higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 3

(6050433)

7 December 2020 (X-paper)
09:00–12:00

This question paper consists of 6 pages.

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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. Write neatly and legibly.

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QUESTION 1

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 The thickness of fibres in hardwood is bigger than those of softwood.

1.2 Cooking liquor is made only by a mixture from the wood chips.

1.3 Chipping increases logs into larger pieces.

1.4 Pulp is the most important raw feedstock of paper production.

1.5 Embossing improves the quality, smoothness and gloss of paper.

(5 × 1) **[5]**

QUESTION 2

2.1 Write down a molecular formula for each of the following:

2.1.1 Mono-ammonium phosphate

2.1.2 Ammonium nitrate

2.1.3 Potassium sulphate

2.1.4 Superphosphate

2.1.5 Urea

(5 × 2) (10)

2.2 A dry fertiliser is usually sold as spherical granules or in pellet form.

2.2.1 How does the size of fertiliser granules affect gradual nutrient release? (2)

2.2.2 State TWO disadvantages of a dry fertiliser. (2)

2.3 Give THREE examples of secondary nutrients. (3)

2.4 State an identifiable symptom observed when each of the following macronutrients is lacking in plants:

2.4.1 Potassium

2.4.2 Phosphorus

(2 × 1) (2)

2.5 Draw a labelled diagram of a fluid bed reactor for pyrite roasting. (6)

[25]

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QUESTION 3

3.1 Give TWO industrial uses for each of the following calcium compounds:

3.1.1 $Ca(OH)_2$

3.1.2 $CaSO_4$

3.1.3 $CaCO_3$

3.1.4 CaO

(4 × 2) (8)

3.2 Complete and balance the following equation:

$Ca(OH)_2(aq) + CO_2(g) \rightarrow$ (2)

3.3 Which sodium compound is used for the following functions?

3.3.1 To improve the taste and flavour of food.

3.3.2 Production of soda-lime-silica glass.

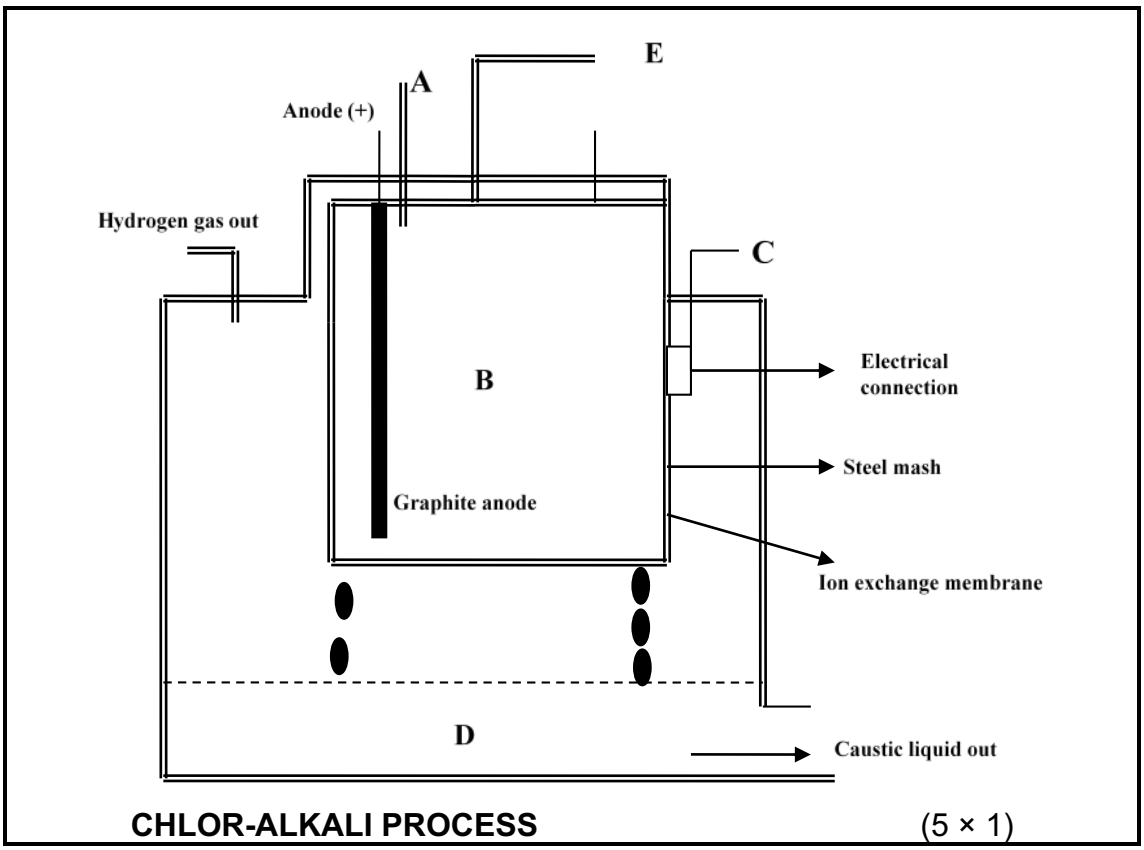
3.3.3 Formally used as a laxative.

3.3.4 Used in baking powder and cooking soda.

3.3.5 Production of soap.

(5 × 1) (5)

3.4 Complete the diagram of a chlor-alkali process by writing the missing terms next to the letter (A–E) in the ANSWER BOOK.



CHLOR-ALKALI PROCESS (5 × 1) (5)

[20]

QUESTION 4

4.1 List FIVE advantages of using slagment. (5)

4.2 Draw a labelled process flow diagram with TEN correct labels for a cement production plant. (10)

[15]

QUESTION 5

5.1 Indicate the type of surfactants found in each of the following products:

5.1.1 Fabric softener

5.1.2 Baby shampoo

(2 × 1) (2)

5.2 List THREE primary ingredients used during the production of soap. (3)

5.3 Draw a labelled process flow diagram to produce soap in a continuous saponification process. (15)

[20]

QUESTION 6

6.1 Indicate where each of the following is found in a tree trunk:

6.1.1 Bark

6.1.2 Cambium layer

6.1.3 Sapwood

6.1.4 Heartwood

(4 × 1) (4)

6.2 List, in sequence, the SEVEN steps of the woodyard process followed in pulp and paper manufacturing. (7)

6.3 Name FOUR techniques to laminate a paper. (4)

[15]

TOTAL: 100

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