higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

DIESEL TRADE THEORY N2

(11040192)

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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. Use only a blue or black pen.
5. Sketches must be large, neat and fully labelled.
6. 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 A damper in an automobile is used to … the energy.

A absorb
B dissipate
C release
D increase

1.1.2 Glow plugs are used in a diesel engine for …

A the easy start-up of the engine.
B providing light inside the combustion chamber.
C fuel injection.
D All the abovementioned

1.1.3 The amount of tilt measured in degrees from the vertical, is called the …

A camber angle.
B caster angle.
C toe-in.
D toe-out.

1.1.4 Camber should not exceed … degrees.

A 2
B 4
C 6
D 8

1.1.5 The angle between the kingpin centre line and the vertical in the plane of the wheel is called the …

A caster angle.
B camber angle.
C kingpin inclination.
D toe-out.

1.1.6 Dead axles …

A are beams which support the vehicle's weight.
B are usually the rear axles.
C contain the differential.
D All the abovementioned

1.1.7 The … is/are not an injector fault.

A nozzle wetness
B blue nozzle body
C excessive leak-off
D blow holes

1.1.8 A/An … brake is not a drum brake.

A external contracting
B internal expanding
C disc
D All the abovementioned

1.1.9 In a vacuum brake, the cylinder chamber consists of a/an … valve.

A atmospheric
B vacuum
C Both (A) and (B)
D None of the abovementioned

1.1.10 Coil springs absorb shocks by …

A bending.
B twisting.
C compression.
D tension.

(10 × 1) (10)

1.2 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.2.1–1.2.10) in the ANSWER BOOK.

1.2.1 The purpose of the piston bypass ports in the brake master cylinder is to allow brake fluid to move through these holes to fill up the vacuum in front of the piston when the brake pedal is applied.

1.2.2 The purpose of a compensator on the handbrake system is to enable the same force on both rear wheels when the handbrake is applied.

1.2.3 A purpose of positive camber on the wheel alignment is to take up the play on the steering linkages when the vehicle is moving forward.

1.2.4 Too big a positive castor angle on the wheel alignment will cause the steering to be difficult.

1.2.5 According to law all tyres must be replaced if less than one millimetre of tyre tread is measured over the total width of the tyre.

1.2.6 The purpose of shock absorbers is to prevent unnecessary oscillations of the spring blades of a vehicle.

1.2.7 Faulty shock absorbers cause unnecessary tyre wear.

1.2.8 One universal joint cannot be used on a Hotchkiss rear-wheel drive arrangement, because it will not cause a constant drive.

1.2.9 The universal joint in a Hotchkiss rear-wheel drive arrangement is lubricated by oil.

1.2.10 The purpose of the interlocking mechanism on a gearbox is to prevent two gears to be selected simultaneously.

(10 × 1) (10)
[20]

QUESTION 2

2.1 State TWO advantages of using spur gears in a gearbox. (2)

2.2 State THREE disadvantages of using helical gears in a gearbox. (3)

2.3 Name SIX components in sequential order, involved when second gear is selected in a four-speed synchromesh gearbox. (6)

2.4 Explain the operation of the conventional differential (not final drive) when the vehicle is negotiating a curve. (6)

2.5 State the disadvantage of the conventional differential. (3)
[20]

QUESTION 3

3.1 State THREE advantages of constant velocity (CV) joints over Hooke's joints. (3)

3.2 Name the THREE types of drive axle units that are used in motor vehicles. (3)

3.3 State THREE differences between a *torque tube drive* and a *Hotchkiss drive* propeller shaft. (6)

3.4 Make a neat, labelled sketch of a semifloating rear axle unit. (6)

3.5 Explain the function of a limited-slip differential. (2)
[20]

QUESTION 4

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

4.2 State TWO functions of kingpin inclination. (2)

4.3 State THREE advantages of leaf springs as used in suspension systems. (3)

4.4 Make a neat, labelled sketch of a worm and sector steering box. (5)

4.5 State FOUR checks that must be performed before setting wheel alignment on a motor vehicle. (4)

4.6 State TWO possible causes of steering wheel play. (2)

4.7 Explain the term the *kerb mass* of a vehicle. (1)
[20]

QUESTION 5

5.1 State FOUR advantages of a *diesel engine* compared to a *petrol engine*. (4)

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

5.3 Explain the operation of a glow plug. (4)

5.4 State THREE functions of a pressure relief valve or permanent bleed orifice found in the diesel fuel system. (3)

5.5 State THREE advantages of the disc brake assembly as compared to the brake shoe assembly. (3)

5.6 State the function of the compensator as used in the handbrake mechanism. (1)

5.7 State THREE functions of the check valve assembly as used in the braking system. (3)
[20]

TOTAL: 100