higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PLANT AND EQUIPMENT
NQF LEVEL 3

(12030263)

6 March 2020 (X-paper)
09:00–12:00

This question paper consists of 6 pages.

291Q1S2006

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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 section on a new page.
5. Use only a blue or a black pen.
6. Write neatly and legibly.

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QUESTION 1

List FIVE safety-drill exercises that everyone should know in case of a fire. **[5]**

QUESTION 2

2.1 Define the following terminology regarding lifting equipment:

2.1.1 Manual lifting

2.1.2 Mechanical lifting

2.1.3 Tandem lifting

(3 × 2) (6)

2.2 Explain in which situations *Tandem Lifting* could be used. (2)

2.3 State FOUR basic functions performed by the banksman during lifting operations. (4)

2.4 State FIVE factors that affect the load capacity of a mobile crane. (5)

2.5 Explain the importance of using hard standings during lifting operations. (3)

[20]

QUESTION 3

3.1 Name SIX causes of black smoke in a diesel engine. (6)

3.2 Differentiate between an *electric motor brush* and a *commutator* in an induction motor. (2 × 2) (4)

3.3 State FOUR advantages of using electric motors. (4)

3.4 Give SIX reasons why fuel does not reach the combustion chamber causing an engine not to start. (6)

[20]

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QUESTION 4

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (4.1.1–4.1.10) in the ANSWER BOOK.

4.1 Mechanical advantage is the number of times a machine multiplies the effort or force.

4.2 Transmission is the part of a vehicle or machine that connects the power source to the driven part.

4.3 A gear is a component in the transmission system that transmits rotational force from one object to another.

4.4 RPM stands for revolutions per minute.

4.5 There are many similarities between belt drives and chain drives.

4.6 Synchromesh refers to gears turning at different speeds at all times.

4.7 A torque converter also means mechanical sympathy.

4.8 Drive ratio is the total amount of speed a machine can reach.

4.9 It is advisable to select gears while the vehicle is in a stationery position.

4.10 All diesel electric drives use automatic gear selection.

(10 × 1) **[10]**

QUESTION 5

5.1 The steps below indicate how a flat tyre should be changed.

Rearrange the steps in sequence by writing down only the corresponding number (a–j) in the ANSWER BOOK.

a. Remove the jack and chocks.

b. Remove the wheel and fit the new wheel onto the wheel studs.

c. Use a torque wrench to tighten the wheel nuts as recommended by the manual.

d. Gently remove the hub cap from the wheel of the vehicle.

e. Let the jack down so that the wheel is on the ground.

f. Slightly loosen the wheel nuts before you begin to jack up the vehicle.

g. Place the jack in the correct position under the vehicle and jack up the vehicle.

h. Make sure that the vehicle handbrake is pulled up and that the vehicle is in gear.

i. Wheel nuts should be easy to remove now.

j. Fit the wheel nuts, and tighten all of them by hand before using your wheel spanner to tighten them properly. (10)

5.2 List 10 dangers of overloading a vehicle. (10)
[20]

QUESTION 6

6.1 State FIVE tools that can be run by compressed air. (5)

6.2 A small construction site would require a generator to supply power to electric equipment that includes electric motors.

State FOUR other pieces of equipment that depend on the supply of electricity from the generator at the site. (4)

6.3 List FOUR tools that you will need when fitting a plug to an extension cord. (4)

6.4 Name TWO popular cordless power tools used in construction. (2)

[15]

QUESTION 7

7.1 State the use of each of the following:

7.1.1 Regulator

7.1.2 Welding hose

(2 × 2) (4)

7.2 Briefly describe how to store and lash oxygen and acetylene cylinders properly. (6)

[10]

TOTAL: 100

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