higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

# NATIONAL CERTIFICATE (VOCATIONAL)

# MATERIALS
## NQF LEVEL 3

(12010273)

**17 November 2023 (X-paper)**
**09:00–12:00**

**This question paper consists of 7 pages.**

143Q1N2317

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# DEPARTMENT OF HIGHER EDUCATION AND TRAINING
# REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
MATERIALS
NQF LEVEL 3
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 Briefly differentiate between the following defects in timber:

1.1.1 Natural defects

1.1.2 Distortion defects

(2 × 2) (4)

1.2 What do you understand by *equilibrium moisture content*? (2)

1.3 What type of metal plates are used to join hanging members of timber? (1)

1.4 Explain the following properties of timber:

1.4.1 Strength

1.4.2 Density

1.4.3 Stiffness

(3 × 2) (6)

1.5 Name TWO methods to grade timber. (2)

**[15]**

## QUESTION 2

2.1 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–J) next to the question number (2.1.1–2.1.10) in the ANSWER BOOK.

| COLUMN A | | COLUMN B | |
|---|---|---|---|
| 2.1.1 | Metal's ability to expand and contract because of changes in temperature | A | electrical conductivity |
| 2.1.2 | Temperature at which metal passes from a solid phase to a liquid phase | B | lustrous appearance |
| 2.1.3 | Ability of metal to resist plastic deformation in the form of abrasive activities | C | ductility |
| 2.1.4 | Ability of metal to conduct an electric current | D | malleability |
| 2.1.5 | Polished look and ability to reflect light | E | heat conductivity |
| 2.1.6 | Ability of metal to be drawn out into a wire | F | yield strength |
| 2.1.7 | Temperature at which metal passes from the liquid phase into the solid phase | G | melting point |
| 2.1.8 | Maximum load that can be applied to a metal before it deforms permanently | H | coefficient of thermal expansion |
| 2.1.9 | Ability of metal to be hammered or shaped into thin sheets without breaking | I | hardness |
| 2.1.10 | Ability of a metal to conduct heat | J | freezing point |

(10 × 1) (10)

2.2 Briefly explain how steel is manufactured. (3)

2.3 Name THREE methods to cut steel. (3)

2.4 Describe the following methods of shaping steel:

2.4.1 Forging

2.4.2 Rolling

(2 × 2) (4)

**[20]**

**QUESTION 3**

3.1 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'True' or 'False' next to the question number (3.1.1–3.1.5) in the ANSWER BOOK.

3.1.1 Ultimate strength is when a material reaches braking point.

3.1.2 Stress is the force that produces strain on a physical body.

3.1.3 The point at which a material transforms from elastic to plastic is known as the yield point.

3.1.4 Deformation is when force is removed from a material or an object.

3.1.5 Strain is the deformation of a physical body as a result of one or more forces applied on it.

(5 × 1) (5)

3.2 List FIVE benefits of prefabricated steel sections. (5)

3.3 Make simple sketches to illustrate the following cold-forged steel sections:

3.3.1 Lipped channel

3.3.2 Top-hat section

3.3.3 Lipped Z-bar

(3 × 2) (6)

3.4 Give a detailed description of what happens when steel is attacked by fire. (4)

**[20]**

## QUESTION 4

4.1 Give ONE word or term for each of the following descriptions. Write only the word or term next to the question number (4.1.1–4.1.6) in the ANSWER BOOK.

4.1.1 Coating an object with a thin layer of a metal by means of electricity.

4.1.2 Sealing off existing rust with an oxygen-impermeable layer.

4.1.3 Mixing of a metal with another corrosion resistant metal to make it more corrosion resistant.

4.1.4 A building is designed in such a way that water runs away from it.

4.1.5 Applying a liquid material that acts as a barrier of corrosion between a metal and the environment.

4.1.6 The process of coating iron or steel with a thin layer of zinc by submerging the metal into a bath of molten zinc.

(6 × 1) (6)

4.2 Explain the steps to ensure correct and successful galvanisation. (5)

4.3 How will you see that galvanised products do not meet the requirements? (2)

4.4 Briefly explain the formation of white rust. (2)

**[15]**

## QUESTION 5

5.1 Name FIVE advantages of welding. (5)

5.2 Explain the importance of wearing the following items during welding.

5.2.1 Safety goggles

5.2.2 Welding helmet

5.2.3 Respiratory mask

(3 × 2) (6)

5.3 Briefly discuss TWO methods to clean and prepare a metal for soldering or brazing. (4)

5.4 As a member of your company's recruiting team, you have to hire a welder. How will you make sure that you hire a qualified and experienced welder? (3)

5.5 Explain the *structural welding code*. (2)
**[20]**

**QUESTION 6**

6.1 Briefly explain the dangers of using float glass. (2)

6.2 How will you identify laminated glass? (2)

6.3 Give THREE advantages of laminated glass. (3)

6.4 Name tools that you will need to install a pane of glass in a window. (3)
**[10]**

**TOTAL: 100**

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