higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PULP AND PAPERMAKING TECHNOLOGY
NQF LEVEL 4

(6050394)

1 March 2018 (Y-Paper)
13:00–16:00

This question paper consists of 6 pages.

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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. Write neatly and legibly.

NC2600

SECTION A

QUESTION 1

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write 'true' or 'false' next to the question number (1.1–1.15) in the ANSWER BOOK. Correct the statement if it is FALSE.

1.1 Re-pulping introduces secondary fibres, broke and virgin pulp into the stock system.

1.2 Wetting increases the mechanical strength of the raw material.

1.3 Flash dried pulps and hardwood pulp can be quite easy to re-pulp such that the slushing time is short.

1.4 Refining is a chemical process that modifies the properties of pulp.

1.5 At phase 1 of the Fourdrinier table forming section, vacuum-assisted water drainage occurs.

1.6 The main function of the transfer roll is to transfer the paper web from one press section to the next press section.

1.7 Kraft papers are used for packaging due to their high strength properties.

1.8 Drying takes place in two stages in the dryer section.

1.9 Poor paper properties can be fixed through correct winder operation.

1.10 Sodium sulphite is used in the soda pulping process.

1.11 Flash tanks separate the liquor from the gas.

1.12 When molten sulphur is burnt in the presence of air, SO_3 is produced.

1.13 The spent cooking liquor from the sulphite process is called weak red liquor.

1.14 The first zone of the lime kiln eliminates moisture.

1.15 The most common cause of recovery furnace explosions is tube failure.

(15 × 1) **[15]**

QUESTION 2

Define each of the following papermaking terms:

2.1 Baffle

2.2 Vortex

2.3 Linting

2.4 Fouling

2.5 Flue gases

(5 × 2) **[10]**

TOTAL SECTION A: 25

SECTION B

QUESTION 3

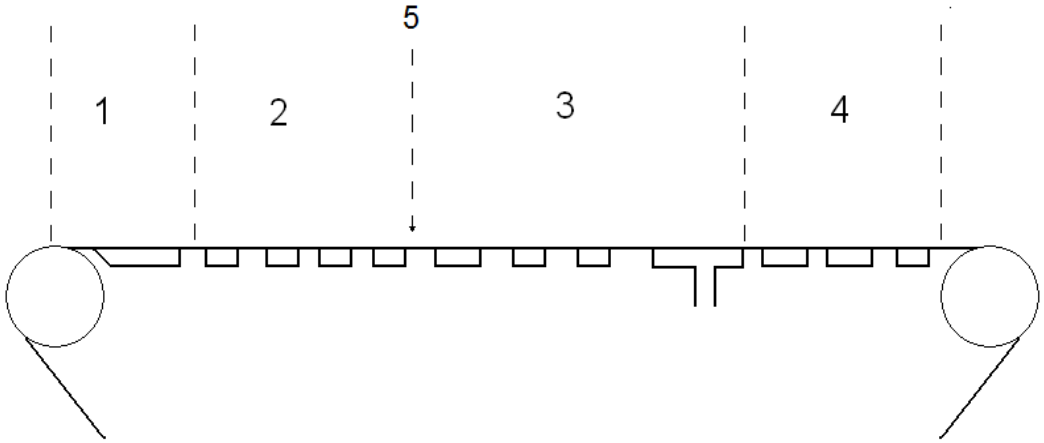
3.1	3.1.1	Name the TWO types of refiners used in the pulp and paper industry.	(2)
	3.1.2	Explain the steps of refining.	(5)
	3.1.3	What effect does refining have on tear strength?	(1)
3.2	3.2.1	What type of fibre is required for facial tissue and why?	(2)
	3.2.2	What type of fibre is required for industrial wipes and why?	(2)

[12]

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QUESTION 4

Study the Fourdrinier table diagram below and answer the questions.



4.1 Name each phase on the forming table above as well as label 5. Write the number (1–5) and the answer next to the question number (4.1) in the ANSWER BOOK. (5)

4.2 Briefly describe what would happen to a web of wet fibre as it passes along each phase in QUESTION 4.1. (4 × 3) (12)

[17]

QUESTION 5

5.1 What is the purpose of paper drying and how is it achieved? (1)

5.2 The quality requirements of different paper depend on its intended end use.

State TWO quality requirements for each of the following paper types:

5.2.1 Carton board

5.2.2 Tissue

5.2.3 Newsprint

5.2.4 Fine paper

(4 × 2) (8)

5.3 State FOUR ways in which you would assess the performance of the dryer section. (4)

[13]

QUESTION 6

6.1 6.1.1 What is black liquor? (2)

6.1.2 State TWO important characteristics of black liquor. (2 × 2) (4)

6.1.3 Give THREE advantages of burning off the organic material in black liquor. (3 × 2) (6)

6.2 The Copeland process works on the basis of a fluidised bed reactor (furnace). Furnaces are associated with a high risk of explosions.

6.2.1 What causes tube failure in furnaces? (4)

6.2.2 How can the risk of explosions be minimised? (2)

[18]

QUESTION 7

7.1 What happens when pellets aggregate to large balls in the lime kiln? (2)

7.2 State the purpose of the causticising plant. (2)

7.3 Give ONE-word explanations for what happens in the three zones of a recovery furnace. (3)

7.4 Briefly discuss the production of SO_2 gas in the sulphur burner. Include the equations involved. (8)

[15]

TOTAL SECTION B: 75
GRAND TOTAL: 100

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