higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATERIALS
NQF LEVEL 3

(12010273)

13 November 2024 (X-paper)
09:00–12:00

This question paper consists of 6 pages.

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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

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 Currently, timber has become the most expensive building material in the building industry.

What might be the cause of timber being so expensive? (2)

1.2 Draw a simple free-hand sketch of a cross-section of a tree trunk and label the following:

1.2.1 Pith

1.2.2 Heartwood

1.2.3 Sapwood

1.2.4 Growth ring

1.2.5 Bark

(5 × 1) (5)

1.3 Name TWO bent metal plates that can be used to connect timber in trusses. (2)

1.4 What does the following symbol mean with regard to the timber grading?

Black crosses (XXX) (2)

1.5 Explain how one should stack timber on site. (4)

[15]

QUESTION 2

2.1 Why should one consider coefficient of thermal expansion during the design stage of steel construction. (3)

2.2 Describe *hardness* in properties of metals. (2)

2.3 Name THREE furnaces or mills that are used to produce steel. (3)

2.4 Explain the process of cutting metal using the following:

2.4.1 Cropping machine

2.4.2 Guillotine

2.4.3 Abrasive water jet

(3 × 2) (6)

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2.5 You are required to construct a community hall using metal.

How will you go about choosing appropriate metals based on the following factors:

2.5.1 Environment

2.5.2 Physical properties

2.5.3 Economics

(3 × 2) (6)
[20]

QUESTION 3

3.1 Discuss FIVE advantages of using steel as a construction material. (5)

3.2 Why is mild steel useful in motors and electrical appliances? (1)

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

Write a minimum of FOUR points explaining why steel collapses in fire. (4)

3.4 Give THREE main functions of bracing when building a steel structure. (3)

3.5 What is the main purpose of shims in steel erection? (2)

3.6 When inspecting a steel structure for compliance, Inserted bolts must also be checked.

Indicate how one goes about ensuring that all bolts have been inserted correctly. (5)
[20]

QUESTION 4

4.1 Discuss the effect of corrosion on metals. (4)

4.2 Define the following terms:

4.2.1 Deterioration

4.2.2 Corrosion

4.2.3 Oxidation

(3 × 2) (6)

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4.3 Discuss the formation of microbial corrosion. (3)

4.4 Briefly explain the term, *anodising*. (2)
[15]

QUESTION 5

5.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (5.1.1–5.1.5) in the ANSWER BOOK.

5.1.1 Welding is the process of joining two pieces of metal together.

5.1.2 A propane torch is used during brazing.

5.1.3 Lead can be used as solder for copper piping in domestic plumbing.

5.1.4 Aluminium is the easiest metal to be soldered.

5.1.5 The Occupational Health and Safety Act allows welders to work in a closed space.

(5 × 1) (5)

5.2 Identify the tools/machines depicted below:

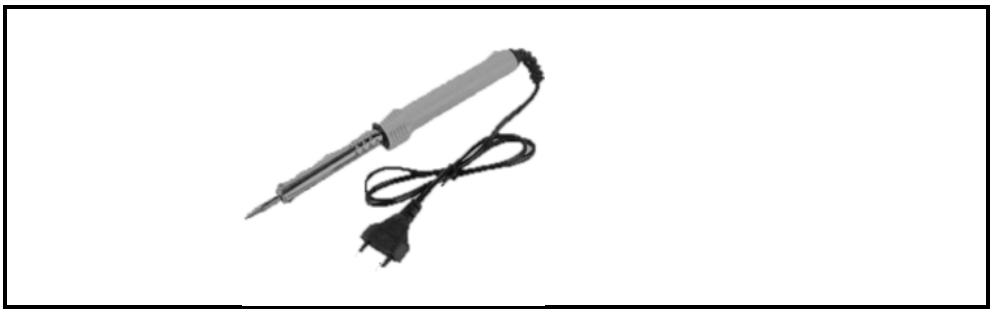
5.2.1



5.2.2



5.2.3



(3 × 1) (3)

5.3 State SIX factors that one would consider when choosing the correct electrode for a welding job. (6)

5.4 Explain in steps how a galvanised mild steel sheet is soft-soldered using lead solder and flux. (4)

5.5 Indicate the type of welding one will use to perform the following tasks:

5.5.1 Joining thin materials

5.5.2 The aviation and automotive industry

(2 × 1) (2)

[20]

QUESTION 6

Redraw and complete the following table in the ANSWER BOOK.

TYPE OF GLASS	PURPOSE	APPLICATION
Wired glass		
Glazed panels		
Laminated glass		
Float glass		
Toughened glass		

[10]

TOTAL: 100

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