higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATERIALS
NQF LEVEL 3

(12010273)

8 November 2022 (X-paper)
09:00–12:00

This question paper consists of 5 pages.

161Q1N2208

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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 black pen.
6. Write neatly and legibly.

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QUESTION 1

1.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

1.1.1 Knots should be considered when structural timber is cut and graded.

1.1.2 Timber has a high tensile strength perpendicular to its grain.

1.1.3 The pull-out resistance of a nail inserted perpendicular to the grain is stronger than the resistance of a nail inserted parallel to the grain.

1.1.4 The seasoning of timber is a process used to lower the moisture content level.

1.1.5 SA pine is classified as softwood suitable for all types of structural timber.

(5 × 1) (5)

1.2 Tabulate THREE characteristics of hardwood and THREE characteristics of softwood. (2 × 3) (6)

1.3 Make a neat sketch of a grading stamp indicating a finger-jointed piece of timber with a visual stress grade of 5. (4)

[15]

QUESTION 2

2.1 State the technical terms used to describe the following processes in a mechanical engineering environment:

2.1.1 The process of cutting metal using different saws

2.1.2 The process of neatening the edges of a metal

2.1.3 The process of cutting metal sheets accurately

2.1.4 The process of cutting metal with a plasma torch

2.1.5 The process of perforating (making a row of holes) a metal sheet

(5 × 2) (10)

2.2 Distinguish between a *pure metal* and an *alloy*. (2)

2.3 Name TWO main constituents of brass. (2)

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2.4 We normally see large portions of steel used as construction material, while other metals such as aluminium are used only in small portions.

As a civil engineering student, how would you justify the above statement? (4)

2.5 What kind of a metal would you select for the following applications in construction?

2.5.1 Plumbing

2.5.2 Sliding doors

(2 × 1) (2)
[20]

QUESTION 3

3.1 Steel is prone to corrosion, especially when exposed to moisture.

Explain how you would store steel in the stockyard to prevent corrosion damage. (5)

3.2 Make TWO simple sketches to illustrate horizontal and vertical bracing. (6)

3.3 Why is a base plate needed at the end of a steel column? (1)

3.4 Give TWO main functions of holding-down bolts for steel structures. (2)

3.5 Explain the term *shims* and their function in the steel structure industry. (2)

3.6 List FOUR aspects that should be checked by the contractor before issuing the handover certificate. (4)
[20]

QUESTION 4

4.1 Describe steps that should be followed to prevent bimetallic or galvanic corrosion. (5)

4.2 Name FOUR elements of corrosion. (4)

4.3 Explain the process of hot-dip galvanising of fabricated steel articles. (2)

4.4 Describe what hot-dip galvanised coating products should look like. (4)
[15]

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QUESTION 5

5.1 There are various parameters that can affect the quality of a weld. Name any FIVE of these parameters. (5)

5.2 Name FIVE safety gear items needed during welding works. (5)

5.3 Electric shock remains a life-threatening hazard in the workshop. As a health and safety representative officer, educate workers about the importance of safety by discussing FIVE precautionary measures to be followed during welding to avoid electric shock. (5)

5.4 Name a tool that you will need to perform soldering. (2)

5.5 Explain the importance of welding in a well-ventilated workshop. (3)
[20]

QUESTION 6

6.1 Explain where you would use the following types of glass in the construction industry:

6.1.1 Toughened glass

6.1.2 Laminated glass

6.1.3 Float glass

(3 × 1) (3)

6.2 Explain how you should store glazing putty. (2)

6.3 Give THREE advantages of laminated glass. (3)

6.4 What kind of drill bit is needed to drill a hole through float glass? (1)

6.5 Name a tool that is used to shape putty when glazing. (1)
[10]

TOTAL: 100

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