higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PULP AND PAPERMAKING TECHNOLOGY
NQF LEVEL 4

XX February 2020

This marking guideline consists of 5 pages.

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SECTION A

QUESTION 1

1.1 C
1.2 D
1.3 C
1.4 A
1.5 B
1.6 D
1.7 A
1.8 B
1.9 C
1.10 D

(10 × 1) **[10]**

QUESTION 2

2.1 False√. Wetting decreases the mechanical strength of the raw material.√

2.2 True✓

2.3 False√. Even though drying removes little water from the sheet, it requires more energy because water removal occurs because of evaporation.√

2.4 True✓

2.5 True✓

(5 × 1) **[5]**

QUESTION 3

3.1 J
3.2 H
3.3 L
3.4 A
3.5 I
3.6 G
3.7 B
3.8 C
3.9 E
3.10 D

(10 × 1) **[10]**

TOTAL SECTION A: 25

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SECTION B

QUESTION 4

4.1 4.1.1
A – Feed
B – Screen basket
C – Foil
D – Rotor
E – Accepts
F – Rejects (6)

4.1.2
- Rotors and foils increase the screening efficiency.
- They also prevent blockages. (2 × 2) (4)

4.2 4.2.1 More hardwood fibre√ to create greater softness (1)
4.2.2 More softwood fibre√ to improve strength (1)
[12]

QUESTION 5

5.1
- Fourdrinier table
- Twin-wire formers (2)

5.2 5.2.1 Two-sidedness is when drainage through one side of the sheet causes a difference in appearance✓ between the top and bottom sides of the paper.✓ (2)

5.2.2
- Sheet porosity increases
- Uneven absorption of size, coating and ink
- Sheet strength is decreased
- Opacity and visual appearance of the sheet is uneven

(4 × 2) (8)
[12]

QUESTION 6

6.1 6.1.1 Mechanical properties test the strength✓ of the paper while visual test the appearance✓ paper. (2)

6.1.2
- Mechanical properties - Tensile strength, tear strength, burst strength, stretch, stiffness and compressibility. (Any THREE)
- Optical properties - brightness, opacity, gloss and formation. (Any THREE) (6)

6.1.3 The paper must have tensile strength✓ and stiffness properties.✓ (2)

6.2
- Drying efficiency
- Heat transfer efficiency
- Production drying rate efficiency
- Production evaporation rate efficiency (4)

[14]

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QUESTION 7

7.1 7.1.1 60 – 80% solids✓✓ (2)

7.1.2 7.1.2.1 Removed by washing evaporators with hot water.✓✓ (2)
7.1.2.2 Reduced by improving soap skimming✓ and by reducing temperature to below critical point.✓ (2)
7.1.2.3 By using baffle plates or using defoamers.✓✓ (2)

7.2 7.2.1 Salt cake (1 × 2) (2)

7.2.2 Na_2CO_3 or Sodium carbonate (1 × 2) (2)

7.2.3
- When the low-water trip-out is not working. The low boiler water level causes tubes to overheat and burst.
- Hammering can cause tubes to rupture.
- It is caused by corrosion of tubes in the furnace bed.
- It is caused by faulty repairs to tube leaks. (4 × 2) (8)

7.2.4
- Ensure that proper care is exercised when cleaning the tubes and furnace.
- Ensure routine inspections and monitoring of the condition of corrosion of the tubes.
- Ensure that emergency shutdown procedures are in place in case of an explosion. (Any 1 × 2) (2)

[22]

QUESTION 8

8.1 CaO or calcium oxide (1 × 2) (2)

8.2 The causticising plant converts used sodium compounds into active sodium hydroxide and sodium sulphide✓ which are reused in the Kraft cooking liquor.✓ (2)

8.3
- Drying
- Reduction
- Oxidation (3)

8.4
- Drying of the lime mud
- Raising the temperature
- Maintaining a high temperature (3)

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8.5 8.5.1
- A waste heat boiler is a horizontal cylindrical vessel with tubes on the inside.
- It is located on the gas discharge side of the burner. (2)

8.5.2
- Water is pumped through the tubes.
- Where the heat from hot flue gases or sulphur gases heat up the water.
- Steam is produced which can be used at other parts of the mill. (3)

[15]

TOTAL SECTION B: 75
GRAND TOTAL: 100

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