higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T440**(E)**(A1)T

NATIONAL CERTIFICATE

DIESEL TRADE THEORY N2

(11040192)

1 August 2019 (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 correctly according to the numbering system used in this question paper.
4. Sketches must be large, neat and fully labelled.
5. Write neatly and legibly.

QUESTION 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 (1.1–1.10) in the ANSWER BOOK.

1.1 ... causes vapour locking in the brake system.

A Overheating of fluid due to frequent brake application
B Overcooling of brakes during high-speed driving
C An excessively high engine speed on a downhill road
D Not using the vehicle for an extended period

1.2 When the brake pedal free-play is less than the specified value ...

A the brakes drag.
B the brakes fade.
C vapour locking occurs in the brake lines.
D the antilock braking system malfunctions.

1.3 Excess camber causes ...

A uneven tyre wear.
B hard steering.
C too much traction.
D excessive steering alignment torque.

1.4 Ball joints are used on the tie-rod ends to ...

A reduce the amount of noise generated.
B reduce the amount of sliding resistance.
C deal with suspension movement both vertically and in other directions.
D improve the force transmission speed.

1.5 The drive shaft is connected to the differential and the wheel hubs through universal joints which ...

A absorb any difference in speed between the left and right wheels when the vehicle turns.
B absorb the vibrations transferred from the surface of the road.
C compensate for variations in the relative positions of the differential and the wheels resulting from bumpy road surfaces or other similar driving conditions.
D None of the above

1.6 ... are TWO advantages of using helical gears rather than spur gears in a transmission system.

A Strength and cost
B Strength and less end thrust
C Noise level and strength
D Noise level and economy

1.7 Incorrect steering axis inclination (S.A.I.) causes ...

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

1.8 An unbalanced wheel …

A makes a noise when its' heavy point hits the road surface.
B deflects in the vehicle's longitudinal direction.
C bounces vertically or deflects from side to side (as seen from the front or the rear).
D creates a standing wave.

1.9 The function of a fuel injector in a diesel engine is to …

A mix fuel and air.
B ignite the air/fuel mixture.
C provide a flame front for ignition.
D spray atomised fuel into the cylinder.

1.10 A basic difference between a spark ignition engine and a diesel engine is …

A the diesel engine compressing air instead of an air/fuel mixture.
B the air temperature igniting the fuel in the diesel engine.
C fuel sprayed into the combustion chamber in the diesel engine as the piston nears TDC on the compression stroke.
D ALL of the above.

(10 × 1) **[10]**

QUESTION 2

2.1 Identify the components of the diesel fuel system used in a vehicle as shown in FIGURE 1 below. Write the answer next to the number (1–7) in the ANSWER BOOK.

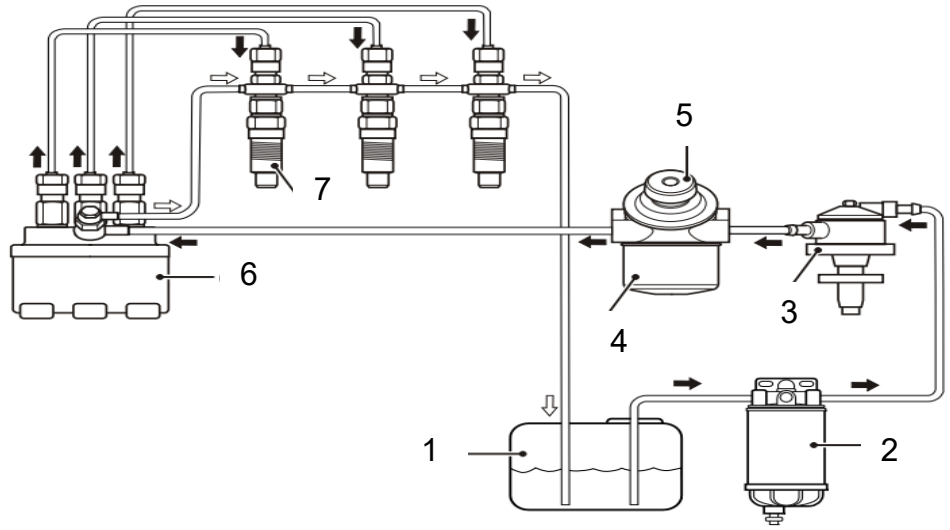

FIGURE 1 (7)

2.2 State FOUR disadvantages of a diesel engine when compared to a petrol engine. (4)

2.3 Name the FOUR combustion phases of diesel fuel. (4)

2.4 Explain how to carry out a dry seat test on a diesel injector. (4)

[19]

QUESTION 3

3.1 Identify the components of a rear axle assembly on a vehicle shown in FIGURE 2 below, by writing the answer next to the letter (A–F) in the ANSWER BOOK.

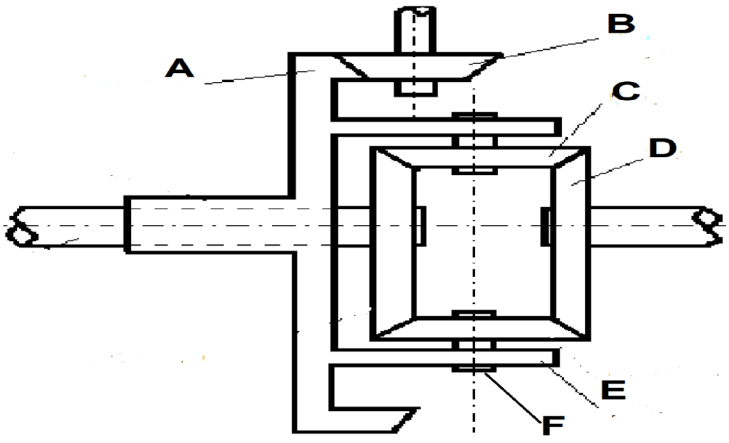

FIGURE 2 (6)

3.2 Explain the operation of the differential when the vehicle turns a corner. (6)

3.3 Name TWO functions of a final drive. (2)

3.4 Give TWO reasons for preloading the pinion bearing. (3)
[17]

QUESTION 4

4.1 Identify the components of the synchronising unit in FIGURE 3 below, by writing the answer next to the letter (A–F) in the ANSWER BOOK.

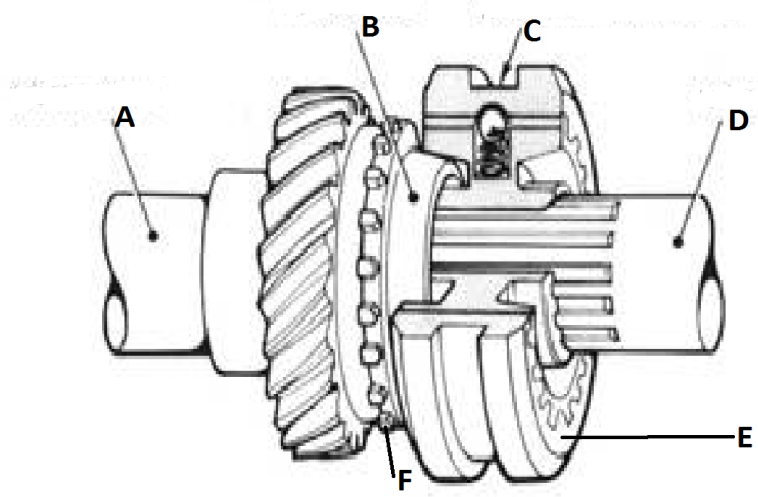

FIGURE 3 (6)

4.2 Explain how the synchronising unit in FIGURE 3 works during a gearchange. (5)

4.3 Name THREE types of bearings used in a gearbox. (3)
[14]

QUESTION 5

5.1 Identify the components of a two-piece Hotchkiss drive assembly in FIGURE 4 below, by writing the answer next to the letter (A–F) in the ANSWER BOOK.

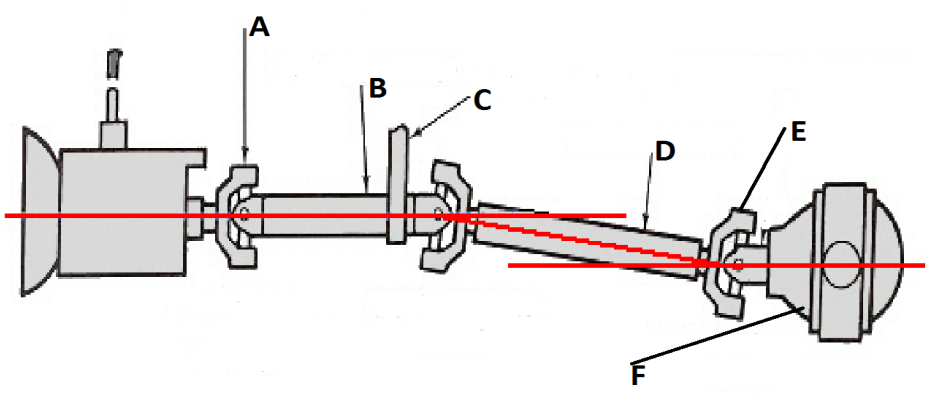

FIGURE 4 (6)

5.2 Give TWO reasons why a divided propeller shaft is used on trucks. (2)

5.3 Identify the components of a constant velocity joint in FIGURE 5 below, by writing the answer next to the letter (A–E) in the ANSWER BOOK.

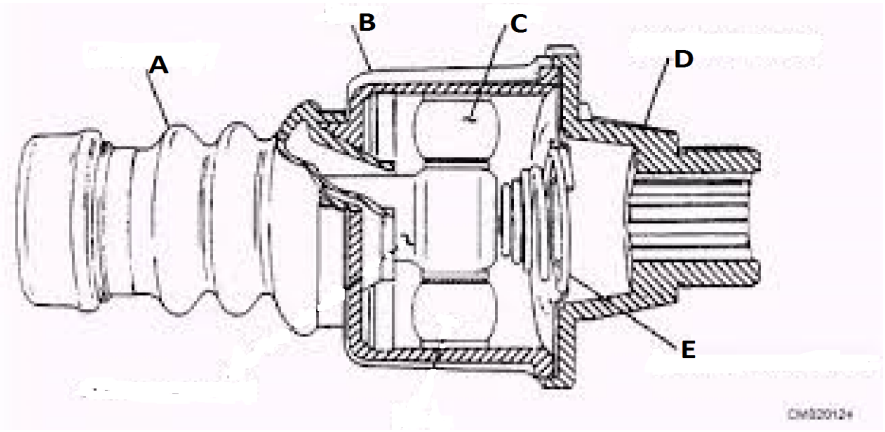

FIGURE 5 (5)

5.4 List the THREE types of axles used on rear-wheel drive vehicles. (3)

5.5 Identify the components of a rear suspension system in FIGURE 6 below, by writing the answer next to the letter (A–F) in the ANSWER BOOK.

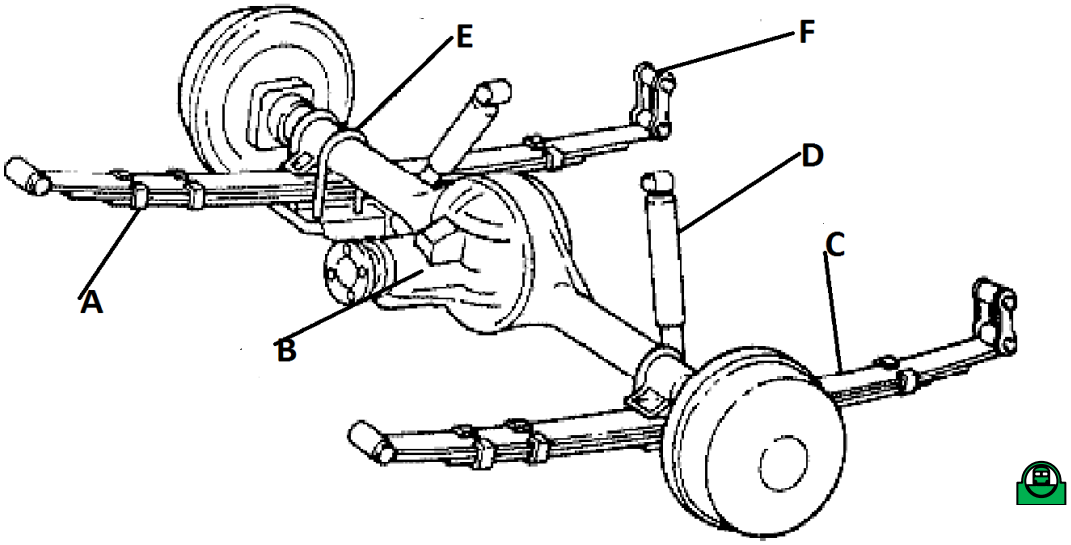

FIGURE 6 (6)

[22]

QUESTION 6

6.1 Identify the components in FIGURE 7 below of a braking system used in a vehicle, by writing the answer next to the letter (A–F) in the ANSWER BOOK.

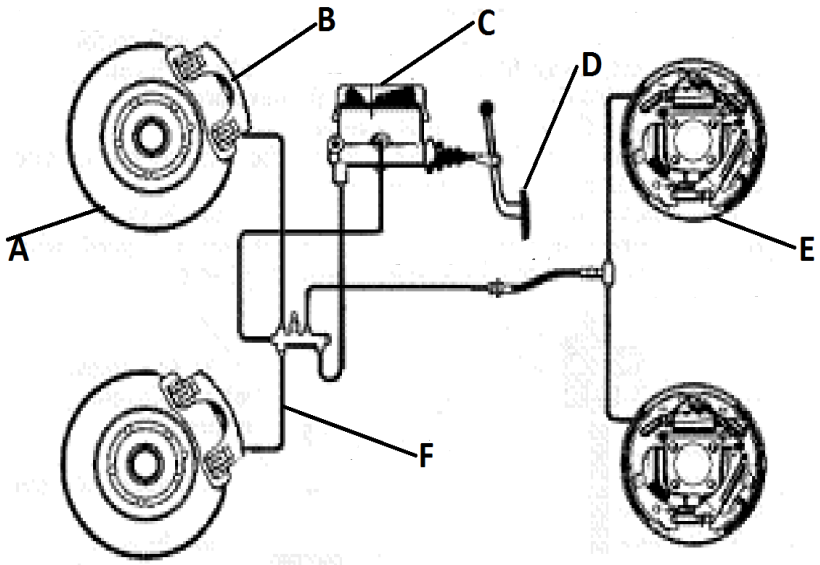

FIGURE 7 (6)

6.2 Give FOUR advantages of disc brakes over drum brakes. (4)

6.3 Explain the procedure of bleeding brakes. (8)
[18]

TOTAL: 100