



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE CHEMICAL PLANT OPERATION N5

(8050015)

**15 April 2021 (X-paper)
09:00–12:00**

Nonprogrammable calculators and drawing instruments may be used.

This question paper consists of 4 pages and 1 addendum.

185Q1A2115

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE
CHEMICAL PLANT OPERATION N5
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. Sketches must be large, neat and fully labelled.
 5. Write neatly and legibly.
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QUESTION 1

Complete the sentences by writing the missing word or words next to the question number (1.1–1.5) in the ANSWER BOOK.

- 1.1 The saturation temperature depends on the ... exerted on the surface of the water.
- 1.2 In axial-flow turbines, steam flow is ... to the turbine axis.
- 1.3 Steam turbines consist of nozzles and ...
- 1.4 Nozzle-mix burners mix ... and gas at the burner tile.
- 1.5 Equilibrium is an inverse function of ... and a direct function of the O_2/SO_2 ratio.
(5 × 1) **[5]**

QUESTION 2

- 2.1 State the specific procedure used for solving material balance problems. (5)
- 2.2 Complete the reactions:
- 2.2.1 $4NH_3 + 3O_2 \rightarrow$
- 2.2.2 $NaNO_3 + H_2SO_4 \rightarrow$
(2 × 2) (4)
- 2.3 Name SIX mixers and what they are used for. (12)
- 2.4 Explain the advantages and disadvantages of closed-circuit gas turbines. (4)
[25]

QUESTION 3

- 3.1 Write brief notes on:
- 3.1.1 Reaction turbine (4)
- 3.1.2 Impulse turbine (4)
- 3.1.3 The design of nozzle (9)
- 3.2 Name FIVE factors that affect the efficiency of the cyclone. (5)
[22]