higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

MOTOR TRADE THEORY N3

(11040673)

22 November 2022 (X-paper)
09:00–12:00

Drawing instruments and nonprogrammable calculators may be used.

This question paper consists of 6 pages.

150Q1E2222

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
MOTOR TRADE THEORY N3
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. Use only a black or a blue pen.
6. Write neatly and legibly.

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QUESTION 1

1.1 Name TWO factors that will determine the firing order of an engine. (2)

1.2 Explain how to determine the firing order if no specifications are available. (3)

1.3 State whether the following statements are TRUE or FALSE. Rewrite the FALSE statements correctly.

1.3.1 The engine cylinder blocks of V-type engines are shorter than those of in-line engines (1)

1.3.2 The cylinders of in-line engines are mounted in two banks on either side of the crankshaft (2)

1.3.3 In single-cylinder engines there is one power impulse for every revolution of the crankshaft. (2)

1.3.4 The crankshafts of a two-cylinder engine will be 180° apart. (1)

1.3.5 To calculate the swept volume of a piston, the area of the cylinder (cm^2) must be divided by the length of the stroke (cm). (2)

1.3.6 Clearance volume refers to the space above the crown of the piston in the combustion chamber. (1)

1.3.7 A chassis dynamometer is used to measure brake power. (1)

[15]

QUESTION 2

2.1 Explain what is meant by twin charging. (2)

2.2 Name ONE advantage and ONE disadvantage of twin charging. (2)

2.3 Explain how a *variable geometry turbocharger* differs from a *non-variable turbocharger*. (2)

[6]

QUESTION 3

3.1 State TWO functions of a camshaft. (2)

3.2 List ONE type of cam follower used in automotive engines. (1)

3.3 State TWO advantages of a hydraulic valve lifter. (2)

3.4 Draw a neat diagram, to illustrated the components of belt drive. The cam shaft pulley, Crank shaft pulley, belt tensioner, belt and distributor drive pully must be clearly indicated. If the camshaft pulley has 40 teeth, what number of teeth must the crank shaft pulley have to ensure that the engine operate smoothly and efficiently? (5)

[10]

QUESTION 4

4.1 What is the function of an electric fuel pump? (2)

4.2 Explain what a wet fuel pump is. (2)

4.3 Name TWO functions of the fuel passing through the fuel pump. (2)

4.4 Name TWO advantages of electric fuel pumps. (2)

4.5 Name THREE factors that determine the correct quantity of fuel that is injected into the fuel intake system of an engine. (3)

4.6 Identify and name to numbered components of the fuel injector in FIGURE 1 below. (3)

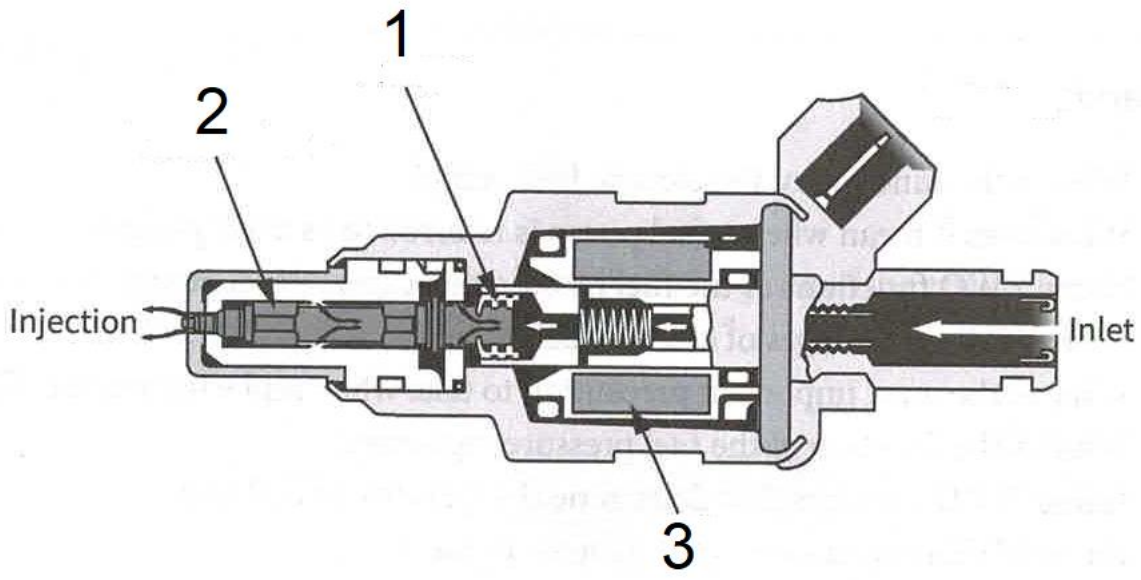

FIGURE 1

[14]

QUESTION 5

5.1 Name the TWO basic categories into which modern, electronically controlled ignition systems are divided (2)

5.2 The COP system consists of THREE main components. Name the components. (3)

5.3 State FIVE checks that can be carried out on an electronic ignition system. (5)
[10]

QUESTION 6

6.1 Describe how lockup is applied. (3)

6.2 Explain how lockup is released. (2)
[5]

QUESTION 7

7.1 State TWO functions of an automatic gearbox. (2)

7.2 Name FOUR advantages of an automatic gearbox. (4)

7.3 Give a brief description of a DSG. (3)

7.4 Name FOUR checks to be carried out on the automatic gearbox. (4)
[13]

QUESTION 8

8.1 State FOUR advantages of a limited-slip differential. (4)

8.2 State TWO disadvantages of a limited-slip differential. (2)
[6]

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QUESTION 9

9.1	State the purpose of power-steering systems.	(1)
9.2	When is no steering action performed in the system?	(1)
9.3	State the advantages of power steering.	(3)
9.4	State the disadvantages of power steering.	(4)
9.5	State the advantages of electric power steering.	(3)
		[12]

QUESTION 10

	List THREE types of hybrid systems found in vehicles.	(3)
		[3]

QUESTION 11

11.	What does each of the first three characters in the following fault codes refer to?	
11.1	P03 XX	(3)
11.2	C16 XX	(3)
		[6]

TOTAL: 100

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