higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T320**(E)**(N180)T
NOVEMBER EXAMINATION

NATIONAL CERTIFICATE

DIESEL TRADE THEORY N2

(11040192)

18 November 2016 (X-Paper)
09:00–12:00

This question paper consists of 6 pages.

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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 NEW page.
5. Write neatly and legibly.

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QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

1.1.1 In gear systems, speed reduction means torque…

A stabilisation.
B increase.
C reduction.
D will not influence.

1.1.2 The ring gear is mounted on the …

A differential housing.
B differential case.
C axle housing.
D driven pinion.

1.1.3 Universally used suspension spring for heavy commercial vehicles is…

A fully elliptic.
B semi elliptic.
C one quarter elliptic.
D three quarter elliptic.

1.1.4 The axle shaft is not supported at either end by bearings in …

A semi floating axle.
B full floating axle.
C three quarter floating axle.
D stub axle.

1.1.5 The boiling range of diesel fuel may be expected to be in the range …

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

(5 × 1) (5)

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FIGURE 1 shows an injector used in a four-cylinder diesel engine.

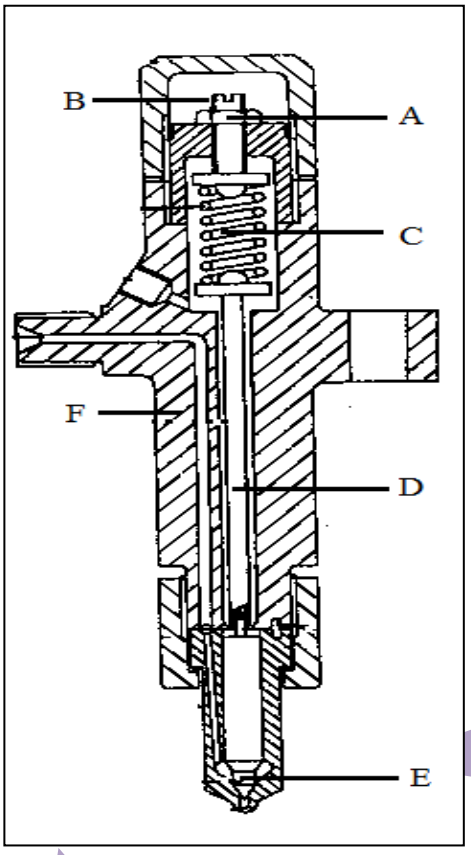

FIGURE 1

1.2 Label items (A–F) in your ANSWER BOOK. (6)

1.3 Give a reason for the following tests that are carried out on a diesel fuel injector

1.3.1 A cylinder balance test (1)

1.3.2 Opening pressure test or pop test (1)

1.3.3 Back leakage test (1)

1.3.4 Spray pattern test (1)

1.3.5 Dry seat test (1)

1.4 Name FOUR types of injector nozzles that are used on diesel engines. (4)

[20]

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QUESTION 2

2.1 Draw a neat, labelled sectional view of a double-piston wheel cylinder that is used on hydraulic rear-wheel brakes of trucks. (8)

2.2 Give TWO reasons for replacing brake drums when the wall thickness is not within limits (too thin). (2)

2.3 Define the term '*hygroscopic'* when referring to brake fluid. (2)

2.4 Give THREE reasons for changing brake fluid regularly. (3)

2.5 List the procedure to be followed when adjusting the drum brakes on trucks with hydraulic brakes. (5)

[20]

QUESTION 3

FIGURE 2 shows a pinion used in a final drive.

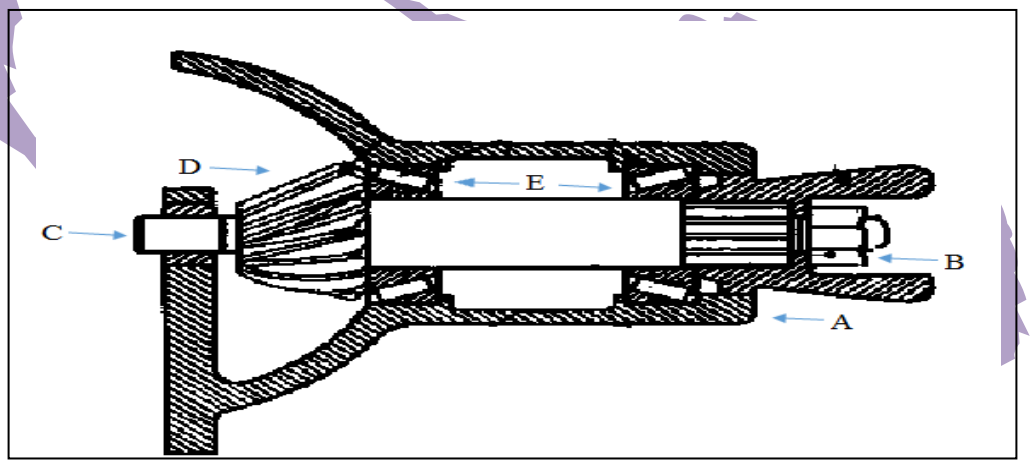

FIGURE 2

3.1 Label items (A–E) in your ANSWER BOOK. (5)

3.2 State the purpose of the pinion depth-adjustment shims. (2)

3.3 State where the pinion preload-adjustment shims are fitted on the final drive. (2)

3.4 State the purpose of the pinion preload-adjustment shims. (2)

3.5 Give TWO reasons for the use of a final drive on a vehicle. (2)

3.6 Draw TWO neat sketches of a built-up banjo-type differential housing and a banjo-type differential housing. (5)

3.7 Name TWO advantages of the overslung worm and wheel final drive compared to the underslung worm and wheel final drive. (2)

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QUESTION 4

4.1 List FIVE functions of a gearbox. (5)

4.2 Name the SIX parts in the correct sequence to indicate the power flow in a four-speed gearbox for reverse (synchronised). (6)

4.3 State ONE function of the Interlocking mechanism (1)

4.4 Give TWO disadvantages of helical gears that is used in gearboxes. (2)

4.5 Give THREE possible reasons for the following gearbox problems:

4.5.1 Gears grate when being changed. (3)

4.5.2 Gears jumping out of mesh. (3)

[20]

QUESTION 5

5.1 List SIX important preliminary checks that should be carried out before commencing with wheel alignment. (6)

5.2 Give THREE reasons for oversteering. (3)

5.3 Name THREE adjustments that can be made to a steering box. (3)

5.4 State TWO advantages of leaf springs as used in motor vehicles. (2)

5.5 Tabulate THREE differences between a *Torque tube drive* and a *Hotchkiss drive* propeller shaft. (6)

[20]

TOTAL: 100

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