



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

**PULP AND PAPERMAKING TECHNOLOGY
NQF LEVEL 3**

(6050383)

**8 November 2022 (X-paper)
09:00–12:00**

This question paper consists of 7 pages.

171Q1N2208

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 black or blue pen.
 6. Write neatly and legibly.
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SECTION A**QUESTION 1**

Give ONE term for each of the following descriptions by writing it next to the question number (1.1–1.5) in the ANSWER BOOK.

- 1.1 Large cylindrical tank that stores chips.
- 1.2 Process during which particles separate because of its ability to float on a particular liquid
- 1.3 Thick mixture of fibre and water
- 1.4 Temperature of the contents in a digester raised by circulating cooking liquor
- 1.5 Last step in the papermaking process



(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 (2.1–2.10) in the ANSWER BOOK.

- 2.1 A Rosserhead debarker is slower than a ring barker.
- 2.2 Washing in the de-inking process removes ink from paper that has small particles of ink on it.
- 2.3 Deflaking is a process in which fibres are refined.
- 2.4 The inactive cooking chemical in the composition of Kraft cooking liquor is sodium hydroxide.
- 2.5 Mechanical pulping produces a higher yield than chemical pulping.
- 2.6 A stainless-steel digester is used in the NSSC pulping process.
- 2.7 The brightening process starts before the extraction process.
- 2.8 The acid sulphite pulping process produces lower pulp strength than the Kraft pulping process.
- 2.9 Spent liquor in the acid sulphite pulping process is called red liquor.
- 2.10 The bottom roll of an embosser has the design on it.

(10 × 1)

[10]

QUESTION 3

Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–M) next to the question number (3.1–3.10) in the ANSWER BOOK.



COLUMN A		COLUMN B	
3.1	Large machines used to remove logs	A	baffles
3.2	Protects the shell of the blow tank from being damaged	B	deflector plate
3.3	Affects the quality of pulp	C	hopper
3.4	Breaks up the flow of fibre	D	chips
3.5	Part of the pin drum feeder	E	R3/SVP generator
3.6	Used for chlorination stage	F	upflow towers
3.7	Mixing of pulp	G	agitator
3.8	Produces chlorine dioxide for bleaching	H	grapples
3.9	Do not need to be cooked	I	additives
3.10	Piling system	J	synthetic binders
		K	downflow towers
		L	latency
		M	contraries

(10 × 1)

[10]**TOTAL SECTION A : 25****SECTION B****QUESTION 4**

- 4.1 Name TWO methods to dispose of bark. (2)
- 4.2 Explain how a drum debarker removes bark from logs. (4)
- 4.3 List THREE ways to ensure that chip piles are managed effectively. (3)
- [9]**



QUESTION 5

- 5.1 Name the FOUR pieces of equipment used when making pulp from bagasse. (4)
- 5.2 Give TWO reasons why the pith and sludge exiting the dewatering press will still be very wet. (2)

**[6]****QUESTION 6**

- 6.1 Explain the working principle of a deflaker. (3)
- 6.2 What is the purpose of the drop leg in a rotary vacuum washer? (1)
- 6.3 Why are softwood trees used in mechanical pulping? (1)
- 6.4 Give TWO reasons why burn marks appear during the grinding process. (2)
- 6.5 Give ONE advantage of having a pit under the pulp stone. (2)
- 6.6 Briefly explain the TMP process. (2)

**[11]****QUESTION 7**

- 7.1 Explain the FOUR stages of the refining process. (4)
- 7.2 Briefly explain each of the following functions associated with the Kraft pulping process:
- 7.2.1 Steam packing
 - 7.2.2 Pre-steaming
 - 7.2.3 Liquor to wood ratio
- (3 × 2) (6)
- 7.3 Give TWO reasons why pulp leaving the Kraft digester will be discoloured. (2)

[12]

QUESTION 8

8.1 Name the TWO pieces of equipment used in the NSSC pulping process. (2)

8.2 What is the reason for blowing bagasse fibres into an atmospheric blow tank? (2)

[4]

**QUESTION 9**

9.1 Give ONE advantage that soda pulping has over chemical pulping. (1)

9.2 Complete the following table indicating poor soda pulping performance by writing only the answer next to the question number (9.2.1–9.2.4) in the ANSWER BOOK.

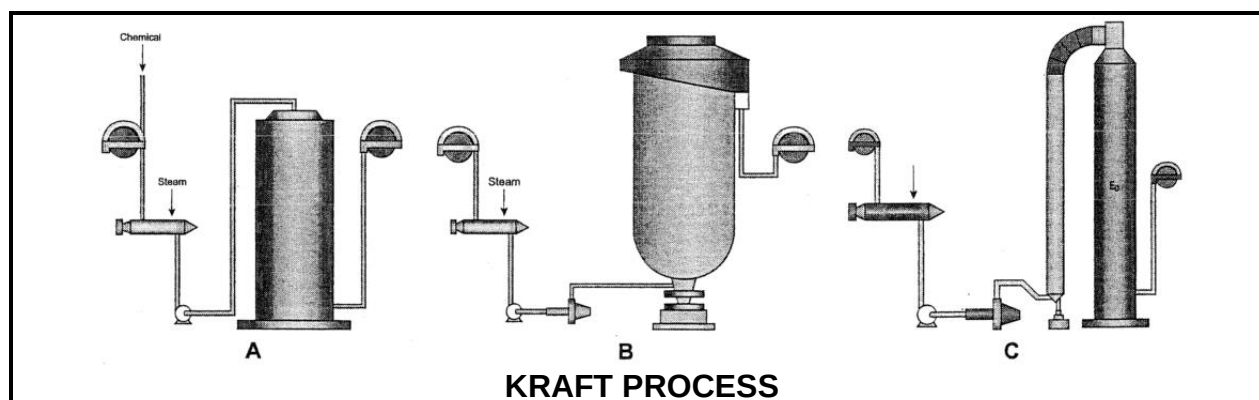
INDICATOR	REASON	REMEDY/SOLUTION
Large amounts of fibre bundles	9.2.1	9.2.2
	9.2.3	9.2.4

(4 × 1)

(4)

9.3 Explain the purpose of calcium or magnesium when cooking woodchips during acid pulping. (2)

[7]

**QUESTION 10**

10.1 Identify each of the towers used during the Kraft process by writing only the answer next to the letter (A–C) in the ANSWER BOOK. (3 × 1)

(3)

10.2 Give THREE disadvantages of tower B. (3)

(3)

10.3 Explain what happens in tower A. (1)

(1)

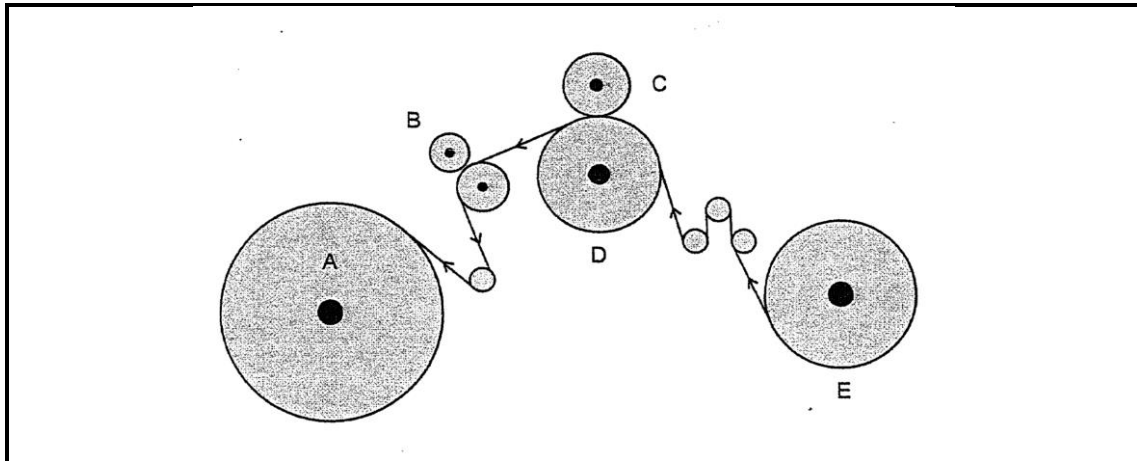
10.4 Use a flow diagram to explain the FOUR stages of the washing process. (4)

[11]



QUESTION 11

11.1



Label the components of the embossing process shown above by writing only the answer next to the letter (A–E) in the ANSWER BOOK. (5 × 1)

(5)

11.2

Name TWO methods of lamination.

(2)

[7]**QUESTION 12**

12.1

Name THREE materials that make up a water-based coating mixture.

(3)

12.2

Additives help pigments to mix with water.



List THREE other purposes of additives.

(3)

12.3

Why is opacity one of the most important quality parameters of writing and printing paper?

(2)

[8]

TOTAL SECTION B : 75
GRAND TOTAL : 100

