



**higher education  
& training**

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL CERTIFICATE (VOCATIONAL)**

**PLANT AND EQUIPMENT  
NQF LEVEL 3**

**NOVEMBER 2010**

**(12030263)**

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

**This question paper consists of 6 pages.**

**TIME: 3 HOURS**  
**MARKS: 100**

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**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 drawings must be neat and well balanced.
  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**

Fires can be classified into three different types. Name the THREE types and also suggest ways in which you can reduce the risk of fire in any TWO of the three types.

**[5]****QUESTION 2: LIFTING OF HEAVY OBJECTS**

2.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (2.1.1 – 2.1.5) in the ANSWER BOOK.

2.1.1 The safe working load of a device is the minimum load that the device is designed to lift safely. (1)

2.1.2 The inspection and testing of lifting equipment must be done by any qualified inspector. (1)

2.1.3 It is not important to keep all inspection registers on the premises. (1)

2.1.4 According to law, every power-driven lifting machine must be provided with two precautionary measures. (1)

2.1.5 Nobody is allowed to lift or move a person by means of a lifting machine, unless the machine has been fitted with a cradle approved by an inspector for that purpose. (1)

2.2 THREE types of back injuries can be sustained from incorrect lifting of objects. List these THREE types of back injuries. (3)

2.3 On a construction site, knots are used with manual lifting equipment. Name any TWO types of knots. (2)

2.4 Explain in your own words why it is important that only trained and qualified crane drivers should operate cranes. (3)

2.5 What do you understand by the following terms?

2.5.1 Tandem lift

2.5.2 Hard standings (4)

2.6 Communication is very important during lifting. State any THREE instructions that a banksman can give to the crane operator. (3)

**[20]**

**QUESTION 3: ELECTRIC MOTORS AND INTERNAL-COMBUSTION ENGINES**

3.1 Distinguish between *work* and *power*. (4)

3.2 Use the list of words below to complete the table comparing electric motors and internal-combustion engines. Write only the correct answer next to the question numbers (3.2.1 – 3.2.6) in the ANSWER BOOK.

magnetic field; noisy; quiet; lasts longer; does not last longer; diagnostic; high efficiency; low efficiency

ELECTRIC MOTOR	INTERNAL-COMBUSTION ENGINE
(3.2.1)	(3.2.2)
(3.2.3)	(3.2.4)
(3.2.5)	(3.2.6)

(6)

3.3 State THREE functions of engine lubricating oil. (3)

3.4 Discuss why a cold engine should be treated 'gently'. (3)

3.5 Give reasons why it is good practice to fill the tank of a petrol engine at the end of a working day. (4)  
[20]

**QUESTION 4: TRANSMISSIONS**

4.1 Gears are generally used to link one rotating object to another. Name THREE ways in which gears can be applied. (3)

4.2 What do you understand by the following terms?

4.2.1 Drive ratio

4.2.2 Revolution

(4)

4.3 Describe the limitations of the following parts:

4.3.1 Belt drive

4.3.2 Chain drive

4.3.3 Torque converter

(3)  
[10]

**QUESTION 5: MAINTENANCE OF VEHICLES**

- 5.1 You are in charge of all the vehicles around the construction site. State FIVE regular maintenance checks and services needed to ensure the smooth operation of vehicles. (5)
- 5.2 The hand brake is one of the most important components in a motor vehicle. Explain the purpose of a hand brake in a vehicle. (2)
- 5.3 Tyres for trucks and construction vehicles are expensive and therefore some companies will use retreaded tyres on their trucks and vehicles. Explain the consequences of using retreaded tyres on trucks and construction vehicles. (3)
- 5.4 The laws that regulate vehicle loading classify vehicles and the type of loads that are allowed. Discuss the following terms:
- 5.4.1 Gross vehicle mass
  - 5.4.2 Gross trailer mass
  - 5.4.3 Gross combination mass
  - 5.4.4 Permissible maximum vehicle mass (4)
- 5.5 State THREE consequences of overloading vehicles. (3)
- 5.6 Explain how you would perform the following activities to extend the life expectancy of batteries:
- 5.6.1 Cleaning the battery
  - 5.6.2 Preventing corrosion
  - 5.6.3 Topping up the fluid (3)
- [20]**

**QUESTION 6: SMALL PLANT AND POWER TOOL OPERATION**

- 6.1 Distinguish between the following pumps:
- 6.1.1 Self-priming pumps
  - 6.1.2 Non-self-priming pumps (4)
- 6.2 State THREE factors to be taken into account when selecting a portable generator for a small construction site. (3)
- 6.3 State THREE precautionary measures to adhere to when using a compressed-air tank. (3)
- 6.4 Explain why water traps are used on pneumatic tools. (1)

- 6.5 A concrete mixer is important on any construction site. Describe the dangers of overloading a concrete mixer. (3)
- 6.6 Explain why double-insulated hand tools do not have an earth connection. (1)  
**[15]**

**QUESTION 7: OXY-ACETYLENE**

- 7.1 An oxy-acetylene torch can be used for different tasks. Identify TWO situations where an oxy-acetylene torch can be used. (2)
- 7.2 Explain how you would differentiate between hand threads for oxygen cylinders and hand threads for acetylene cylinders. (2)
- 7.3 You are in charge of a welding workshop at your company. Explain TWO ways in which you would maintain the correct storing and lashing of acetylene and oxygen cylinders in your workshop. (4)
- 7.4 What is the purpose of flashback arresters? (2)  
**[10]**
- TOTAL: 100**