higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T440**(E)**(A3)T

NATIONAL CERTIFICATE

DIESEL TRADE THEORY N2

(11040192)

3 April 2019 (X-Paper)
09:00–12:00

This question paper consists of 10 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. Use only BLUE or BLACK ink.
5. Write neatly and legibly.

QUESTION 1

1.1 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 (1.1.1–1.1.10) in the ANSWER BOOK.

1.1.1 Which ONE of the following symptoms is caused as a result of brake disc run-out?

A Ineffectiveness of the brakes
B Rapid wearing of the brake pads
C Localised wearing of the brake pads
D Judder during braking

1.1.2 The torque available at the contact between the driving wheels and the road is known as … effort.

A tractive
B brake
C clutch
D None of the abovementioned

1.1.3 Incorrect steering axis inclination (S.A.I.) causes …

A the vehicle to pull to the side of lesser inclination.
B a tendency to assume toe-out orientation.
C poor recovery of the steering wheel after making a turn.
D generation of a braking effect at tight corners.

1.1.4 The vehicle ride will be more comfortable if the …

A vehicle mass is kept to the minimum.
B sprang mass is kept to the minimum.
C unsprung mass is kept to the minimum.
D All the abovementioned

1.1.5 The cetane rating of diesel fuel is in the order of:

A 45
B 25
C 60
D 70

1.1.6 The compression ratio for diesel engines usually lies in the range of:

A 6–10
B 10–15
C 15–25
D 25–40

1.1.7 The main function of the brake fluid is …

A lubrication.
B power transmission.
C cooling.
D None of the abovementioned

1.1.8 The basic characteristic(s) of a brake fluid is/are …

A a high boiling point.
B low viscosity.
C compatibility with rubber and metal parts.
D ALL the abovementioned

1.1.9 The main feature of the MacPherson strut suspension is that the …

A vertical size of the suspension can be made more compact.
B non-vertical external forces are supported by the suspension arms.
C unsprung mass is lighter.
D assembly is slightly more complicated in design.

1.1.10 When turning a corner the …

A front wheels are toeing out.
B front wheels are turning on different angles.
C inside front wheel has a greater angle than the outside front wheel.
D ALL the abovementioned

(10 × 1) (10)

1.2 FIGURE 1 shows a diagram of the steering geometry. Name the components indicated by writing only the answer next to the letter (A–F) in the ANSWER BOOK.

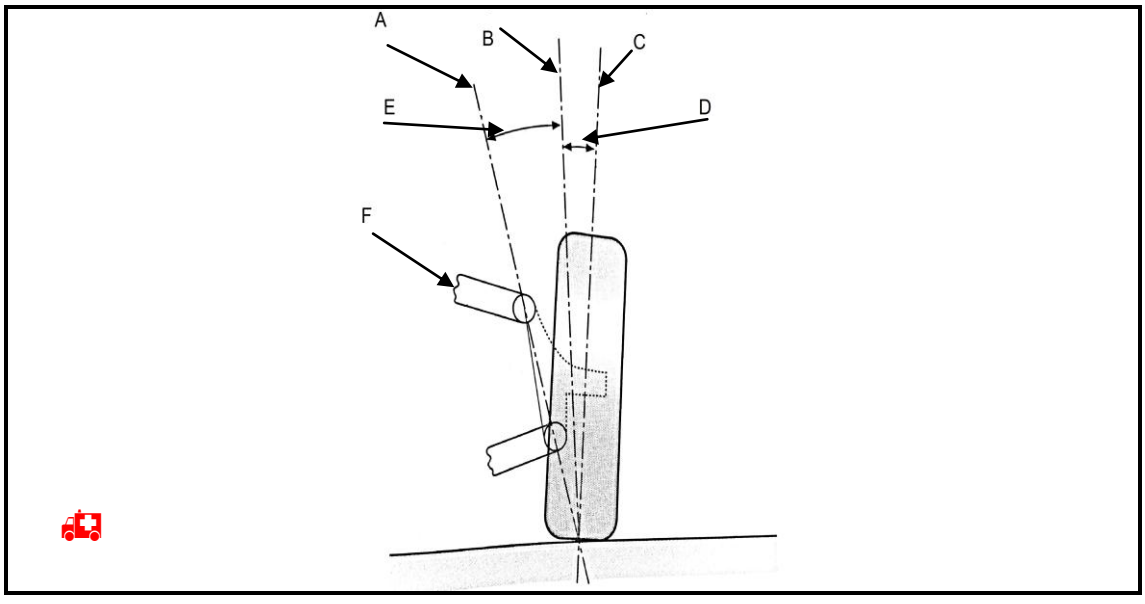

FIGURE 1 (6)

1.3 Explain the following steering geometry terms:

1.3.1 Camber

1.3.2 Included angle

1.3.3 Toe-out on turns

(3 × 2) (6)
[22]

QUESTION 2

2.1 Name FOUR types of diesel fuel injector nozzles used on diesel engines. (4)

2.2 State TWO functions of diesel fuel injectors. (2)

2.3 Give THREE reasons why a copper washer is fitted between the injector tip and the cylinder head on a diesel engine. (3)

2.4 State FOUR advantages of a diesel engine as compared to a petrol engine. (4)

2.5 Name TWO basic types of injector pumps used on diesel engines. (2)

2.6 State ONE purpose of each of the following diesel fuel system components:

2.6.1 Lift pump

2.6.2 Glow plugs

2.6.3 Leak-off pipes

(3 × 1) (3)

2.7 FIGURE 2 shows a diagram of a diesel fuel system used on a vehicle. Name the components indicated by writing only the answer next to the letter (A–E) in the ANSWER BOOK.

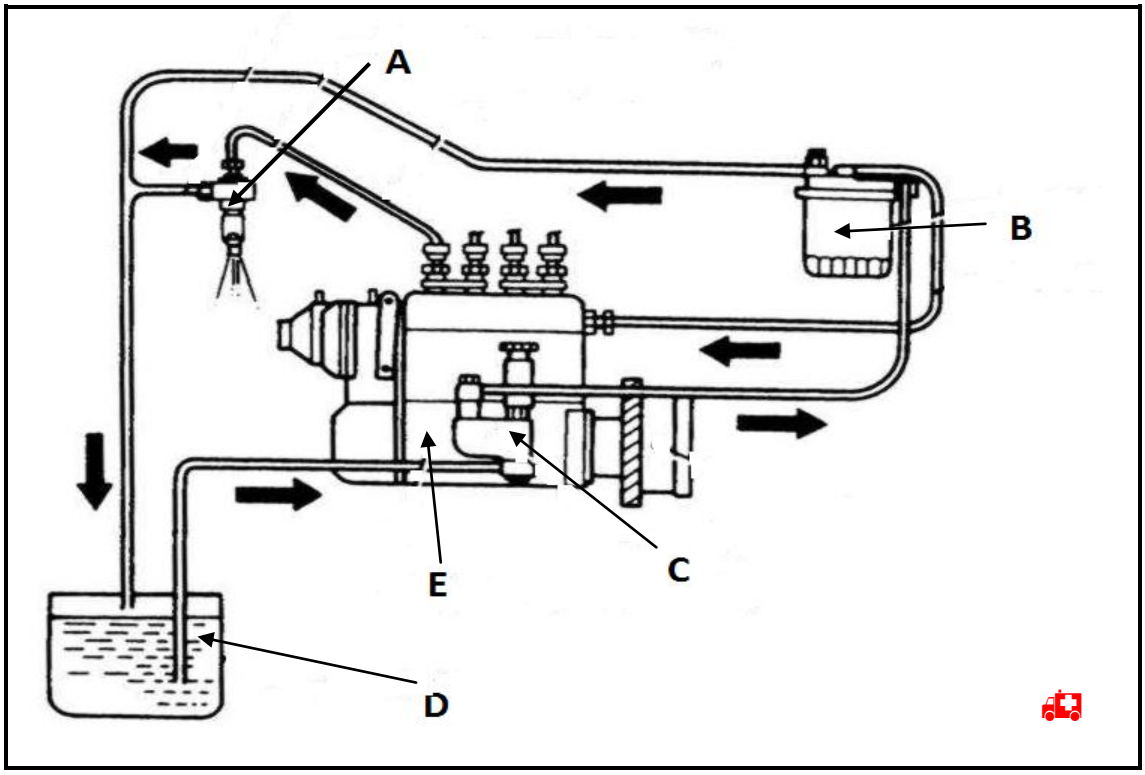

FIGURE 2

(5)
[23]

QUESTION 3

3.1 Choose a description from COLUMN B that matches an item in COLUMN A. Write only the letter (A–F) next to the question number (3.1.1–3.1.6) in the ANSWER BOOK.

COLUMN A		COLUMN B	
3.1.1	Shift forks	A	holds transmission in gear
3.1.2	Shift linkage	B	fit into grooves cut in outside of synchro collar
3.1.3	Detent mechanism	C	internal shift rail or external rod
3.1.4	Spring tension	D	various patterns for different transmissions
3.1.5	Interlock mechanism	E	holds detent balls into detent notches in shift rail
3.1.6	Shift patterns	F	prevents selection of two gears at once

(6 × 1) (6)

3.2 FIGURE 3 shows a diagram of a propeller shaft assembly used on a vehicle. Name the parts indicated by writing only the answer next to the letter (A–F) in the ANSWER BOOK.

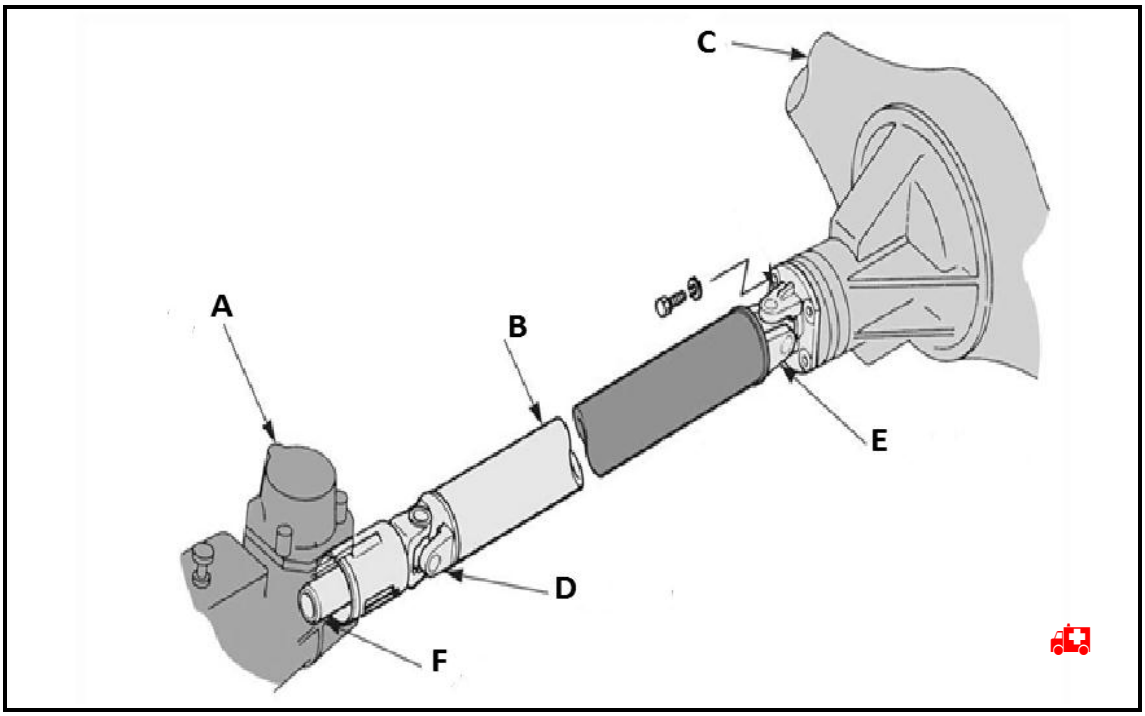

FIGURE 3 (6)

3.3 State ONE function of EACH of the following components:

3.3.1 Slip joint

3.3.2 Hooke's type universal joint

(2 × 1) (2)

3.4 Give TWO reasons why a divided Hotchkiss is used on heavy vehicles. (2)

3.5 Give TWO reasons for the use of a differential unit. (2)

3.6 FIGURE 4 shows a diagram of a 1–2 synchronising unit used on a four-speed gearbox. Name the parts indicated by writing only the answer next to the letter (A–E) in the ANSWER BOOK.

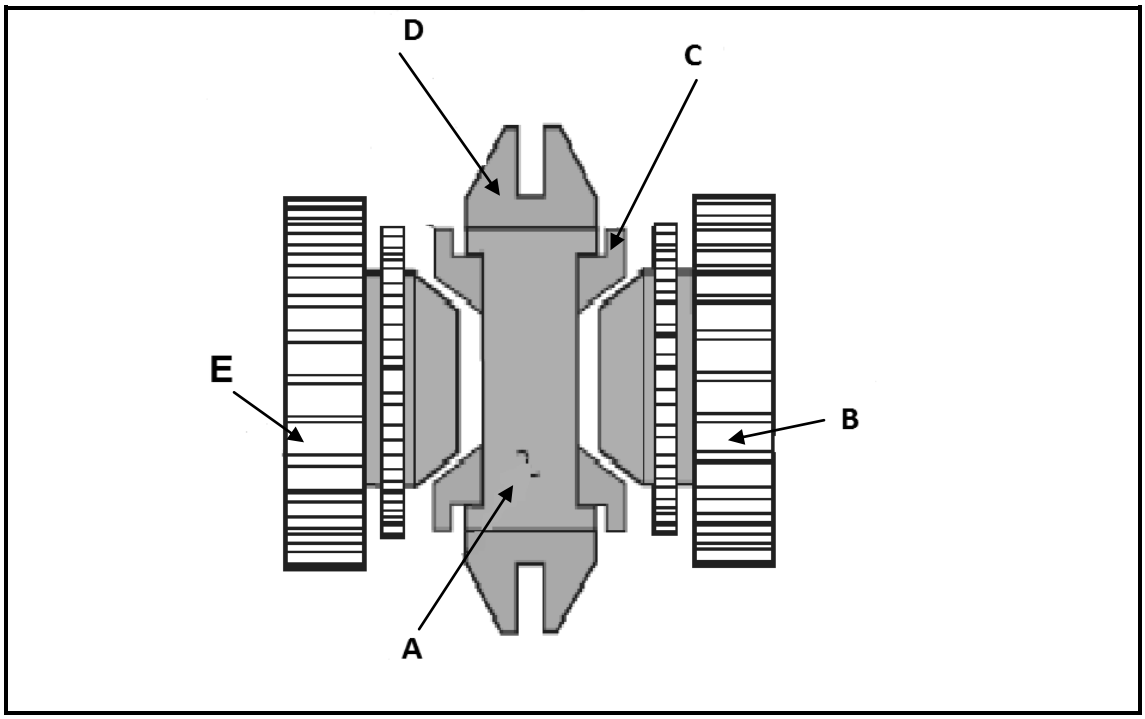

FIGURE 4 (5)

3.7 Give TWO reasons for the use of a synchronising unit. (2)

[25]

QUESTION 4

4.1 FIGURE 5 shows a diagram of a braking system. Name the parts indicated by writing only the answer next to the letter (A–F) in the ANSWER BOOK.

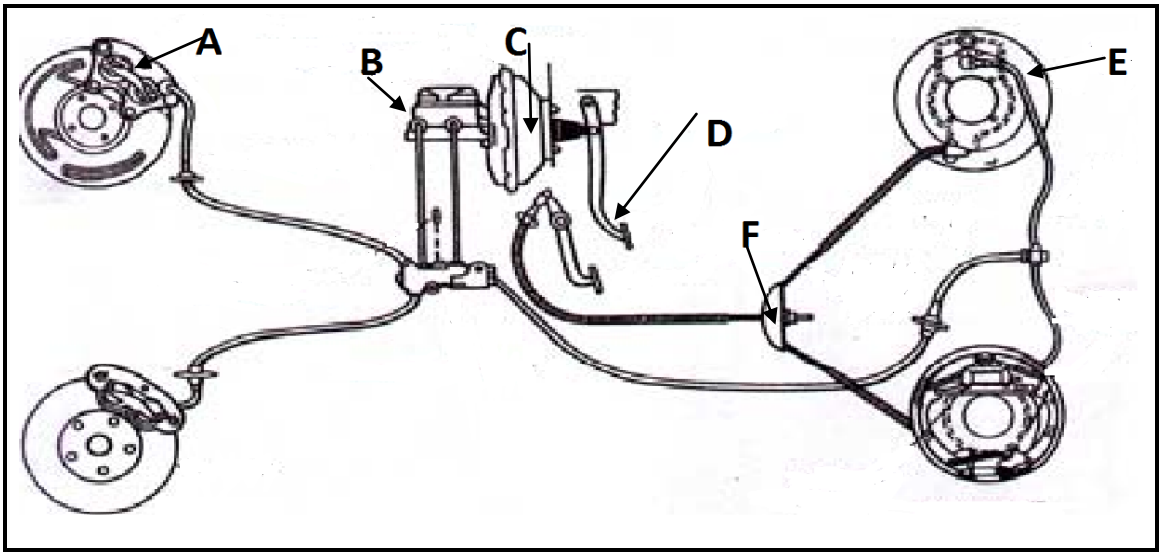

FIGURE 5 (6)

4.2 Give ONE purpose of each of the following braking components shown in FIGURE 5:

4.2.1 Component C

4.2.2 Component F

(2 × 1) (2)

4.3 FIGURE 6 shows a diagram of a residual pressure master cylinder. Name the parts indicated by writing only the answer next to the letter (A–F) in the ANSWER BOOK.

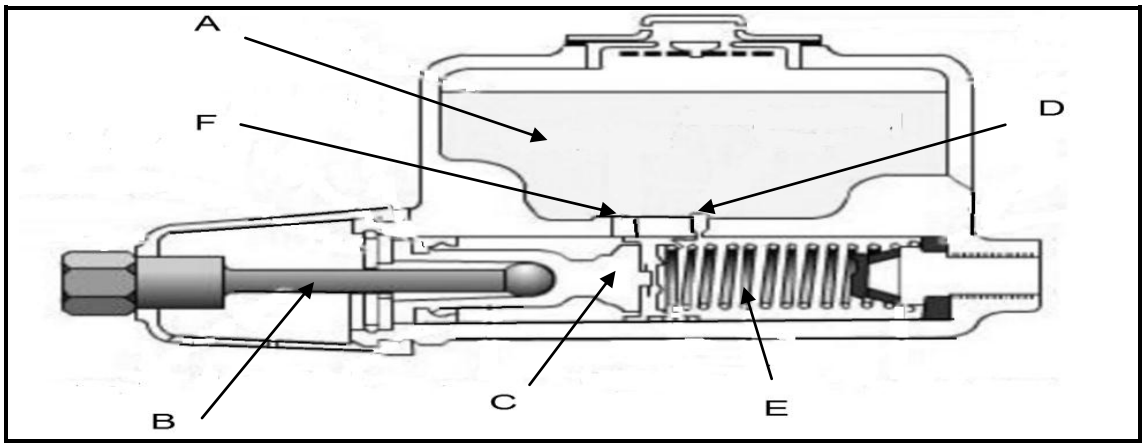

FIGURE 6 (6)

4.4 State TWO functions of a check valve. (2)

[16]

QUESTION 5

5.1 FIGURE 7 shows a diagram of a leaf spring used on a vehicle. Name the components indicated by writing only the answer next to the letter (A–C) in the ANSWER BOOK.

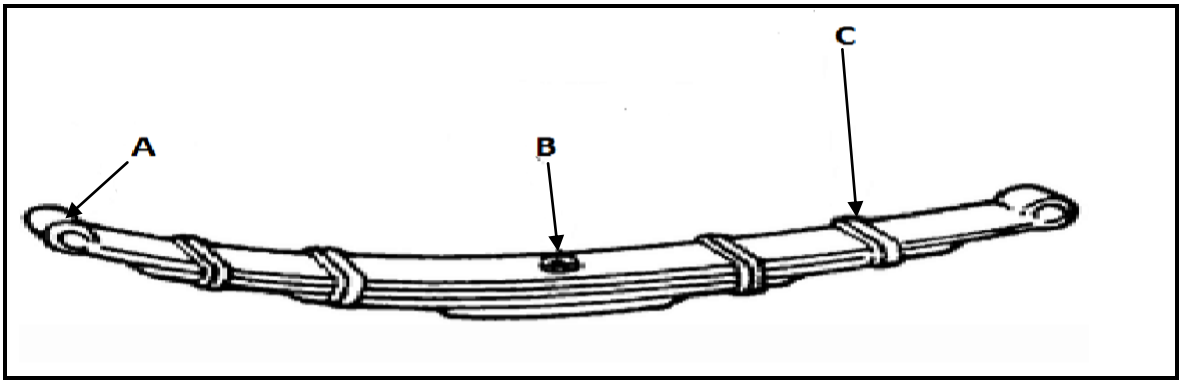

FIGURE 7 (3)

5.2 State ONE purpose of each of the following suspension components:

5.2.1 Centre bolt

5.2.2 Swinging shackle

5.2.3 Rebound clips

(3 × 1) (3)

5.3 FIGURE 8 shows a diagram of a constant velocity joint. Name the components indicated by writing only the answer next to the letter (A–F) in the ANSWER BOOK.

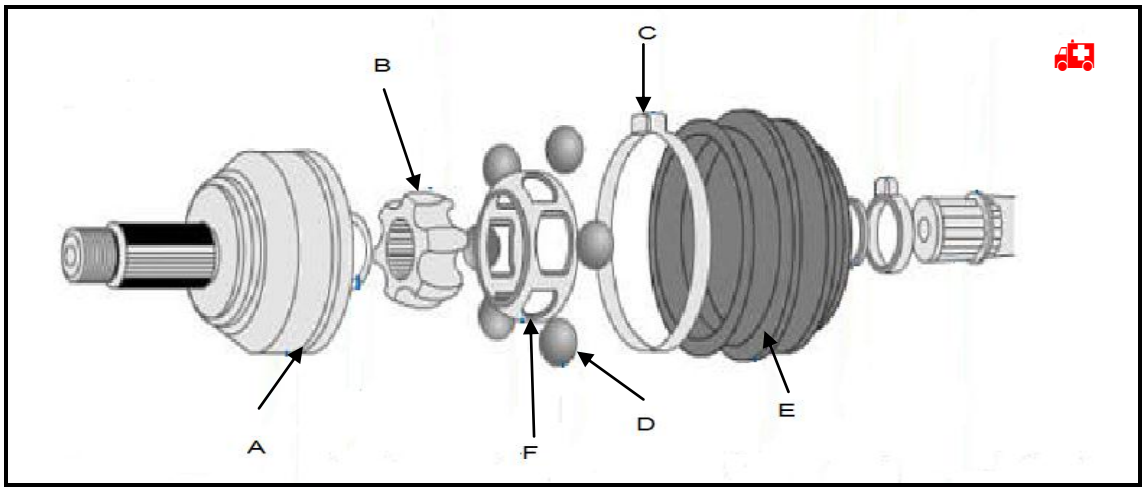

FIGURE 8 (6)

5.4 State TWO advantages of using a constant velocity joint. (2)

[14]

TOTAL: 100