higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PULP AND PAPERMAKING TECHNOLOGY
NQF LEVEL 2

(6050372)

16 November 2023 (Y-paper)
13:00–16:00

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 PAPERMAKING TECHNOLOGY
NQF LEVEL
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.

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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 (1.1–1.6) in the ANSWER BOOK.

1.1 The process whereby the plant fibre is broken up by soaking it in a liquid.

A Macerating
B Curing
C Trimming
D De-inking

1.2 Paper originates from one of these countries.

A Russia
B Egypt
C South Africa
D China

1.3 Every time when fibre is recycled, it becomes …

A longer
B shorter
C thin
D thick

1.4 The wood from trees that belong to the angiosperm class.

A Softwood
B Heartwood
C Hardwood
D Sapwood

1.5 The main purpose of chemical pulping is …

A to remove cellulose.
B to remove lignin.
C to remove pulp.
D to remove acid.

1.6 Hydraulic pressure is … on the roll side of the sheet than on its left side

A weaker
B lower
C smaller
D greater

(6 × 1) **[6]**

QUESTION 2

Choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A–L) next to the question number (2.1–2.6) in the ANSWER BOOK.

COLUMN A		COLUMN B	
2.1	They are also known as coniferous trees	A	log loading system
2.2	Property of a substance that is attracted to water	B	hydrophobic
2.3	Production of pulp using mechanical methods	C	hardwood trees
2.4	The cycle that starts with logs being brought to the grinder on overhead conveyor belts	D	mechanical pulping
2.5	A process that uses raw material bought from external suppliers to produce cooking liquor	E	chemical recovery
2.6	A mechanical process that does not add to the quality of the paper	F	chemical production
		G	hydrophilic
		H	pressurised air system
		I	softwood trees
		J	thermo-mechanical pulping
		K	supercalendering
		L	wet lamination

(6 × 1) **[6]**

QUESTION 3

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (3.1–3.9) in the ANSWER BOOK.

3.1 South Africa has become a world leader in selective growing and cloning of eucalyptus species.

3.2 The benefit of recycling paper is that the cost of solid waste removal and disposal is reduced for local government authorities.

3.3 Pulp slurry produced by a grinder falls into a pit before overflowing into a flume channel.

3.4 A sulphur burner is an air-cooled refractory-lined combustion chamber.

3.5 Sulphurous acid reacts with magnesium hydroxide to form magnesium sulphate.

3.6 A ball valve controls the pulp flow to the paper machine.

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3.7 The purpose of a head box is to transfer the flow of stock from the round piping system in the approach flow system to a rectangular flow across the full width of the paper machine at uniform speed in the direction of the machine.

3.8 The extrusion laminating process involves the mixing of plastic granules to form them into a film.

3.9 The responsibility of inspecting the product and preventing defective paper from reaching the customer lies with the finishing room.

(9 × 2) **[18]**

TOTAL SECTION A: 30

SECTION B

QUESTION 4

4.1 The value of secondary paper collected for recycling is different.

Arrange the paper below in order of highest to lowest value.
(A) Brown paper, (B) dirty paper or contaminated paper with glue, staples or wax, (C) uncontaminated waste from converting plants. (3)

4.2 List THREE criteria that determine quality of secondary (waste) paper. (3)

4.3 Weight is one of the important physical properties of wood that affects the efficiency of the pulping process.

Explain it in terms of:

4.3.1 Heartwood of a tree

4.3.2 Sapwood

(2 × 2) (4)

4.4 The thickness of paper is an important property for the end-user and converting requirement of many grades of paper.

4.4.1 What is the standard procedure for measuring paper thickness (TAPPI thickness)? (2)

4.4.2 Name TWO problems that are encountered with this type of measurement. (2)

4.4.3 What is a commonly used unit in practice to measure paper thickness? (1)

4.4.4 List THREE factors influencing the thickness of a sheet of a paper. (3)

4.5 List TWO common contrary items found in secondary paper. (2)

[20]

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QUESTION 5

5.1 Name THREE requirements of storing logs outdoors. (3)

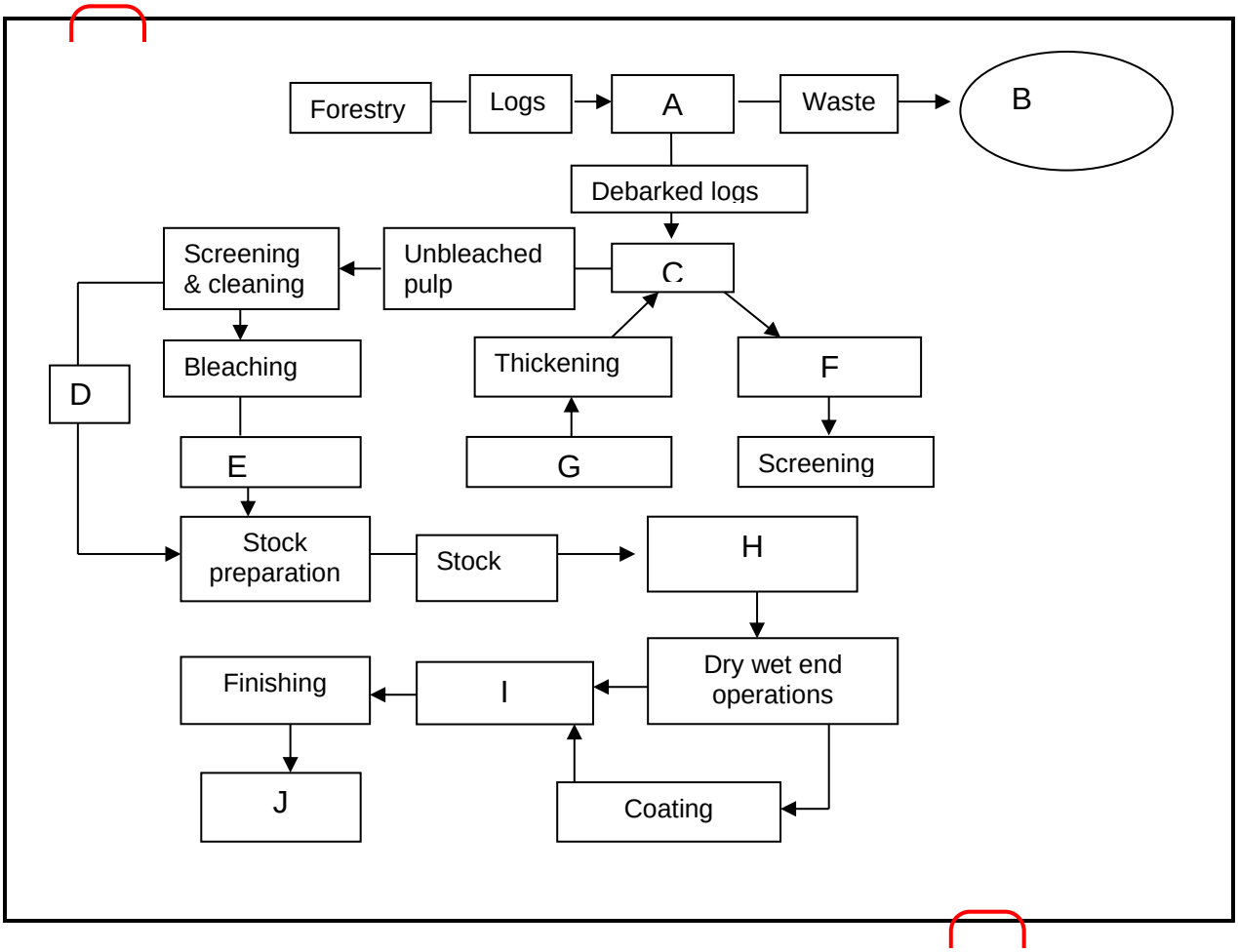
5.2 What is the name of the process that prevents the decomposition of fibre in bagasse that is stored for long periods? (1)

5.3 Describe the term, *bale.* (2)

5.4 Why is it important to sort paper again before it can be used? (2)

5.5 Describe the purpose of storing waste paper. (2)

5.6 The diagram below in shows a process flow diagram of pulp production. Write the names of the components next to the letter (A–J) in the ANSWER BOOK.



(10)
[20]

QUESTION 6

6.1	Differentiate between *cooking liquor* and *green liquor*.	(4)
6.2	What does the acronym, NSSC, stand for?	(2)
6.3	Mention ANY FOUR of the steps involved in the kraft chemical recovery process.	(4)
6.4	Name any FOUR pieces of equipment in the modern approach flow system.	(4)
6.5	Explain the importance of an internal headbox shower.	(2)
6.6	State TWO disadvantages of roll formers.	(2)
6.7	Explain the basic mechanisms involved in phase 4 of the pressing process.	(2)
		[20]

QUESTION 7

7.1	Name FOUR processes involved in the finishing process.	(4)
7.2	What are microcrystalline waxes used for?	(2)
7.3	Differentiate between *wet* and *dry* lamination.	(4)
		[10]

TOTAL SECTION B: 70
GRAND TOTAL: 100

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