



# higher education & training

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

## **NATIONAL CERTIFICATE (VOCATIONAL)**

### **MATERIALS NQF LEVEL 3**

(12010273)

**11 December 2020 (Y-paper)  
13:00–16:00**

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

571Q1N2011


**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. Use only a black or blue pen.
  5. Write neatly and legibly.
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**QUESTION 1**

- 1.1 Name FOUR applications where timber can be used as construction material. (4)
- 1.2 Briefly explain the following defects that may occur in timber:
- 1.2.1 Distortion defects
- 1.2.2 Natural defects (2 × 2) (4)
- 1.3 Define the following terms: 
- 1.3.1 Felling
- 1.3.2 Seasoning (2 × 2) (4)
- 1.4 What do you understand about equilibrium moisture content with regard to timber? (3)
- [15]**

**QUESTION 2**

- 2.1 Describe the following properties of metals:
- 2.1.1 Lustrous
- 2.1.2 Electrical conductivity
- 2.1.3 Malleability 
- 2.1.4 Ductility 
- 2.1.5 Heat conductivity (5 × 2) (10)
- 2.2 Which metals are represented by the following abbreviations?
- 2.2.1 Cu
- 2.2.2 Fe
- 2.2.3 Al
- 2.2.4 Zn
- 2.2.5 Pb  (5 × 1) (5)
- 2.3 Give FIVE reasons why people prefer to use aluminium doors and windows instead of steel nowadays. (5)
- [20]**

**QUESTION 3**

- 3.1 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–J) next to the question number (3.1.1–3.1.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
3.1.1	The force that produces strain on a physical body	A	Young's modulus
3.1.2	Its sections are formed by rolling heated pieces of metal at a temperature of above 900 °C	B	mild steel
3.1.3	The deformation of a physical body as a result of a force applied	C	stress
3.1.4	Measurement of stress per unit of strain. It indicates the resistance of the steel to deformation within its elastic limit	D	yield point
3.1.5	The maximum tensile stress that a metal can handle	E	ultimate strength
3.1.6	Steel is able to resist breaking when it is stressed	F	toughness
3.1.7	Steel changes its shape temporarily due to stress applied and goes back to its original shape once the force is removed	G	hot-rolled steel
3.1.8	How much steel can stretch before it reaches the point where it finally breaks	H	elastic behaviour
3.1.9	Steel reached maximum strength and starts to deform plastically, which means it will never return to its original shape	I	strain
3.1.10	Contains low amount of carbon and is a large part of steel production	J	elongation

(10 × 1) (10)



- 3.2 Why is it better to buy prefabricated steel sections than to buy raw steel and put the sections together on a construction site? (5)

- 3.3 Steel is normally incombustible (cannot burn) but in most cases when steel is attacked by fire, the structure eventually collapses.

Explain in a paragraph of about FIVE points, why steel collapses in fire.



(5)  
[20]

**QUESTION 4**



- 4.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (4.1.1–4.1.5) in the ANSWER BOOK.
- 4.1.1 Oxidation is the increase of oxygen or the loss of electrons in a metal.
  - 4.1.2 The more noble metal will always become the cathode.
  - 4.1.3 The less noble metal will always become the anode. 
  - 4.1.4 Aluminium is a metal that can resist corrosion.
  - 4.1.5 Seawater is an element which speeds up corrosion in metals. (5 × 1) (5)
- 4.2 Explain the process of hot-dip galvanising fabricated steel. (4)
- 4.3 Steel is known to be a very choosy material in terms of its environment.  
Discuss the use of steel based on the environment.  (4)
- 4.4 State TWO obvious requirements when inspecting a hot-dip galvanised product. (2)
- [15]**

**QUESTION 5**

- 5.1 Describe the following:
- 5.1.1 Soldering
  - 5.1.2 Brazing 
  - 5.1.3 Welding (3 × 2) (6)
- 5.2 State FIVE advantages of welding. (5)

- 5.3 Name the kind of safety gear that should be used for protection of the following when welding:
- 5.3.1 Head
  - 5.3.2 Eyes
  - 5.3.3 Skin 
  - 5.3.4 Feet
  - 5.3.5 Respiratory system
- (5 × 1) (5)
- 5.4 Briefly explain the term *filler metal*. (2)
- 5.5 It is very important to prepare a metal surface before soldering or brazing for proper bonding. 
- Describe ONE basic method that may be used to clean a metal surface before soldering or brazing. (2)
- [20]**

**QUESTION 6**

- 6.1 State FIVE advantages of using laminated glass as a construction material. (5)
- 6.2 Briefly explain how you would store putty.  (3)
- 6.3 What is the use of a putty knife during glazing?  (2)
- [10]**
- TOTAL: 100**