



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE CHEMICAL PLANT OPERATION N5

(8050015)

**5 August 2021 (X-paper)
09:00–12:00**

Drawing instruments and nonprogrammable calculators may be used.

**This question paper consists of 4 pages, 1 periodic table, 1 steam table
and 2 information sheets.**

195Q1G2105



DEPARTMENT OF HIGHER EDUCATION AND TRAINING
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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. Start each question on a new page.
 5. Only use a black or blue pen.
 6. Write neatly and legibly.
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QUESTION 1

Complete the following sentences by filling in the missing word or words. Write only the word or words next to the question number (1.1–1.10) in the ANSWER BOOK.

- 1.1 ... is the form or manifestation of energy that flows from one object to another.
- 1.2 Calorie refers to the amount of ... to raise the temperature of one gram of water from 14,5 °C to 15,5 °C. 
- 1.3 Kopp's rule states that the total heat capacity of a compound is approximately equal to the sum of the heat capacities of the ...
- 1.4 If steam contains ... suspended in it, it is called wet steam.
- 1.5 In an impulse turbine, the entire available ... from supply to exhaust occurs across the nozzles.
- 1.6 In axial-flow turbines the steam flow is ... to the turbine axis.
- 1.7 When burners are burning with a/an ..., it indicates that complete combustion has taken place. 
- 1.8 In cyclones, the incoming dust-laden air receives a/an ... on entrance to the cylinder.
- 1.9 Sulphuric acid and salt are roasted in a furnace to form ... and sodium sulphate.
- 1.10 Tumbling mixers are used for dense solids in liquids and ...

(10 × 2)

[20]**QUESTION 2**

- 2.1 Superheated steam at 500 °C and 4 000 kPa is concentrated at 100 kPa.
Determine the heat available for the heating process. 

NOTE: Accept that the steam $C_p = 1,97 \text{ kJ/kg.K}$.

(5)

- 2.2 Write short notes on the following types of steam turbines:

2.2.1 Curtis turbine 

2.2.2 Reaction turbine

(2 × 5)

(10)

[15]