higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PULP AND PAPERMAKING TECHNOLOGY
NQF LEVEL 4

7 November 2022

This marking guideline consists of 6 pages.

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INSTRUCTIONS TO MARKERS

1. Mark all the questions.
2. Follow the answers according to the numbering system used in this question paper.
3. Use only a red pen.
4. Put your ticks and crosses neatly and legibly.

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SECTION A

QUESTION 1

1.1 C
1.2 A
1.3 C
1.4 B
1.5 D

(5 × 1) **[5]**

QUESTION 2

2.1 G
2.2 H
2.3 J
2.4 B
2.5 F

(5 × 1) **[5]**

QUESTION 3

3.1 True
3.2 False
3.3 False
3.4 True
3.5 False
3.6 True
3.7 False
3.8 True
3.9 True
3.10 False

(10 × 2) **[20]**

TOTAL SECTION A: 30

SECTION B

QUESTION 4

4.1 It is different types of secondary papers that are used or discarded because they are not fit for any particular use; it can be used again or recycled. (2)

4.2 It is a chemical test where lignin✓ in the pulp fibres reacts with acidic permanganate under controlled conditions.✓ This test is used in the mill control to indicate the degree of delignification that occurs during cooking,✓ and also to determine the extent of cooking or chemical requirement for bleaching.✓ (4)

4.3 The temperature can either strengthen or weaken certain properties of pulp. (2)

4.4
- Sand
- Grit
- Metal filings
- Plastics
- Stickies
- Styrofoam
- Pieces of wood (Any 2 × 1) (2)

4.5
- They are easy to install.
- They do not get easily damaged.
- They have a longer service life than older metal fabric. (3)

4.6
- The porosity of the sheet increases.
- Uneven absorption of size coating and ink.
- Sheet strength decreases.
- Opacity and visual appearance of the sheet is uneven. (4)

4.7 To ensure good compressibility of the paper in the printing nip. (2)

4.8 Decreases (1)

[20]

QUESTION 5

5.1 Rate-of-evaporation graph (2)

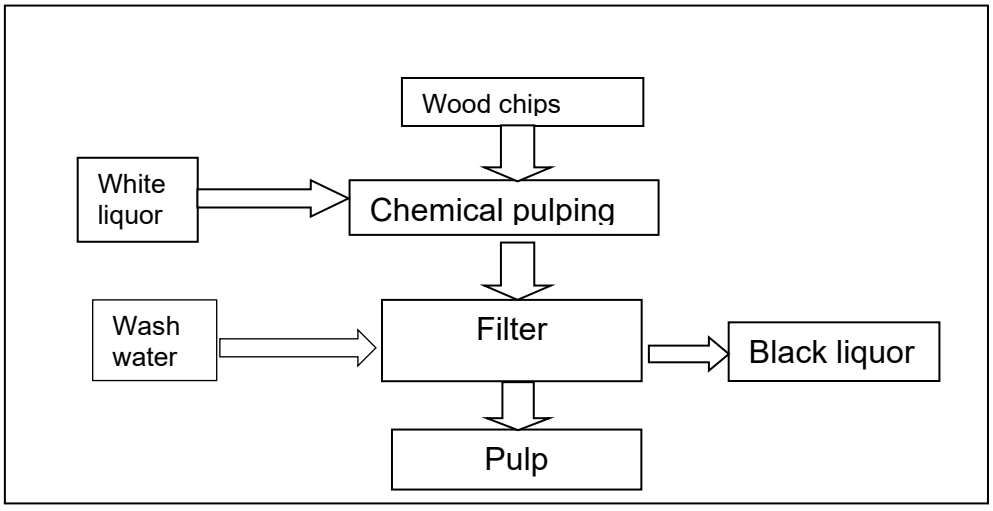
5.2 A – Warming up
B – Constant rate
C – Falling rate
D – Bond water (4)

5.3 Heat is applied to the sheet✓ which automatically raises the sheet temperature until evaporation takes place.✓ Once the temperature becomes high, evaporation is achieved✓ until equilibrium is reached.✓ Then the next stage will start.✓ Too much high temperature will cause the sheet to stick to the cylinder✓ or blister as steam forces the sheet apart.✓ (7)

5.4 It is the water that is trapped inside the paper that is difficult to remove. (2)
[15]

QUESTION 6

6.1



(7)

6.2 If the composition is highly contaminated, it will lower the quality of the liquor.✓ The quality of the liquor is decreased by unwanted particles which cause problems like scaling on equipment.✓ Too much pulp fibre drops the quality of the liquor.✓ Contaminants depend on the process that is used.✓ For example, if acid liquor is used, the alkaline chemicals will become the contaminants.✓ Contaminants in the black liquor are methanol and organic acids like fatty acids.✓ (6)

6.3 A – Chips
B – Washing and screening
C – Kraft pulp
D – White liquor
E – Black liquor evaporation
F – Chemical recovery
G – Re-causticising (7)
[20]

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QUESTION 7

7.1 $CaCO_3$✓ + heat ⟶ CaO✓ + CO_2✓ (3)

7.2 In this process, lime mud is separated from the liquor.✓ Slurry enters the feed pipe✓ and flows to a feed well.✓ Mud settles to the bottom of the clarifier✓ and is then dragged to the discharge well by the rake arms and blades.✓ The mud is pumped out of the discharge well through pipes.✓ Clarified liquor rises from the clarification section into the storage section.✓ The clear liquor is then drawn off through the liquor outlet.✓ The clear liquor (strong white liquor) is pumped to storage tanks✓ while the mud is pumped to the mud-washing system.✓ (10)

7.3 This test determines the amount of acid-soluble sodium present in lime sludge and burnt lime.✓ A sample is first dissolved in hydrochloric acid whereafter an atomic absorption spectroscopy (ASS) is used to determine the sodium content of the sample.✓ (2)

[15]

TOTAL SECTION B: 70
GRAND TOTAL: 100

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