higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PLANT AND EQUIPMENT
NQF LEVEL 3

(12030263)

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

This question paper consists of 5 pages.

283Q1N2214

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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. Write neatly and legibly.

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QUESTION 1: BASIC FIRE AWARENESS

Complete the following sentences by writing only the missing word or words next to the question number (1.1–1.5) in the ANSWER BOOK.

Fire needs heat, fuel (for example, wood, grass, paper or petrol) and oxygen to burn. When fuel becomes sufficiently hot, it combines with oxygen in the air and (1.1) … . The temperature at which a fuel starts burning is called its (1.2) … . The heat from the flames keeps the fuel at its (1.3) … , which causes surrounding fuel to start burning. This makes fire dangerous, because it means that once a fire starts it will keep itself going until it runs out of (1.4) … or (1.5) … . **[5]**

QUESTION 2: LIFTING OF HEAVY OBJECTS

2.1 What does the principle of leverage state? (2)

2.2 Define the following terms relating to a simple lever:

2.2.1 The effort arm

2.2.2 The load arm

(2 × 2) (4)

2.3 Summarise the correct posture to adopt when lifting heavy objects. (6)

2.4 Compare FOUR differences between a *conveyor belt* and a *builder's hoist*.

(2 × 4) (8)

[20]

QUESTION 3: ELECTRIC MOTORS AND INTERNAL COMBUSTION ENGINES

3.1 List SIX parts of an induction motor. (6)

3.2 Induction motors are the most commonly used motors in many applications and are also called asynchronous motors.

Explain why induction motors are also called asynchronous motors. (2)

3.3 Basically, there are two types of induction motor, depending on the type of input supply.

Name the TWO types of induction motor. (2)

3.4 Internal combustion engines are far more complicated in design and require more maintenance and lubrication than electric motors.

Differentiate between the *electric motor engine* and the *internal combustion motor engine.* (6)

3.5 When talking about how fuel efficient an engine is, we need to measure how much power we get out of the engine compared to how much fuel we need to put into it.

Write the formula for calculating fuel efficiency in full. (3)

3.6 When a spark ignition engine does not start, there can be three main causes.

Which of the following statements is incorrect? Write only the letter(A–C) next to the question number (3.6) in the ANSWER BOOK.

A The fuel is reaching the combustion chamber.
B There is no spark from the spark plug to ignite the fuel.
C There is insufficient pressure in the combustion chamber. (1)
[20]

QUESTION 4: TRANSMISSIONS

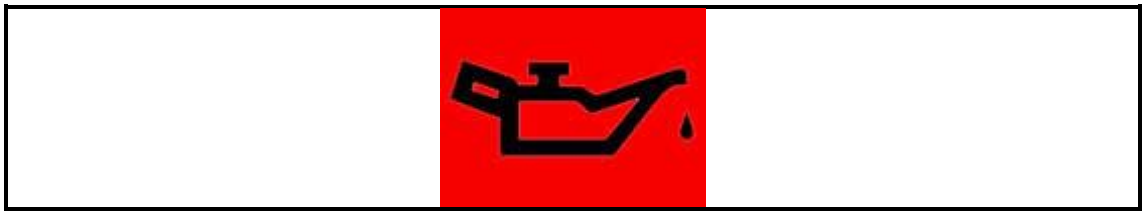
4.1 Give another name for belt drive. (1)

4.2 Define what *turbulence* is. (2)

4.3 Give a summary of automatic transmission in fuel. (7)
[10]

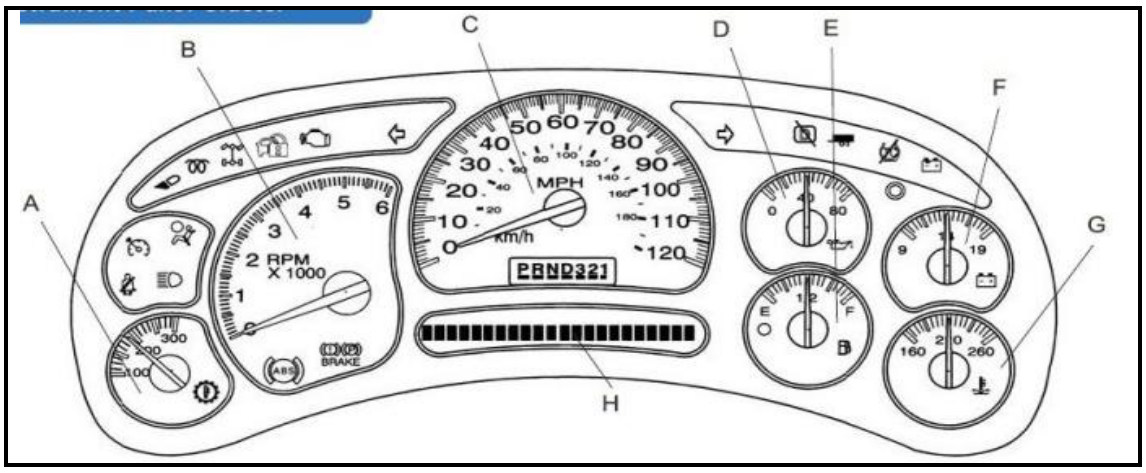
QUESTION 5: MAINTENANCE OF VEHICLES

5.1 Identify the figure below.



(1)

5.2





Identify the parts of the instrument panel by writing only the answer next to the letter (A–F) in the ANSWER BOOK. (8)

5.3 Interpret the following symbol with regard to electrical energy or power:

Ah (1)

5.4 State FIVE possible causes of an undercharged battery. (5)

5.5 The National Road Traffic Act of 1996 includes the National Road Traffic Regulations, which were added as a schedule to the Act in 1999. This law tells us what we should do and what we may not do when we operate vehicles and transport goods.



What does Regulation 234 state? (5)
[20]

QUESTION 6: SMALL PLANT AND POWER TOOL OPERATION

6.1 Why is the earth wire connected to the casing? (2)

6.2 What does the pneumatic tool use to work? (1)

6.3 With regard to regulations called the Vessels Under Pressure Regulations of 1996 (Government notice, R: 1591, 4 October 1996), which falls under Section 43 of the Occupational Health and Safety Act of 1993 (Act 85 of 1993):



What does the law state and what type of information should be on the manufacturer's data plate? (12)
[15]

QUESTION 7: OXY-ACETYLENE

7.1 Name TWO types of regulators. (2)

7.2 Explain each of the two types of regulators named in QUESTION 7.1. (2 × 2) (4)

7.3 It is essential to wear personal protective equipment when working with oxy-acetylene equipment.



Name FOUR items of PPE to be worn when working with oxy-acetylene. (4)
[10]

TOTAL: 100

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