higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

# MARKING GUIDELINE

## NATIONAL CERTIFICATE (VOCATIONAL)

## PULP AND PAPERMAKING TECHNOLOGY
## NQF LEVEL 2

**16 November 2023**

**This marking guideline consists of 5 pages.**

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## SECTION A

### QUESTION 1

1.1 A
1.2 D
1.3 B
1.4 C
1.5 B
1.6 D

(6 × 1) **[6]**

### QUESTION 2

2.1 I
2.2 G
2.3 D
2.4 A
2.5 F
2.6 K

(6 × 1) **[6]**

### QUESTION 3

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

(9 × 2) **[18]**

**TOTAL SECTION A: 30**

## SECTION B

### QUESTION 4

4.1
- Uncontaminated waste from converting plants or (C)
- Brown paper or (A)
- Dirty paper or contaminated paper with glue, staples or wax or (B) (3)

4.2
- Method of the original fibre preparation
- Nature of any printing, lamination and gluing that the paper underwent
- The purpose for which the paper was originally used (3)

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4.3 4.3.1 This tends to be dense and heavier producing a greater amount of pulp which is dark in colour.

4.3.2 Sapwood is found in younger trees in greater quantities which is lighter in weight, colour and also contains water which affects the apparent weight of the wood.

(2 × 2) (4)

4.4 4.4.1 To hold the paper between two steel plates at a prescribed pressure. (2)

4.4.2
- Uneven paper surface
- The pressure exerted by the platen will cause the sheet to compress (2)

4.4.3 Micrometres (1)

4.4.4
- Weight
- Amount of pressing
- Calendaring and refining
- Type of fibre used
- Sheet moisture
- Nature of additives used (Any 3 × 1) (3)

4.5
- Tins
- Stones
- Nuts
- Bolts
- Grit
- Sand
- Paperclips
- Foil
- Plastic
- Polystyrene
- Plastic
- Hair
- String
- Synthetic fibres
- Latex
- Wax
- Bitumen
- Ink (Any 2 × 1) (2)

**[20]**

## QUESTION 5

5.1
- Storage area must be open and well drained
- Storage area must be kept free of weeds and debris
- The ground should be surfaced with gravel, crushed rocks, blacktop or concrete (3)

5.2 Ritter liquor preservation process (1)

5.3 Secondary fibre that has been compressed into squares.✓✓ (2)

5.4 To ensure quality and minimise the risks that contraries and unrecyclable paper contain or hold. ✓✓ (2)

5.5 To make sure that fibre stock is available✓ even when collection is discontinued✓. (2)

5.6
A – Wood yard
B – Steam generation
C – Pulping
D – Kraft pulp
E – Bleached pulp
F – Refining
G – Cleaning
H – Wet-end operations
I – Winding
J – Finished paper (10)
**[20]**

## QUESTION 6

6.1 Cooking liquor is chemicals used during chemical pulping to digest the wood in order to make pulp available for paper production.✓✓ Green liquor is the product obtained when the smelt from the recovery boilers is fed into a dissolving tank together with weak wash water✓✓ (2 × 2) (4)

6.2 Neutral Sulphite Semi-Chemical (2)

6.3
- Concentration of spent liquor in multistage evaporators
- Formation of strong black liquor (SBL) through concentration of weak black liquor (WBL) in multi-effect evaporators
- SBL is further concentrated to form heavy black liquor (HBL)
- Combustion of concentrated spent liquor in recovery furnace
- Burning of HBL in a recovery furnace and removal of inorganic chemicals (smelt)
- Converting sodium carbonate into sodium hydroxide in causticisers
- The smelt is dissolved in water to form green liquor
- Formation of white liquor by causticising green liquor with lime (CaO)

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- Regeneration of calcium carbonate into calcium oxide in a lime kiln
- Recovery of lime mud from white liquor
- Conversion of lime mud back into lime (CaO) (Any 4 × 1) (4)

6.4
- Machine chest
- Silo
- Fan pumps
- Basis mass valve
- Vacuum pumps
- Air removal systems
- Multistage cleaning systems
- Pressure screens
- Flow spreaders
- Head box
- Pulsation attenuators
- Dye addition systems (Any 4 × 1) (4)

6.5
- To maintain a clean surface✓✓ and/or
- To prevent the build-up of deposits that could drop off and cause a breakage of the machine. (Any 1 × 2) (2)

6.6
- More pinholes
- Grainy formation
- Lower internal bond
- Pressure pulsations are translated into basis weight variations
- Higher head box consistencies
- Lower retention than the Fourdrinier (Any 2 × 1) (2)

6.7 The compression of paper in the in-going part of the nip is resisted by pressure in the structure.✓ Fluid flows through paper and felt then re-wets the expanding unsaturated area in the outgoing part of the nip thereby transferring water from the felt to the paper.✓ (2)

**[20]**

## QUESTION 7

7.1
- Embossing
- Supercalendering
- Laminating
- Coating (4)

7.2 For lamination of packaging materials like aluminium foil (2)

7.3 Wet lamination uses aqueous adhesives where one or more substrates must be porous to allow water to evaporate through the substrate✓✓ while dry lamination allows the combination of adhesives of two non-porous substrates which can be contained in the solvent or in water.✓✓ (2 × 2) (4)

**[10]**

**TOTAL SECTION B: 70**
**GRAND TOTAL: 100**

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