higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PULP AND PAPERMAKING TECHNOLOGY
NQF LEVEL 4

(6050394)

12 November 2024 (X-paper)
09:00–12:00

This question paper consists of 6 pages.

105Q1N2412

Copyright reserved

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
PULP AND PAPERMAKING TECHNOLOGY
NQF LEVEL 4
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.

Copyright reserved

SECTION A

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 Drying is achieved by …

A condensation.
B evaporation.
C pulping.
D distillation.

1.2 Type of paper often printed with a high-quality finisher:

A Carton board
B Kraft paper
C Tissue paper
D New Spirit paper

1.3 The concentration of weak spent liquor is between … and … percent.

A 12; 14
B 18; 22
C 16; 20
D 12; 18

1.4 Which ONE of the following is not a factor that affects the quality of any liquor?

A Composition
B Concentration
C Heating value
D U-factor

1.5 Burned sulphur produces a gas that is an essential feature in … pulping process.

A sulphate
B nitrogen
C sulphite
D bisulphite

(5 × 1) **[5]**

QUESTION 2

Give ONE term for each of the following descriptions by writing it next to the question number (2.1–2.5) in the ANSWER BOOK.

2.1 Measured in terms of the U-factor or heat transfer coefficient

2.2 Continuous sheet of paper wound on a core

2.3 Large quantity of combustible organic compounds

2.4 A wall found in an evaporator shell that divides two sections

2.5 Equipment used for heating lime

(5 × 1) **[5]**

QUESTION 3

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (3.1–3.5) in the ANSWER BOOK.

3.1 Misaligned lead-in rolls must be corrected by realigning the winder.

3.2 A Venturi scrubber is a direct-contact evaporator that further concentrates liquor.

3.3 A variation in reduction efficiency affects the activity of green liquor and the concentration of dregs.

3.4 A settling tank is a horizontal stainless-steel vessel.

3.5 The purpose of a ramen cooler is to heat up released gas.

(5 × 1) **[5]**

TOTAL SECTION A: 15

Copyright reserved

SECTION B

QUESTION 4

4.1 Name THREE factors that will affect the ease of repulping. (3)

4.2 Name TWO types of repulpers used in the pulp and papermaking industry. (2)

4.3 Write brief notes on a disc deflaker. (6)

4.4 Differentiate between *brightness* and *lightness* in pulp and papermaking. (2 + 2) (4)

4.5 Name the FOUR phases of a Fourdrinier table. (4)

4.6 Name and explain THREE factors that will affect drainage on a forming board. (3 × 2) (6)

4.7 List THREE main jobs of the pressing section. (3)

4.8 Define the term *grammage* and give the units used to express it. (2)
[30]

QUESTION 5

5.1 What is the purpose of the dryer section? (2)

5.2 Give FOUR reasons for testing paper. (4)

5.3 Explain the basic operating principle of winding a parent roll/jumbo reel. (7)

5.4 Name TWO methods of assessing the quality of a reel. (2)
[15]

QUESTION 6

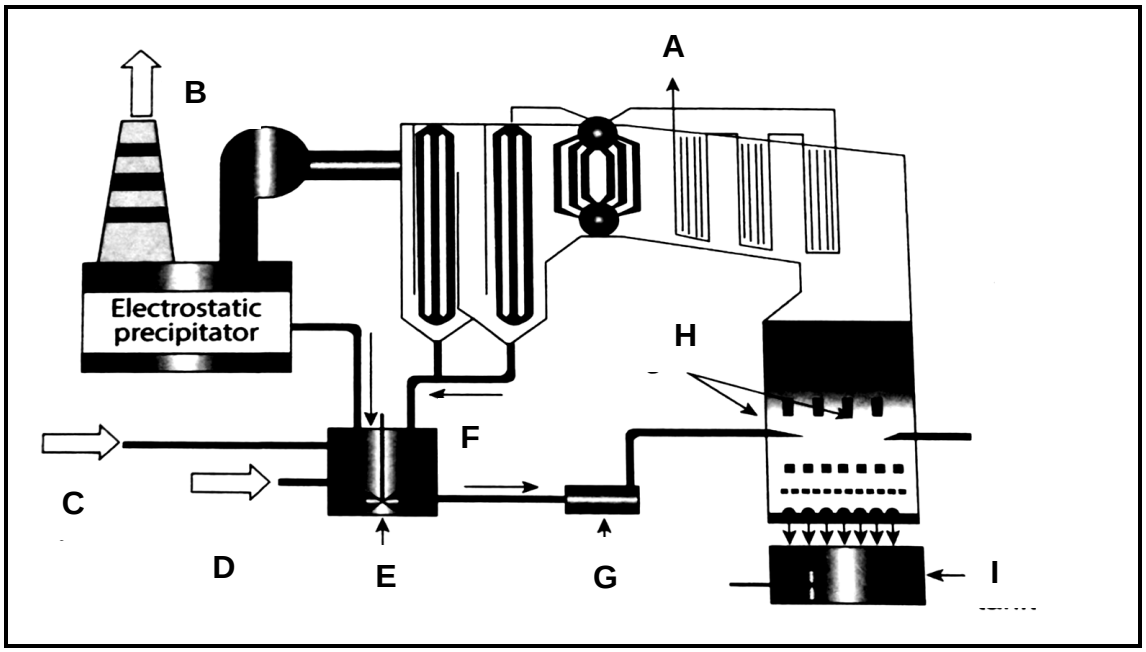
6.1 Give FIVE advantages of black liquor oxidation. (5)

6.2 Write brief notes on heating value as an important quality of black liquor. (5)

6.3 Explain how to test the dry matter content of black liquor. (3)

Copyright reserved

6.4



Label the diagram of a Kraft recovery furnace shown above by writing only the answer next to the letter (A–I) in the ANSWER BOOK. (9 × 1) (9)

6.5 Name THREE components of evaporators. (3)
[25]

QUESTION 7

7.1 Define each of the following terms:

7.1.1 Slaking

7.1.2 Calcination

7.1.3 Reduction efficiency

(3 × 2) (6)

7.2 Draw a labelled diagram of a turbulent contact absorber. (5)

7.3 What is the colour of raw solid sulphur? (1)

7.4 Explain THREE ways of minimising the formation of sulphur trioxide (SO_3) during the sulphur burning process. (3)
[15]

TOTAL SECTION B: 85
GRAND TOTAL: 100

Copyright reserved