higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

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NATIONAL CERTIFICATE

MOTOR TRADE THEORY N1

(11040651)

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
MOTOR TRADE THEORY N1
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. ALL sketches must be neat and in good proportion.
5. ALL answers including sketches must be done in the ANSWER BOOK.
6. Write neatly and legibly.

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QUESTION 1

1.1 Choose the answer from the possible options given. Write only the letter (A–D) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK.

1.1.1 An accident can be described as an event that …

A may cause injury or harm to persons or property.
B is unplanned and uncontrolled and caused by unsafe acts or conditions, resulting in harm to persons or property.
C is undesirable and causes injury or harm to persons or property.
D probably may cause injury or harm to persons or property

1.1.2 Write down which safety sign indicates a radiation hazard.

A 

B 

C 

D 

1.1.3 A … is used to insert piston rings into a cylinder.

A ring-groove cleaner
B ring expander
C ring squeezer
D cylinder honing tool

1.1.4 A wet liner is a cylinder sleeve that …

A is in direct contact with the cooling water.
B requires water to be fitted.
C is the opposite of a dry liner.
D does not require water to be fitted.

1.1.5 This component controls the lateral movement of the crankshaft:

A Release bearing
B Main bearing
C Big-end bearing
D Thrust washer

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1.1.6 To check the evenness of the cylinder head mating surface, the … should be used.

A straight edge and plastic gauge
B straight edge and feeler gauge
C engineer's square and feeler gauge
D steel rule and feeler gauge

1.1.7 Before fitting new rings to a used cylinder bore, the cylinder must be deglased using a …

A reamer.
B ridge cutter.
C cylinder honer.
D emery cloth.

1.1.8 The four-stroke engine cycle was developed by …

A Nikolaus Otto.
B Ottoman.
C Otto Holtzhauzen.
D Rudolf Diesel.

1.1.9 In the four-stroke cycle, ignition takes place at the end of the … stroke.

A 1st
B 2nd
C 3rd
D 4th

1.1.10 In the two-stroke cycle, the cycle is completed after the crankshaft made … revolution(s).

A 1
B 2
C 3
D 4

(10 × 1) (10)

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

1.2.1 Petrol engines use spark plugs to ignite the air-fuel mixture.

1.2.2 A major advantage of front engine front-wheel drive is improved traction.

1.2.3 All diesel engines operate on a two-stroke cycle.

1.2.4 Fuel injection systems have replaced carburettors on modern vehicles.

1.2.5 The main reason for having oil clearance on crank-journal bearings is to ensure a proper fit.

1.2.6 The function of the oil pump is to maintain the required oil pressure in the engine lubricating system.

1.2.7 Internal oil leaks cannot cause excessive oil consumption.

1.2.8 Piston-type oil pumps do not create much pulsation.

1.2.9 One of the reasons of coolant additives is to allow the water to warm up more quickly.

1.2.10 Correct clutch pedal free play is important for proper engagement of the clutch.

(10 × 1) (10)
[20]

QUESTION 2

2.1 Name the FIVE categories of safety signs and name the geometric shapes of these signs. (5 × 2) (10)

2.2 Name THREE types of pliers that can be used to cut wires. (3)

2.3 Explain how an error of parallax occurs when taking a reading. (2)

2.4 Name ONE other error that can occur during measuring. (1)
[16]

QUESTION 3

3.1 Most passenger vehicles utilise a single dry-plate clutch configuration.

State TWO functions of the assembly. (2)

3.2 Fully explain the operation of a helical clutch assembly. (8)

3.3 Explain the reason for the small indentations on some piston crowns. (2)

3.4 Name, in the correct sequence, the components of a side camshaft in an overhead-valve operating system. (5)

3.5 Briefly explain the latest development in flywheel design on engines with manual transmissions. (3)
[20]

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QUESTION 4

4.1 Explain the main difference in construction between the two-stroke low-speed diesel engine and the two-stroke high-speed diesel engine. (4)

4.2 Which component in the rotary engine serves the same function as the piston in a piston-type engine? (1)

4.3 Over time the layout of engines has changed to improve traction and space utilisation.

Draw TWO simple sketches to indicate the difference between a *rear engine, rear-wheel drive layout* and a *mid-engine, rear-wheel drive layout*. (6)

4.4 When an engine overheats, the reasons could be related to mechanical defects or cooling system defects.

State FOUR cooling system-related defects that can cause overheating. (4)
[15]

QUESTION 5

5.1 Some later model cars will sound a buzzer to indicate low oil pressure.

What are the test conditions for the buzzer to sound? (3)

5.2 State FOUR mechanically-related defects that can cause low oil pressure. (4)

5.3 The dry-sump design allows for the engine to be mounted lower.

Explain the difference between *wet-sump* and *dry-sump designs*. (2 × 2) (4)

5.4 Draw a simple, labelled sketch of a full-flow lubrication system. (5)
[16]

QUESTION 6

6.1 On diagnosing a hard starting complaint, you found the battery electrolyte level to be too low.

Explain how this low level affects the operation of the battery. (4)

6.2 How does the electrolyte temperature influence the specific gravity reading? (3)

6.3 Give the information indicated by the tyre marking: 205/45 V R 17. (5)

6.4 What is the main constituent used in tyre manufacturing? (1)
[13]

TOTAL: 100

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