higher education & training

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REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

MOTOR TRADE THEORY N2

(11040662)

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
MOTOR 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. Only use a black or blue pen.
6. Write neatly and legibly.

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QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the correct 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 Taper on an engine cylinder can be described as one of the following:

A The measurement at the top of the cylinder
B The difference between the measurement at taken at the top and taken at the bottom of the cylinder
C The measurement between the cylinder and the piston
D The measurement at the bottom of the cylinder

1.1.2 The function of bearings in gearboxes are …

A to increase the torque and speed of the gearbox.
B to reduce transmission noise.
C to reduce friction between moving components.
D to reduce the operating temperature.

1.1.3 Clutch slip can be a result of one of the following causes:

A Broken or loose engine mountings
B Too much clutch pedal free play
C Cracked friction surface on the flywheel or pressure plate
D Weak or broken pressure plate springs or diaphragm

1.1.4 Which of the following components is not part of an active suspension?

A Air conditioner pressure sensor
B Door light switches
C Steering angle velocity sensor
D Front height sensor

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

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

1.1.6 Dead axles …

A are axles that mainly support the vehicle weight.
B are usually irreparable.
C store kinetic energy.
D transmit torque from the driveshaft to the wheels.

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1.1.7 If the air-fuel mixture in a spark ignition engine is too rich, then air-fuel ratio is approximately …

A 15:1.
B 10:1.
C 17:1.
D 13:1.

1.1.8 When the contact breaker gap is adjusted too small, then …

A the ignition timing is advanced.
B the capacitor is overcharged.
C the voltage in the secondary circuit is decreased.
D All of the above can occur.

1.1.9 The torque available at the contact between driving wheels and road is known as …

A tractive effort.
B brake effort.
C clutch effort.
D none of these.

1.1.10 The air conditioner compressor is a device that …

A increases the pressure of air or gas by reducing its volume.
B forces air through the evaporator and passenger cabin.
C converts refrigerant to gas.
D removes moisture from the refrigerant.

(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 Too much positive caster will cause irregular tyre wear on the inner tread.

1.2.2 An interlocking mechanism ensure that the gear does not disengage.

1.2.3 The axle of the three-quarter floating axle is subjected to side thrust and driving torque.

1.2.4 The function of an ignition coil in spark plug ignition system is to distribute current.

1.2.5 Crankshaft thrust clearance or end float can be rectified by machining the crankshaft.

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1.2.6 The clutch uses friction to transfer power from one surface to another.

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 During idling, the air-fuel mixture requirement for running the engine is a rich mixture.

1.2.10 The alternator generates direct current which is converted to alternating current and is supplied to the electrical system.

(10 × 1) (10)
[20]

QUESTION 2

2.1 FIGURE 1 shows a diagram of a FWD transaxle transmission. Name the labelled parts by writing only the answer next to the question number (2.1.1–2.1.7) in the ANSWER BOOK.

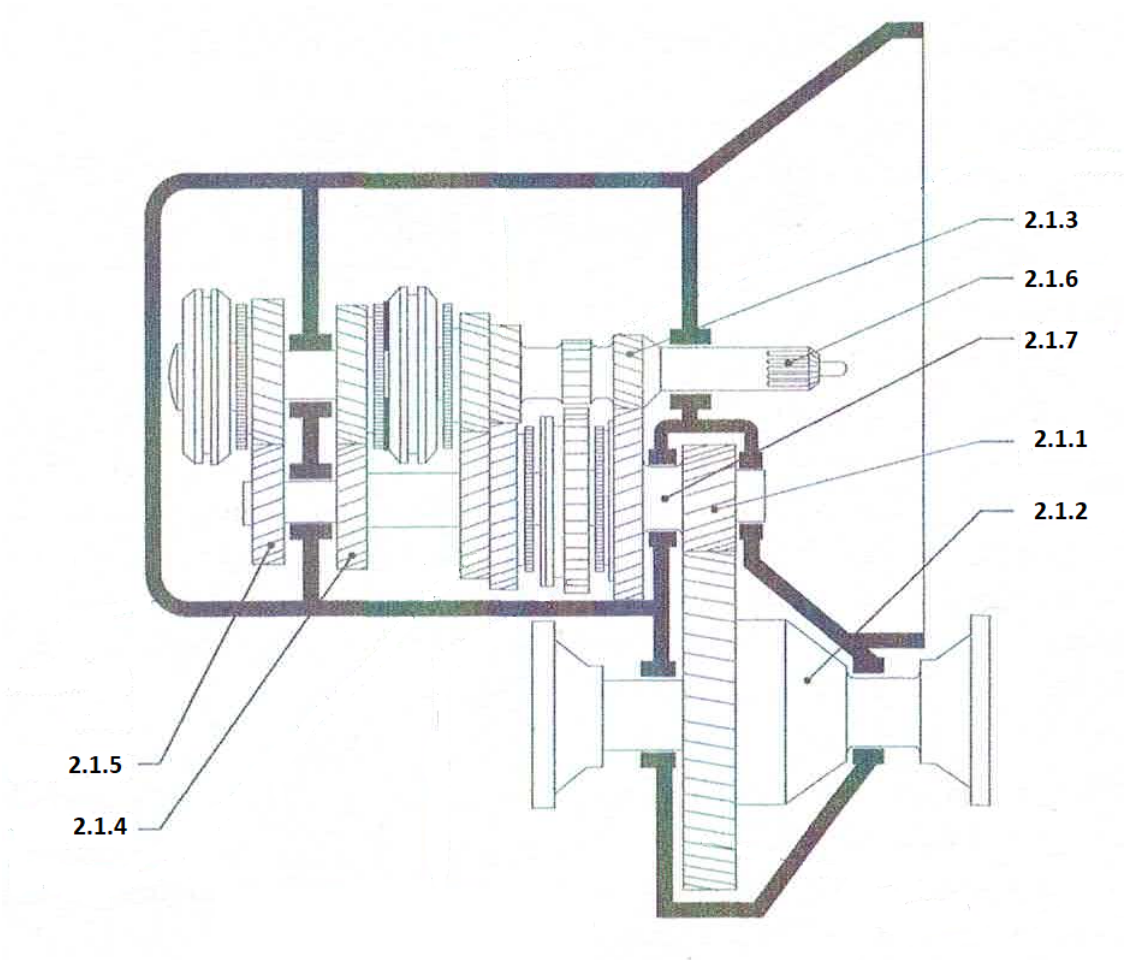

FIGURE 1 (7)

2.2 Describe two functions of a synchromesh unit. (2)

2.3 Explain how one would check whether a synchroniser ring is worn and needs to be replaced. (2)

2.4 Name any FIVE labelled components of a final-drive assembly shown in FIGURE 2 below by writing only the answer next to the letter (A–I) in the ANSWER BOOK.

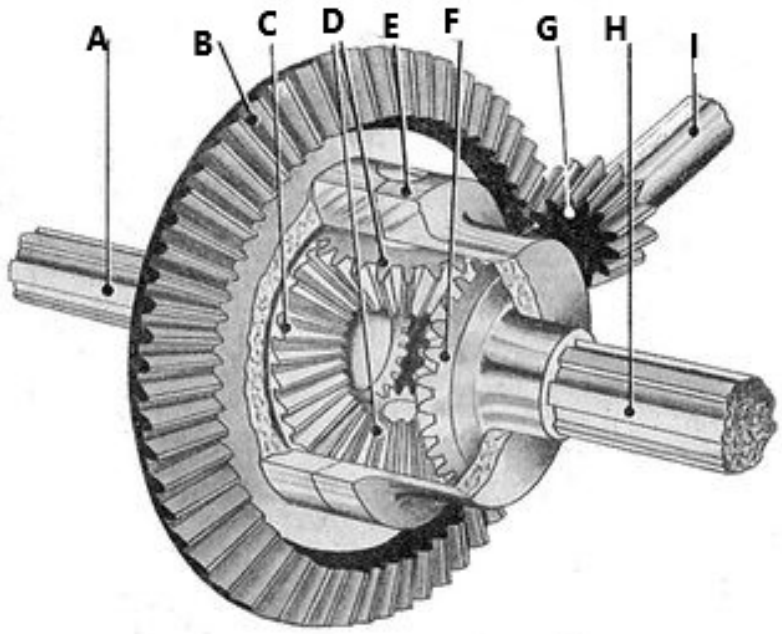

FIGURE 2 (5)

2.5 Explain the operation of a conventional differential when the vehicle is negotiating a turn. (5)

2.6 Write down the procedure that one would follow to test a vehicle of which the clutch is slipping. (4)
[25]

QUESTION 3

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

3.2 List THREE functions of a suspension system. (3)

3.3 Briefly describe the operation of an active suspension. (3)

3.4 Write down THREE advantages of an active suspension. (3)

3.5 Name FOUR components found in a power-steering system. (4)

3.6 Name FOUR angles that must be measured when checking wheel alignment. (4)
[20]

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QUESTION 4

4.1 Write down TWO advantages and TWO disadvantages of a hydraulic brake system. (4)

4.2 Describe the function of the wheel speed sensors in an ABS braking system. (2)

4.3 Explain TWO functions of an EBS braking system. (2)

4.4 Give TWO causes for each of the following carburettor faults:

4.4.1 Rich air fuel mixture

4.4.2 Lean air fuel mixture

(2 × 2) (4)

4.5 List THREE main components of an air induction system on the EFI system. (3)

4.6 What is the recommended place to measure a piston diameter for size and critical clearance? (2)

[17]

QUESTION 5

5.1 Describe the operation of a conventional ignition system. (6)

5.2 Give the effect on engine performance of incorrectly set ignition timing in the following conditions:

5.2.1 Retarded

5.2.2 Advanced

(2 × 1) (2)

5.3 Name THREE properties of a spark plug electrodes. (3)

5.4 Define the term *current draw.* (2)

5.5 List FIVE components that forms part of the starting system. (5)

[18]

TOTAL: 100

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