higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS TECHNOLOGY
NQF LEVEL 2

(6050342)

21 November 2023 (Y-paper)
13:00–16:00

This question paper consists of 6 pages.

231Q1N2321

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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. Start each section on a new page.
5. Use only a blue or black pen.
6. Write neatly and legibly.

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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 … refers to a large volume or quantity of a product or item.

A Firewater
B A drum
C Bulk
D A manhole

1.2 Oil ponds pose a/an … risk.

A blockage
B overflowing
C hazardous
D fire

1.3 These pipes are used where extremely high quality and integrity is needed in the chemical industry:

A Seamless pipes
B Spiral-welded pipes
C Large diameter pipes
D Longitudinal-welded pipes

1.4 … refers to a chemical other than an explosive that initiates or promotes combustion in other materials and thereby causing fire, either itself or through the release of oxygen or other gases.

A An explosive
B An oxidiser
C An unstable reactive
D A combustible

1.5 It is ONE of the components of a floating roof:

A Bed support
B Outlet
C Vent valve
D A deck manhole

(5 × 1) **[5]**

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 T-pieces allow the flow to be directed in one way.

2.2 The main purpose of the valves is to show the relationships between all the major steps in a process environment.

2.3 A sacrificial anode is the anode that corrodes in order for another metal to be protected against corrosion.

2.4 Connecting rods transmit motion or power from the piston to the crankshaft.

2.5 SOPs tell people how to do certain tasks in the process technology industry.

(5 × 1) **[5]**

QUESTION 3

3.1 Name FOUR types of information on the labels that are found above the line that represents a specific section of a pipe. (4)

3.2 Draw each of the following valve symbols:

3.2.1 Globe valve (3)

3.2.2 Diaphragm valve (3)

3.3 Flanges are used to connect two pipes together or to connect a pipe to equipment.

State THREE factors that may cause a flange to fail. (3)

3.4 List THREE basic types of fitting connections. (3)

[16]

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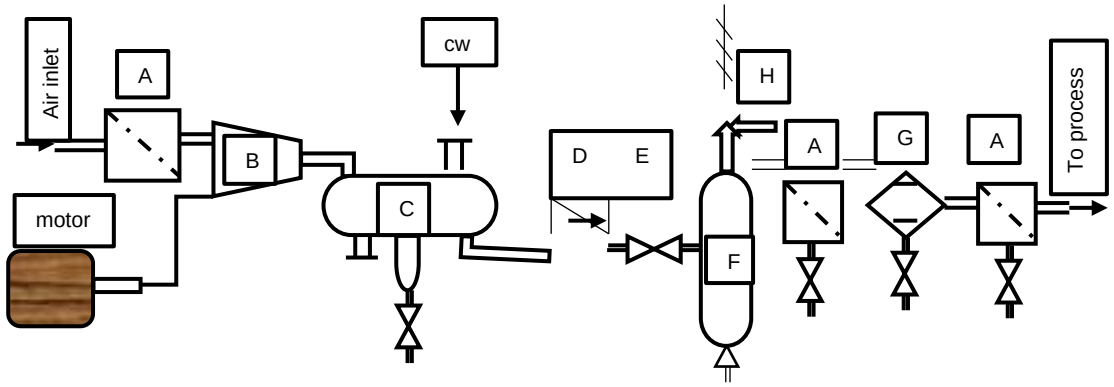
QUESTION 4

4.1 Define the term *reciprocating.* (2)

4.2 List FOUR types of rotary pumps. (4)

4.3 Compressor configurations are structured to ensure that unwanted materials do not enter the system. For air compressors, these unwanted materials are mainly dust and moisture.

Below is a diagram indicating the compressor configurations that demonstrate such kinds of installations. Label the letters (A–H) by writing only the answer next to the letter in the ANSWER BOOK.



(8)

4.4 State FIVE disadvantages of reciprocating compressors. (5)
[19]

QUESTION 5

5.1 Write down FIVE advantages of intermediate bulk containers. (5)

5.2 Fire-fighting equipment must always be available when working with containers. Give FIVE hints for the prevention of fires. (5)

5.3 List FIVE examples of solid materials that are stored in bulk. (5)
[15]

QUESTION 6

6.1 Write brief notes on *treated water*. (5)

6.2 Indicate FIVE steps to be followed during water-treatment processes. (5)
[10]

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QUESTION 7

7.1 Define the following terms:

7.1.1 Saturation

7.1.2 Mother liquor

7.1.3 Crystals

(3 × 2) (6)

7.2 If a 35 000-ℓ settling tank receives 75 ℓ water per minute, calculate the *retention time* of the water. (5)

7.3 Draw a freehand diagram to illustrate a filtration mechanism. (5)

7.4 Write brief notes on *nucleation*. (5)

7.5 List FOUR functional sections of a cyclone. (4)

7.6 State FIVE disadvantages of cyclones. (5)

[30]

TOTAL: 100

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