE good characteristics of a brake fluid. (5)

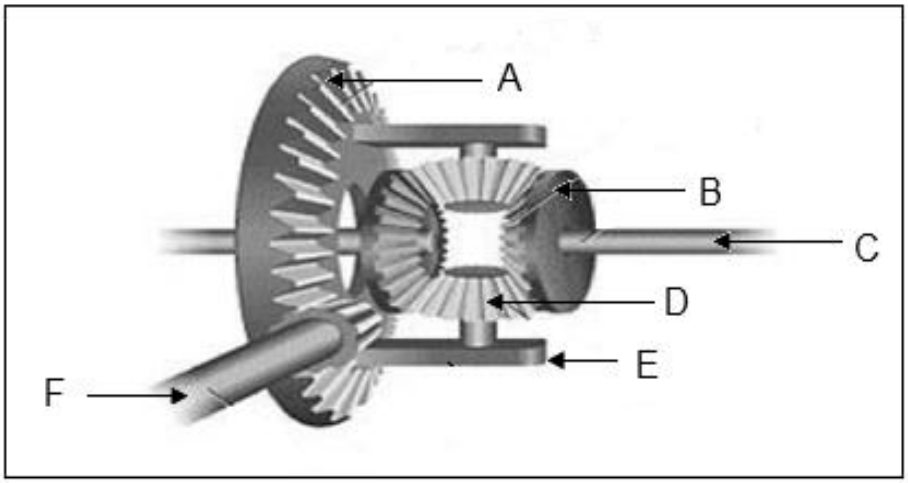
2.4 Give FOUR advantages of disc brakes. (4)

[20]

QUESTION 3

3.1 FIGURE 3 shows a rear differential assembly.

Label items (A–F) in your ANSWER BOOK.



(6)

FIGURE 3

3.2 State TWO functions of a final drive unit. (2)

3.3 Name FIVE types of final drive gears used in the rear differential assembly. (5)

3.4 Give ONE disadvantage of the conventional rear differential assembly. (1)

3.5 Choose a description from COLUMN B that matches a term in COLUMN A. Write only the letter (A–G) next to the question number (3.5.1–3.5.6) in the ANSWER BOOK.

COLUMN A		COLUMN B	
3.5.1	Locking gearbox mechanism	A	selector rod bent
3.5.2	Interlocking mechanism	B	prevents gears from jumping out
3.5.3	Helical gear	C	prevents two gears from being selected at the same time
3.5.4	Gears grating when being selected	D	changes direction of rotation
3.5.5	Reverse idler gear	E	greater contact surface area on the gear teeth
3.5.6	Gearbox stuck in gear	F	gearbox oil low
		G	noisier than spur gears

(6 × 1) (6)
[20]

QUESTION 4

4.1 State THREE functions of a good steering system. (3)

4.2 Give THREE reasons why correct wheel alignment is important. (3)

4.3 Explain the following wheel balancing terms:

4.3.1 Static balance (2)

4.3.2 Dynamic balance (2)

4.4 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (4.4.1–4.4.10) in the ANSWER BOOK.

4.4.1 A diesel injector pump is mechanically powered by the …

A injectors.
B transformers.
C transmission.
D engine.

4.4.2 A transfer pump is normally mounted on the side of the … pump.

A vacuum
B accelerator
C converter
D injector

4.4.3 … smoke from a diesel exhaust generally indicates too much fuel being injected into the engine.

A Green
B Blue
C Grey
D Black

4.4.4 Speed variation of a universal joint is the greatest when the shafts are at an angle of …

A 10°.
B 20°.
C 30°.
D 40°.

4.4.5 The type of axle from which the axle shaft can be removed without removing the wheel:

A Semi-floating
B Three-quarter-floating
C Quarter-floating
D Full-floating

4.4.6 An axle that delivers no power to the wheels is called a … axle.

A steering
B dead
C suspension
D tandem

4.4.7 The boiling point of diesel fuel may be in the range of …

A 70 °C to 100 °C.
B 125 °C to 135 °C.
C 150 °C to 200 °C.
D 230 °C to 375 °C.

4.4.8 The king pin inclination is usually …

A less than ½°.
B between 1° and 2°.
C between 2° and 5°.
D above 7°.

4.4.9 When the slip angle is greater at the rear than at the front the vehicle tends to …

A oversteer.
B understeer.
C increase the toe-out on turns.
D decrease the toe-out on turns.

4.4.10 The primary purpose of a shock absorber:

A Limiting spring compression
B Regulating spring rebound
C Acting as a helper spring
D Providing a comfortable ride

(10 × 1) (10)
[20]

QUESTION 5

5.1 FIGURE 4 shows the layout of a diesel fuel system.
Label items (A–F) in your ANSWER BOOK.

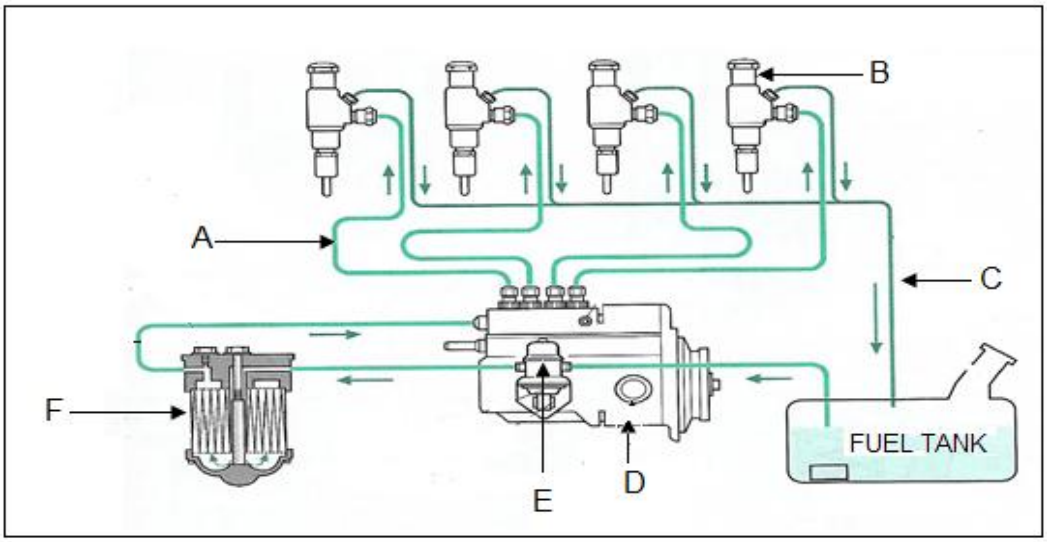


FIGURE 4 (6)

5.2 Explain the operation of item 'B' in FIGURE 4. (5)

5.3 State TWO functions of item 'B' in FIGURE 4. (2)

5.4 List THREE functions of a copper washer situated between the injector and the cylinder head. (3)

5.5 Give TWO possible causes of the following injector faults:

5.5.1 Excessive leak-off

5.5.2 Injector nozzle blew off.

(2 × 2) (4)
[20]

TOTAL: 100