higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PULP AND PAPERMAKING TECHNOLOGY
NQF LEVEL 3

(6050383)

17 November 2023 (X-paper)
09:00–12:00

This question paper consists of 7 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
PULP AND PAPREMAKING TECHNOLOGY
NQF LEVEL 3
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

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 The wood yard is the first step in the papermaking process.

1.2 The recommended size of wood chips is between 10 and 30 mm long and between 2 and 5 mm thick.

1.3 Sludge and pith are waste from bagasse washing.

1.4 Bagasse is put into the bagasse washer through the fibre inlet.

1.5 During counter-current washing, wash water flows in the same direction as the pulp.

1.6 A rotary vacuum washer removes ink from secondary fibres.

1.7 Na_2CO_3 is the active chemical in kraft pulping.

1.8 Ozone bleaching is the last stage of bleaching.

1.9 Pulp washing is done to prevent chemical carry-over.

1.10 The paper that moves between rolls is known as a web.

(10 × 1) **[10]**

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 A path created by chemicals flowing through pulp.

2.2 A large hole in the ground where waste material is discarded.

2.3 The space between two rolls where the web passes through.

2.4 Lamination process that laminates paper or paperboard with plastic film.

2.5 The shiny and very smooth paper found in magazines and brochures.

(5 × 1) **[5]**

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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	Main component in the grinding process	A	soda process
3.2	Process of increasing the temperature of liquor in a digester	B	latency
3.3	Bagasse is cooked during this process	C	woodchips
3.4	Twisting and blending of fibres during refining	D	electrostatic precipitator
3.5	Small pieces of wood	E	ramping
3.6	Softens chips for refining	F	NSSC process
3.7	Method used to test freeness	G	grindstone
3.8	Produces high yield of between 55 and 85%	H	chlorine dioxide
3.9	Used in the brightening process	I	calendar
3.10	Pair of rolls for smoothening	J	kraft pulping process
		K	embossing
		L	pre-steamer
		M	CSF

(10 × 1) **[10]**

TOTAL SECTION A: 25

SECTION B

QUESTION 4

4.1 Define *wood log debarking*. (2)

4.2 It is important to always remove barks when making pulp because it will show in the finished paper.

Give FOUR reasons for wood log debarking. (4)

4.3 Name TWO types of screens used for woodchip screening. (2)

4.4 Explain the term *bagasse.* (2)

4.5 Name TWO methods to preserve bagasse and give a short description of each. (4)
[14]

QUESTION 5

5.1 Define *secondary fibre*. (1)

5.2 Explain the THREE main problems if contraries are present in fibre. (3)

5.3 Below are the chemical tests done on secondary fibre. Name the equipment to test each.

5.3.1 Conductivity

5.3.2 Thickness

5.3.3 Brightness

(3 × 2) (6)

5.4 Flotation is used for paper with large ink areas such as the paper from magazines. (4)
Describe the FOUR steps in the flotation process.

5.5 Explain digester loading as one of the processes occurring in a digester. (5)

5.6 One of the indicators of poor performance in the kraft pulping process are large amounts of unfiberised wood.

Provide FIVE remedies for that. (5)

5.7 Give the operation temperature, pressure and cooking time of the kraft pulping process, including their units. (3)
[27]

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QUESTION 6

6.1 What does the acronym NSSC stand for? (1)

6.2 State TWO advantages of the NSSC pulping process. (2)

6.3 What are the typical operating temperature, pressure and cooking time of the soda pulping process? Include their units. (3)

6.4 Describe the THREE indicators of poor NSSC pulping performance. (3)

6.5 Tabulate the differences between the kraft pulping and the acid pulping processes. (4)

6.6 Define the *pulp bleaching process.* (1)

6.7 What are the TWO stages of the bleaching process? (2)

6.8 Name THREE types of bleach plant towers. (3)

6.9 Draw a block diagram of a counter-current washing system consisting of FOUR stages. Include labels. (5)

[24]

QUESTION 7

7.1 Embossing is the process whereby paper, board or tissue paper get a raised pattern.

7.1.1 Name TWO types of embosser machines commonly used. (2)

7.1.2 Name TWO factors that influence the success of the embossing process. (2)

7.2 Laminating is the application of an adhesive such as starch, vegetable protein or synthetic resin, or a plastic sheet to paper or board.

Give TWO reasons for laminating paper. (2)

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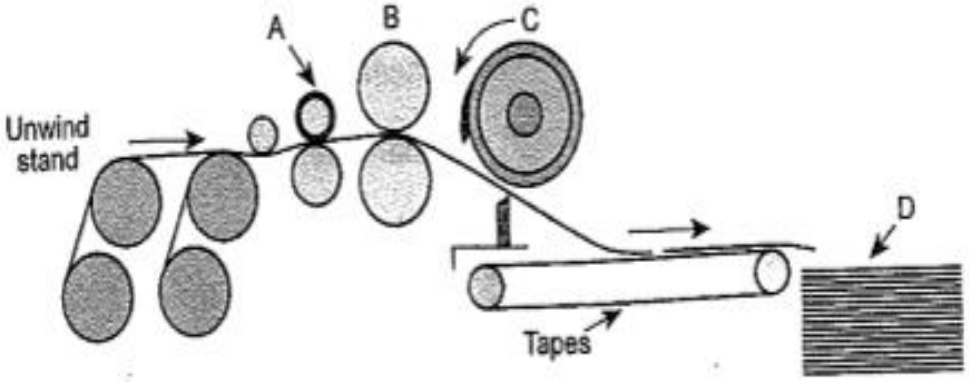
7.3 Name the labelled parts. To answer question (7.3), write only the answer next to the letters (A–D) in the ANSWER BOOK.



(4)
[10]

TOTAL SECTION B: 75
GRAND TOTAL: 100

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