higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS TECHNOLOGY
NQF LEVEL 2

(6050342)

27 February 2020 (Y-paper)
13:00–16:00

This question paper consists of 6 pages.

127Q1S2027

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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 black or blue pen.
6. Write neatly and legibly.

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SECTION A

QUESTION 1

Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 The main purpose of flow sheets is to …

A show the relationship between all major process steps in a process environment.
B indicate product-usage locations.
C help the operator see how the flow goes.
D determine the pipe class.

1.2 Process deviations are caused by …

A product stream name.
B equipment failure.
C alkylation.
D isomerisation.

1.3 The main welding method used to manufacture spiral-welded pipes:

A Submerged arc-welded pipe
B Tungsten inert gas-welded pipe
C Electric resistance welded pipe
D High-frequency and laser-welded pipe

1.4 Cryogenic refers to which ONE of the following?

A Temperatures above -150 °C
B Temperatures equal -150 °C
C Temperatures below -250 °C
D Temperatures below -150 °C

1.5 Used to open, close or restrict flow of fluids inside a piping system:

A Pumps
B Screws
C Pipes
D Valves

(5 × 1) **[5]**

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QUESTION 2

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (2.1–2.5) in the ANSWER BOOK.

2.1 Legends are used to describe symbols and line structures for a specific PFD.

2.2 Main process lines on PFDs are not broken.

2.3 Balloons are used along with valve symbols to indicate the function of the valve.

2.4 Steel pipes are extremely light and have good general-corrosion resistance.

2.5 Threaded flanges are thin membranes placed between two flanges to ensure a tight seal.

(5 × 1) **[5]**

QUESTION 3

Complete the following sentences by writing only the missing word or words next to the question number (3.1–3.5) in the ANSWER BOOK.

3.1 … uses size exclusion to remove solids from a liquid suspension.

3.2 Negatively charged ions are called …

3.3 A … is a metal tool with several teeth used for scrapping.

3.4 Devices used to accomplish the screening process are called …

3.5 Pressure screens use … to keep particles in motion while separating them through a screen.

(5 × 1) **[5]**

TOTAL SECTION A: 15

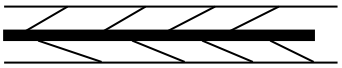
SECTION B

QUESTION 4

4.1 State TWO purposes of process-flow diagrams. (2)

4.2 Name each of the following line types:

4.2.1

4.2.2 

4.2.3 

(3 × 1) (3)

4.3 Define the term *corrosion*. (2)

4.4 List THREE types of check valves. (3)

4.5 List THREE uses of demineralised water. (3)

4.6 Explain the function of clarifiers. (2)
[15]

QUESTION 5

5.1 List THREE common shapes of casing in pumps. (3)

5.2 Name FIVE components of a gear pump. (5)

5.3 Odours arising from processes or other sources on industrial sites must be controlled and this is accomplished by introducing fresh air in sufficient quantities to reduce the odour concentrations to an acceptable level.

5.3.1 What is the name of this process? (2)

5.3.2 Explain the function or use of blowers in the process named in QUESTION 5.3.1. (2)

5.4 List THREE advantages of reciprocating compressors. (3)

5.5 Electrical faults are not gas-transfer equipment faults, but rather faults with drive equipment.

5.5.1 Explain how electrical faults can be recognised in gas-transfer equipment. (2)

5.5.2 What should be done when suspecting an electrical problem? (3)
[20]

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QUESTION 6

6.1 Which tanks are commonly used to store fuel underground? (2)

6.2 Give TWO advantages of the tanks in QUESTION 6.1. (2)

6.3 Give TWO uses of ponds. (2)

6.4 Give ONE function of each of the following components of floating roofs:

6.4.1 Secondary seal

6.4.2 Rim vents

6.4.3 Deck legs

(3 × 2) (6)

6.5 Write brief notes on *sacrificial anodes* as a way to prevent corrosion. (7)

6.6 What does the acronym *LPG* stand for? (1)

[20]

QUESTION 7

7.1 List FOUR problems associated with rapid sand filters. (4)

7.2 Name TWO types of pressure applied to squeeze filtrate through a membrane medium in pressure filtration. (2)

7.3 What is the purpose of clarification? (2)

7.4 List NINE components of a vertical basket centrifuge. (9)

7.5 Give TWO factors that ensure the separation process in a cyclone. (2)

7.6 Explain the operating principles of a cyclone. (9)

7.7 What is the unit of concentration? (2)

[30]

TOTAL SECTION B: 85
GRAND TOTAL: 100

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