higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

AUTOMOTIVE REPAIR AND MAINTENANCE
NQF LEVEL 2

(6021032)

2 December 2020 (X-paper)
09:00–12:00

This question paper consists of 9 pages.

175Q1N2002

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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 blue pen.
6. All sketches must be neat, clean and in proportion.
7. Write neatly and legibly.

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QUESTION 1

1.1 When should each of the following types of eye protection be used?

1.1.1 

1.1.2 

1.1.3 

(3 × 1) (3)

1.2 Give TWO examples of good housekeeping in a motor workshop. (2)

1.3 State THREE safety precautions to take when using each of the following:

1.3.1 Compressed-air equipment

1.3.2 Electrical appliance

(2 × 3) (6)

1.4 List THREE precautions that must be adhered to before working underneath a vehicle when lifting it with a trolley jack. (3)

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1.5 Give the total reading of the Vernier as shown in FIGURE 1 below.

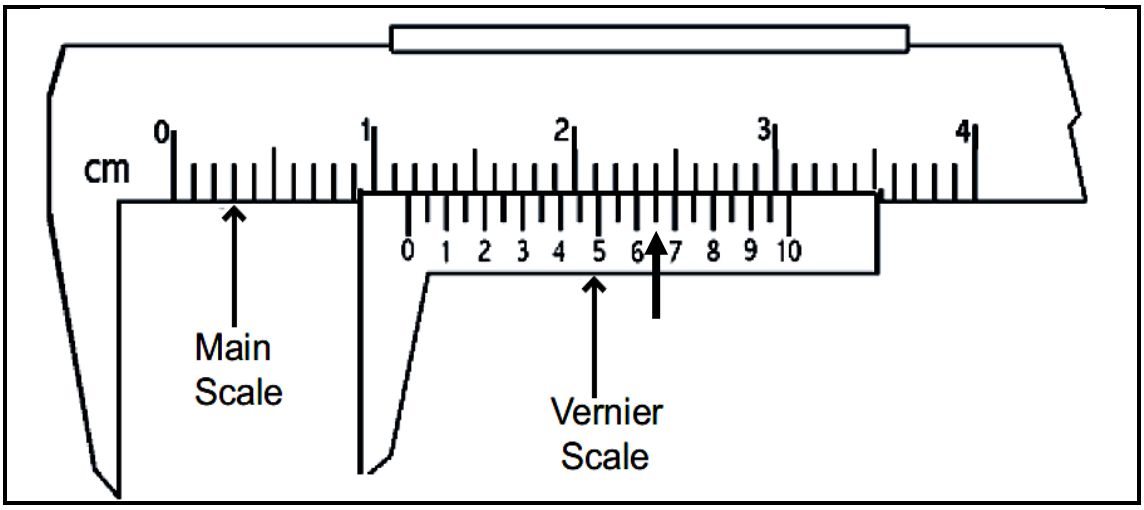


FIGURE 1 (2)

1.6 Give the total reading of the micrometer as shown in FIGURE 2 below, in millimetres.

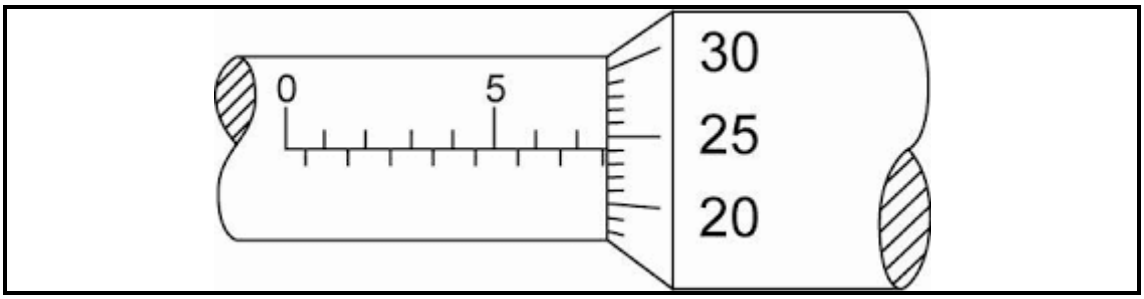


FIGURE 2 (2)

1.7 Name TWO engine components that are made of cast iron. (2)
[20]

QUESTION 2

2.1 State the function of each of the following special tools:

2.1.1 Piston-ring squeezer

2.1.2 Valve-spring compressor

2.1.3 Feeler gauge

2.1.4 Honing tool

(4 × 1) (4)

2.2 FIGURE 3 below, shows the components of a piston assembly.

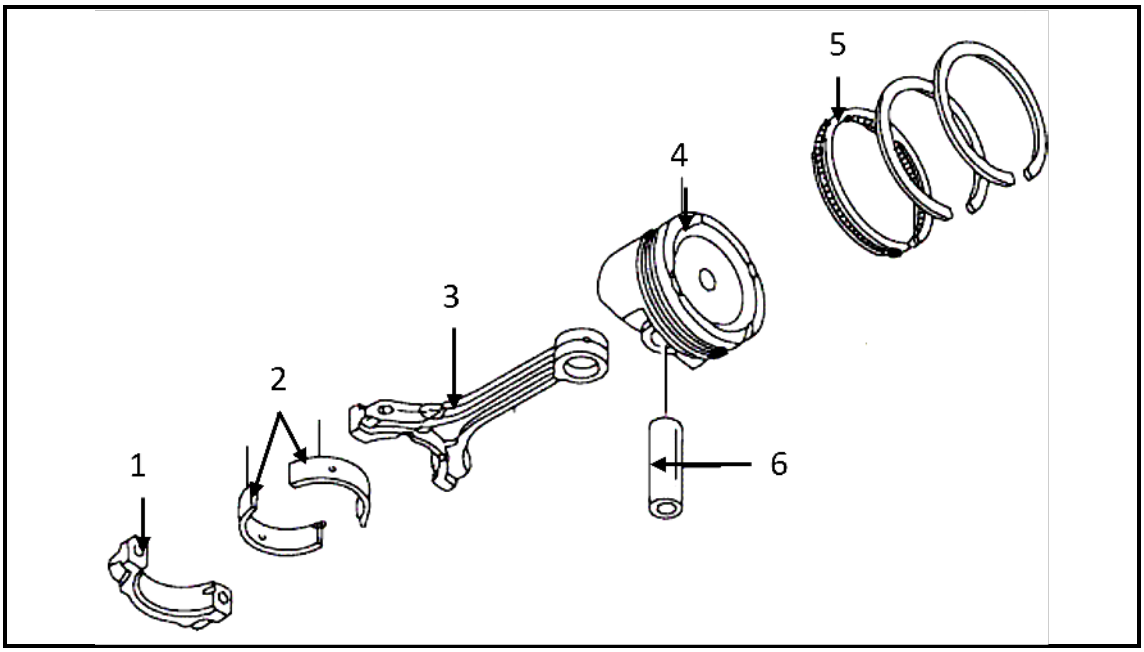


FIGURE 3

Label the components of the piston assembly by writing only the answer next to the number (1–6) in the ANSWER BOOK. (6 × 1) (6)

2.3 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 (2.3.1–2.3.6) in the ANSWER BOOK.

2.3.1 Battery-electrolyte mixture ratio:

A 30/70
B 40/60
C 50/50
D 25/75

2.3.2 The active material in a battery cell is lead … paste.

A platinum
B nickel
C oxide
D alloy

2.3.3 The lead dioxide of the positive plate has a … colour.

A chocolate brown
B candy-apple red
C lime green
D black

2.3.4 The lead paste used in the manufacture of the positive plates are made-up of …

A lead oxide, carbonic acid and water.
B lead alloy, sulphuric acid and water.
C lead nickel, citric acid and distilled water.
D lead oxide, sulphuric acid and distilled water.

2.3.5 Modern lead-acid battery separators are made of …

A PVC.
B polypropylene.
C fibreglass.
D rubber mats.

2.3.6 When removing a battery, always remove the … first.

A positive cable
B hold-down clamp
C negative cable
D main battery fuse

(6 × 1) (6)

2.4 Name the tool used for each of the following tasks:

2.4.1 Removing the ridge on the upper end of an engine cylinder

2.4.2 Tightening cylinder head bolts

2.4.3 Testing cylinder compression pressure

2.4.4 Measuring crankshaft end float

(4 × 1) (4)
[20]

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QUESTION 3

3.1 State TWO functions of the clutch that is fitted between the engine and the gearbox on a motor vehicle. (2)

3.2 Study FIGURE 4 below and answer the questions..

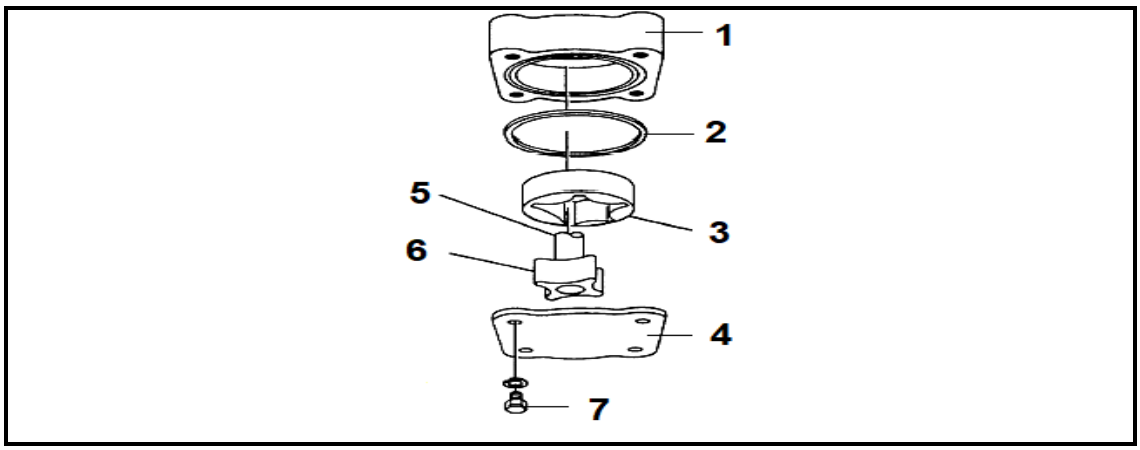


FIGURE 4

3.2.1 Name the type of oil pump shown in FIGURE 4 above. (1)

3.2.2 Name the labelled parts of the oil pump by writing only the answer next to the number (3.2.1–3.2.7) in the ANSWER BOOK. (7)

3.3 Make a large, neat sectional sketch of a two-stroke (valveless) spark-ignition engine. Label any THREE parts on the sketch. (2 + 3) (5)

3.4 Name the TWO types of oil-filtration systems used in internal-combustion engines. (2)

3.5 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (3.5.1–3.5.3) in the ANSWER BOOK.

3.5.1 A wheel rim must be able to resist the torque when the vehicle accelerates and brakes.

3.5.2 The function of the tyre bead is to prevent the wheel rim from spinning inside the tyre.

3.5.3 The chafer prevents the tyre from chafing against the body of the vehicle.

(3 × 1) (3)

[20]

QUESTION 4

4.1 Complete the following paragraph by choosing a word or words from the list below. Write only the answer next to the question number (4.1.1–4.1.4) in the ANSWER BOOK.

deform; heat; load; pressure

If the (4.1.1) ... increases, the tyres will (4.1.2) ... more and the (4.1.3) ... will increase. If the tyre speed increases, the (4.1.4) ... will also increase.

(4 × 1) (4)

4.2 What does each of the following abbreviations stand for:

4.2.1 SAE

4.2.2 API

(2 × 1) (2)

4.3 List THREE under-bonnet fluids (other than oil) that must be inspected as part of a vehicle service. (3)

4.4 FIGURE 5 below, shows a sketch of the cooling system of an internal-combustion engine.

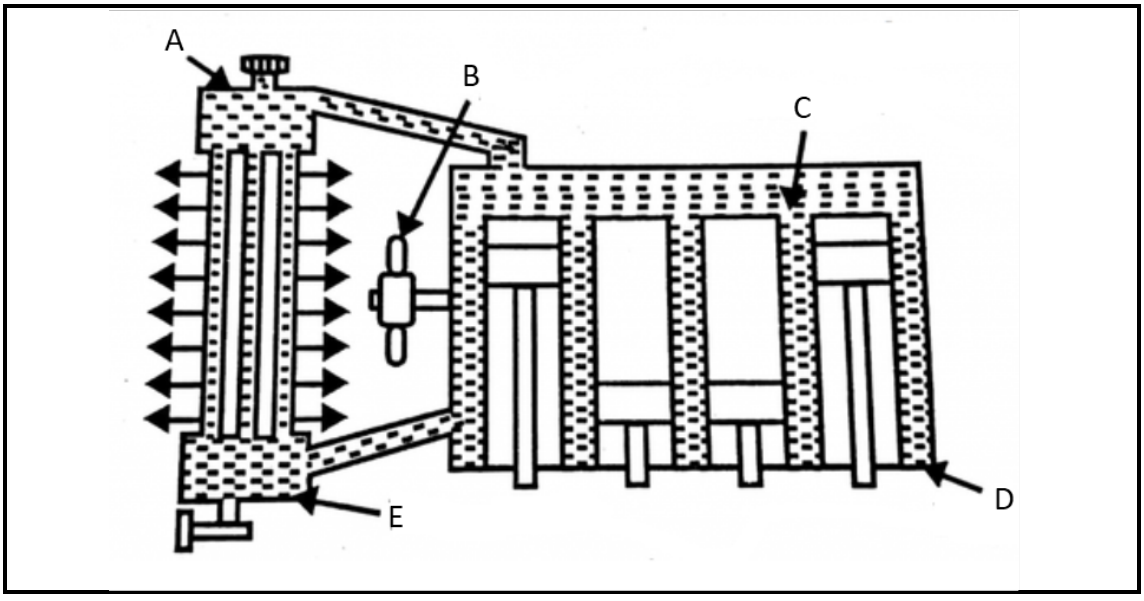


FIGURE 5

Label the parts by writing only the answer next to the letter (A–E) in the ANSWER BOOK. (5 × 1) (5)

4.5 List FIVE basic conditions of employment policies and procedures that must be established within an organisation. (5)

4.6 State ONE function of antifreeze in a cooling system. (1)

[20]

QUESTION 5

5.1 Name TWO symptoms on a motor vehicle that could be caused by a faulty lead-acid battery. (2)

5.2 Show, with the aid of a sketch, how to rotate the wheels on a motor vehicle fitted with radial ply tyres including the spare wheel. (2)

5.3 Where will a tyre show excessive wear if it is:

5.3.1 Over-inflated

5.3.2 Under-inflated

(2 × 1) (2)

5.4 List FOUR components of a lead-acid battery. (4)

5.5 List THREE hand tools, THREE special tools and TWO pieces of workshop equipment used during the servicing process of a vehicle. (3 + 3 + 2) (8)

5.6 Give TWO reasons why proper fan belt tension is important. (2)

[20]

TOTAL: 100

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