



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE **CHEMICAL PLANT OPERATION N6**

(8050026)

8 April 2021 (X-paper)
09:00–12:00

This question paper consists of 5 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE
CHEMICAL PLANT OPERATION N6
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 Water gas is also called a blue gas.
- 1.2 The naphthene series has the same chemical formula as the olefin series.
- 1.3 A gas purge system can be used when the contents of a tank is very hot.
- 1.4 Extraction is the same as a filtration process.
- 1.5 Wax is removed from petroleum by using a filtration process.

(5 × 1)

[5]**QUESTION 2**

Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–G) next to the question number (2.1–2.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
2.1	Transfer of steam, compressed air or fluid <input checked="" type="radio"/>	A	kerosene
2.2	Viscosity	B	toluene
2.3	Natural gas	C	distillation
2.4	Used as jet fuel	D	poise
2.5	Liquid which has not vaporised	E	pseudo-custody
		F	residue
		G	methane

(5 × 1)

[5]**QUESTION 3**

- 3.1 Plate efficiency is a function of the rate of mass transfer between liquid and vapour.
- 3.1.1 Name THREE types of plate efficiency. (3)
- 3.1.2 Name TWO factors that lower plate efficiency. (2)
- 3.2 Define *condition of feed (q)*. (3)

- 3.3 Describe each of the following plates:
- 3.3.1 Trays (5)
- 3.3.2 Bubble-cap plates (4)
- 3.4 State THREE uses of adsorption. (3)
- [20]**

QUESTION 4

- 4.1 Give a chronological description of the manufacturing of aluminium sulphate by using bauxite. (8)
- 4.2 Define each of the following conversion processes:
- 4.2.1 Isomerisation
- 4.2.2 Cracking (2 × 3) (6)
- 4.3 Draw a process flow diagram of a by-product coke-oven procedure. (11)
- [25]**

QUESTION 5

- 5.1 Discuss the following separation processes used in petroleum refining:
- 5.1.1 Filtration (4)
- 5.1.2 Extraction (5)
- 5.1.3 Crystallisation (3)
- 5.2 Explain the following methods for purification of natural gas:
- 5.2.1 Compression (3)
- 5.2.2 Treatment with drying substance (3)
- 5.2.3 Refrigeration (1)
- 5.3 State THREE problems that could be caused by water in the transmission line. (3)
- [22]**

QUESTION 6

- 6.1 Describe how chlorine is dried during the manufacturing process. (3)
- 6.2 Write brief notes on a diaphragm-type depth-measuring system. (7)
- [10]**

QUESTION 7

- 7.1 Name FIVE displacement meters. (5)
- 7.2 Write brief, clarifying notes on the operation of induction-bridge hydrometers. (5)
- 7.3 Name THREE types of temperature scales. (3)
- [13]**

TOTAL: 100