higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS TECHNOLOGY
NQF LEVEL 2

(6050342)

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13:00–16:00

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
PROCESS TECHNOLOGY
NQF LEVEL 2
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

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

1.1 They are used to indicate all in-line components and equipment.

A PFD
B Symbols
C Legends
D Line breaking

1.2 A … is a weld that connects two parts together by adding extra material to it.

A fillet
B weld neck
C t-fitting
D gasket

1.3 Separator plates that restrict or direct fluid flow.

A Stream traps
B Ball floats
C Baffles
D Balanced pressure stream traps

1.4 The application of corrosion-resistant materials to the pipe surface is known as …

A coating
B wrapping
C cathodic protection
D insulation

1.5 … means to cause a machine to operate.

A Start valve
B Actuated
C Throttle
D Plug valve

(5 × 1) **[5]**

QUESTION 2

2.1 Describe TWO ways in which PFDs can help an operator in a process plant. (2)

2.2 Draw the symbols below:

2.2.1 3-way valve

2.2.2 Relief valve

(2 × 2) (4)

2.3 List any THREE labels that can be included on the specification of the pipes. (3)
[9]

QUESTION 3

Write SIX dimensions that can be used to describe the size of a pipe. **[6]**

QUESTION 4

4.1 Sketch a free hand diagram of stroke 1 single-acting piston pump. (5)

4.2 Explain the operating principles of double-acting piston pumps from stroke 2. (3)

4.3 Rotary pumps are classified according to the type of rotating element.

Name FIVE types of rotary pumps. (5)

4.4 A plant operator has to inspect and find faults in any operating pumps in the plant.

Provide FOUR best ways in which operator can use to inspect and find faults in pumps. (4)

4.5 Explain THREE remedies applied during vortexing. (3)
[20]

QUESTION 5

5.1 Write out the acronym SOPs in full. (1)

5.2 The principles of minimising storage losses are basically the same as those for maintaining the quality of the stored product. By protecting the quality of the product, the losses that takes place during the storage may also be minimised.

5.2.1 Write any FIVE guidelines to be followed in order to minimise storage losses. (5)

5.2.2 To prevent negative environmental impact, hazardous chemicals must not be released to the environment.

Name FOUR things to remember when storing to products in order to ensure safety of the environment. (4)

5.3 In a storage area, there could be frequent spillages of chemicals and similar materials that could cause anything from a minor inconvenience to a major disaster.

State SEVEN questions to ask when spillage occur. (7)

5.4 Name any THREE applications where side-entry mixers are used effectively. (3)
[20]

QUESTION 6

6.1 Write brief notes on demineralised water. (3)

6.2 List THREE main sources of effluent water. (3)

6.3 Identify any FOUR components of pressure screen. (4)
[10]

QUESTION 7

7.1 Define the following terms:

7.1.1 Filtrate

7.1.2 Porous medium

7.1.3 Slurry

7.1.4 Coagulation

7.1.5 Supersaturated

(5 × 2) (10)

7.2 List FIVE things that determines the efficiency of separation in the stock properties. (5)

7.3 Name SEVEN components of Swenson-Walker cooling crystalliser. (7)

7.4 Write brief notes on the formation of crystals from the nucleation processes. (3)

7.5 Discuss the operating principles of simple centrifugation. (5)
[30]

TOTAL: 100

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