higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 3

(6050433)

13 November 2018 (X-Paper)
09:00–12:00

This question paper consists of 7 pages.

NCV

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

1.1 List FIVE manufacturers of fertiliser in South Africa. (5)

1.2 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write 'true' or 'false' next to the question number (1.2.1–1.2.3) on the ANSWER BOOK.

1.2.1 Both dry and liquid fertilisers are applied directly to the soil and absorbed by the plant.

1.2.2 Foliar fertiliser can also be applied directly to the soil where nutrients are required.

1.2.3 Plants absorb water-soluble fertiliser much faster than other fertilisers.

(3 × 1) (3)

1.3 Lwazi is working on a farm and notices that the crops are showing some kind of deficiency.

Name the types of nutrients that he will need to control the following deficiencies.

1.3.1 Lack of green colour between the veins on the leaves.

1.3.2 Younger leaves of the plant show the signs of dieback.

1.3.3 Leaf scorch.

1.3.4 The crop looks small and sickly.

(4 × 1) (4)

1.4 Study the following reaction equation that is used in the production of nitric acid and answer the questions.

$2NO_2 \longleftrightarrow N_2O_4$

1.4.1 Why is a double sided arrow ($\longleftrightarrow$) used? (2)

1.4.2 Which product will produce high concentrated nitric acid? (1)

[15]

QUESTION 2

Produce a labeled basic freehand drawing of the process flow of a typical nitric acid production process. **[10]**

QUESTION 3

3.1 Define the following raw materials used in cement manufacturing:

3.1.1 Clay

3.1.2 Alkali waste

3.1.3 Slate

3.1.4 Ash

3.1.5 Shale

(5 × 2) (10)

3.2 Rotary kiln is a piece of equipment used in the production of cement to heat the materials for various reactions to occur.

State the temperature ranges inside the kiln for the formation of the following reactions:

3.2.1 $CaCO_3 \longrightarrow Ca + CO_2$

3.2.2 $2CaO + SiO_2 \longrightarrow 2CaO.SiO_2$

3.2.3 $2Ca.SiO_2 \longrightarrow 3CaO.SiO_2$

(3 × 2) (6)

3.3 Explain the slag granule formation process. (4)

[20]

QUESTION 4

4.1 State THREE uses of the following:

4.1.1 Calcium hydroxide

4.1.2 Calcium sulphate

(2 × 3) (6)

4.2 Write balanced reactions equations following:

4.2.1 The formation of gypsum form anhydrite.

4.2.2 The formation of anhydrite from gypsum.

(2 × 4) (8)

4.3 Give ONE source of sodium chloride. (1)

[15]

QUESTION 5

5.1 Hydrophobic and hydrophilic are the most important ends of surfactants.

5.1.1 Name THREE types of hydrophilic group. (3)

5.1.2 Name TWO types of hydrophobic structure. (2)

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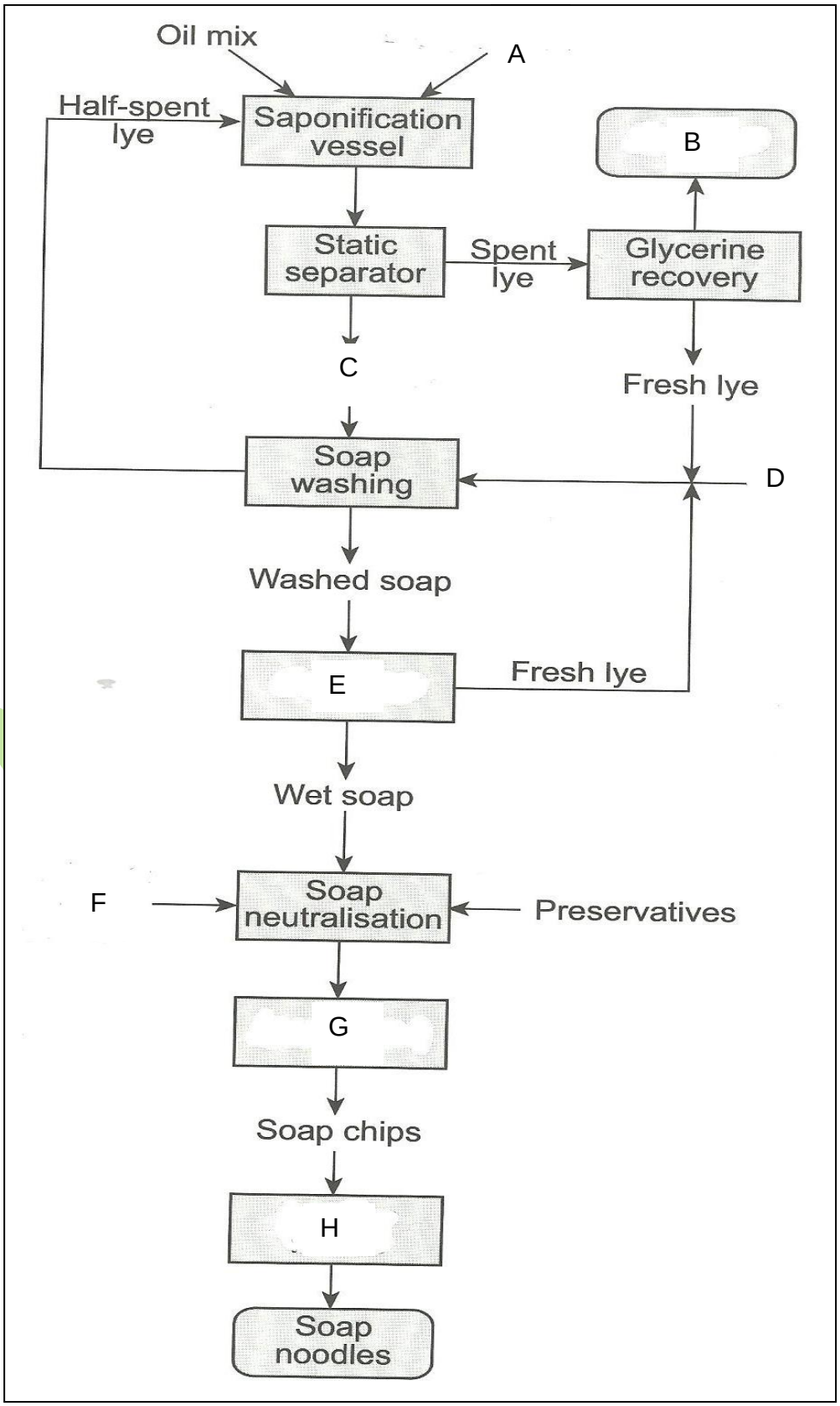
5.2 The diagram below is a process flow diagram of a production of soap using a continuous process. Complete the diagram by filling in letters (A–H) in your ANSWER BOOK.



(8)

5.3 Pests are destructive living organism that can spread life-threatening diseases and virus and they can be control very easily by using pesticides.

5.3.1 State THREE primary benefits of using pesticides. (3)

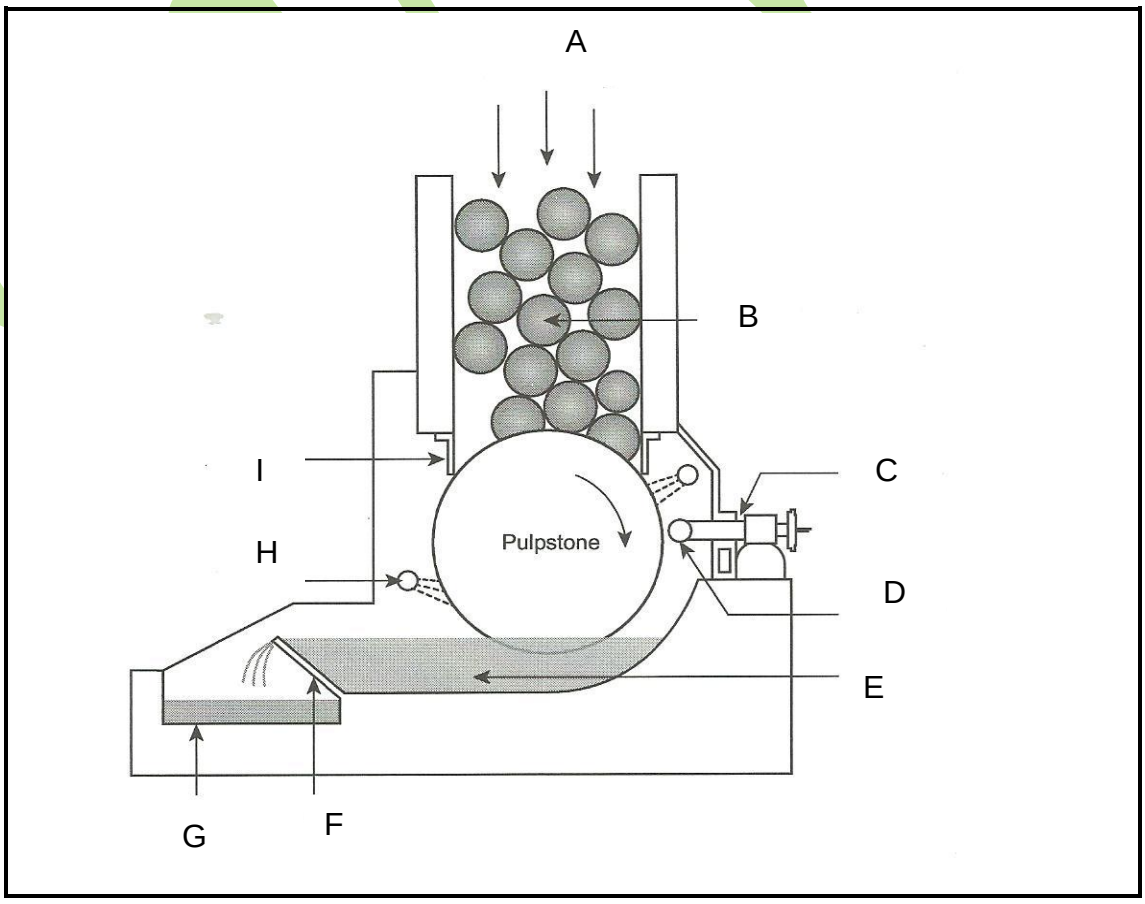
5.3.2 What is the main disadvantage of using pesticides? (1)

5.4 Name THREE types of organic insecticides. (3)
[20]

QUESTION 6

6.1 List FOUR raw materials used in pulp production. (4)

6.2 The following diagram indicates the components of groundwood pulping process. Complete the diagram by filling in letters (A–I) in your ANSWER BOOK.



(9)

6.3 List FOUR phases of the batch digester. (4)

6.4 State THREE factors affecting embossing process. (3)
[20]

TOTAL: 100

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