



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

**PLANT AND EQUIPMENT
NQF LEVEL 3**

NOVEMBER 2011

(12030263)

**2 November (X-Paper)
09:00 – 12:00**

This question paper consists of 6 pages.

TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
 2. Read ALL the questions carefully.
 3. ALL drawings must be neat and well balanced.
 4. Number the answers according to the numbering system used in this question paper.
 5. ALL work you do not want to be marked MUST BE clearly CROSSED OUT.
 6. Write neatly and legibly.
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QUESTION 1: BASIC FIRE AWARENESS

- 1.1 Name THREE pre-requisite elements of starting a fire. (3)
- 1.2 Identify which fire extinguisher you would use for the following fires:
- 1.2.1 Class C fires (1)
- 1.2.2 Class D fires (1)
- [5]**

QUESTION 2: LIFTING HEAVY OBJECTS

- 2.1 Define the term *safe working* load in lifting heavy objects. (2)
- 2.2 What is the safety factor of the following equipment? Write the number as your answer.
- 2.2.1 Chains (1)
- 2.2.2 Wire ropes (1)
- 2.2.3 Natural Fiber ropes (1)
- 2.3 Describe the procedure for lifting an object by hand. (3)
- 2.4 Explain FOUR safety aspects you would look for when using a chain block. (4)
- 2.5 Describe the uses (applications) of the following:
- 2.5.1 Bowline Knot (1)
- 2.5.2 sheet bend knot (1)
- 2.5.3 figure of eight knot (1)
- 2.5.4 Reef knot (1)
- 2.6 Name FOUR sling configurations used for lifting an object attached to a crane. (4)
- [20]**

QUESTION 3: ELECTRICAL MOTOR AND INTERNAL COMBUSTION ENGINE

3.1 Define the following terms:

3.1.1 Work (1)

3.1.2 Power (1)

3.1.3 Torque (1)

3.2 Complete the table to compare the features of an electrical motor and the internal combustion engine. Write only the answer next to the question number (3.2.1 – 3.2.8) in the ANSWER BOOK.

Moving parts	3.2.1	3.2.2
Starting	3.2.3	3.2.4
Operation	3.2.5	3.2.6
Maintenance	3.2.7	3.2.8

(8)

3.3 What is the difference between the spark ignition (petrol) engine and compression ignition (diesel) engine? (4)

3.4 Give FIVE possible reasons why a diesel engine will not start. (5)

[20]

QUESTION 4: TRANSMISSIONS

4.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (4.1.1 – 4.1.3) in the ANSWER BOOK.

4.1.1 Gears transmit rotation from one object to another. (1)

4.1.2 Gear ratio is determined by the weight of one gear to another. (1)

4.1.3 Chain drives are often made of rubber while the belt drive are made of metal. (1)

4.2 Explain the following terms when selecting and engaging gears:

4.2.1 Synchromesh. (2)

4.2.2 Mechanical sympathy (2)

4.3 A planetary gear sets consist of THREE main parts. Name the THREE parts. (3)

[10]

QUESTION 5: MAINTANANCE OF VEHICLES

- 5.1 Explain what is meant by vehicle maintenance. (3)
- 5.2 Give the function of the following:
- 5.2.1 Hand brake (1)
 - 5.2.2 A.B.S Systems (1)
 - 5.2.3 Fuel filter (1)
- 5.3 What is the metric unit of measurement of tyre pressure? (1)
- 5.4 Discuss the consequences of overloading a vehicle. (4)
- 5.5 Name THREE ways in which a battery's life span can be extended. (3)
- 5.6 Explain the purpose of venting a battery. (2)
- 5.7 Give TWO main advantages of trickle charging. (4)

[20]**QUESTION 6: SMALL PLANT & POWER TOOL OPERATION**

- 6.1 Explain the following terms referring to water pumps:
- 6.1.1 Impeller. (2)
 - 6.1.2 Self-priming pumps. (2)
- 6.2 Explain the difference between peak rating and normal or running rating. (4)
- 6.3 According to the Health and Safety Act (O.H.S.A), which regulations must you follow when inspecting the internal and external of pressure tanks? (4)
- 6.4 Give the function of the earth leakage circuit breaker. (1)
- 6.5 Describe the danger of using very slender drill bits. (2)

[15]

QUESTION 7: OXYACETYLENE

- 7.1 Identify the colours of the components of oxyacetylene:
- 7.1.1 Oxygen hose and bottle. (1)
 - 7.1.2 Acetylene hose and bottle. (1)
- 7.2 Discuss FOUR dangers of welding in a closed space. (4)
- 7.3 Name THREE types of flames that you can use when igniting an oxyacetylene torch. (3)
- 7.4 Explain what you understand by the word purging when shutting down an oxyacetylene set. (1)
- [10]**
- TOTAL: 100**