higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

PAPERMAKING N4

5 December 2023

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 the 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 Decrease in the dimensions of a sheet of paper or loss incurred in weight between the amount of pulp used and the paper produced

1.2 Paper not treated to bleaching; it has a light brown hue

1.3 Quality of a sheet of paper to resist penetration by water from one surface to the other

1.4 A paper machine developed by Sealy Fourdrinier that produces a continuous web of paper

1.5 Paper made from the fibres in their first use, usually from wood pulp

1.6 A printing ink that does not conceal the colour beneath. Process inks are transparent so that they will blend to form other colours.

1.7 A press condition in which the impression is slurred and unclear because too much ink was used or sheets were handled or rubbed before the ink was dry

1.8 In printing, inks, varnishes, solvents and oily or greasy compounds used to reduce the consistency for printing

1.9 Ink containing metal substances, used to produce special printed output

1.10 The basis weight of paper stated in metric terms of grams per square metre and expressed as g/m^2

(10 × 2) **[20]**

QUESTION 2

2.1 True
2.2 False
2.3 True
2.4 True
2.5 True

(5 × 1) **[5]**

TOTAL SECTION A: 25

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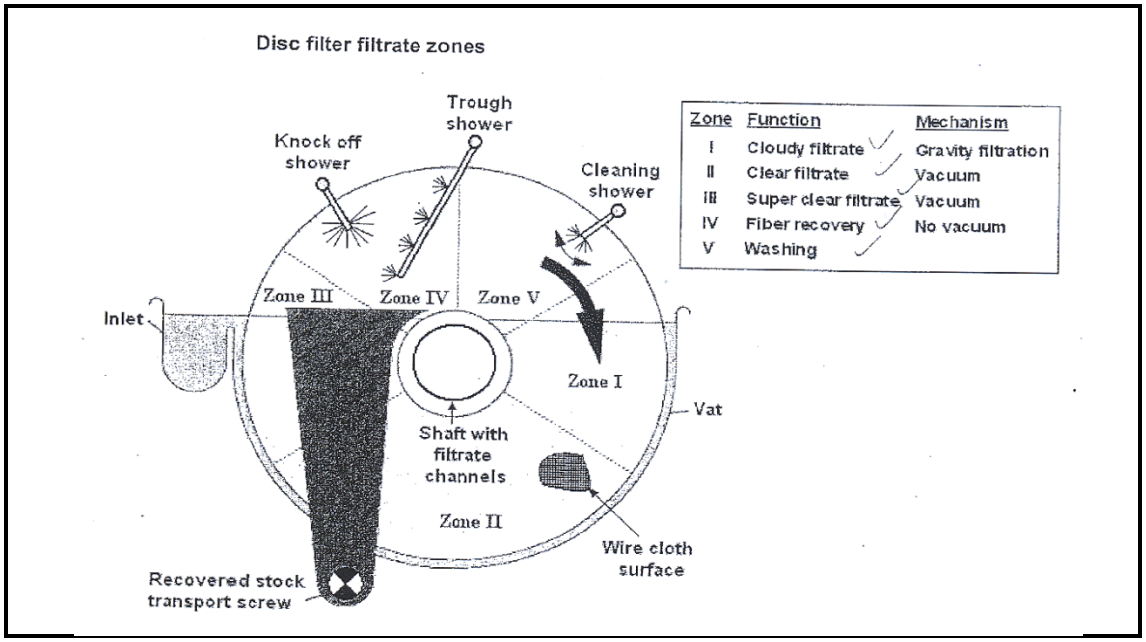
SECTION B

QUESTION 3

3.1 Improves stretch and strength (2)

3.2



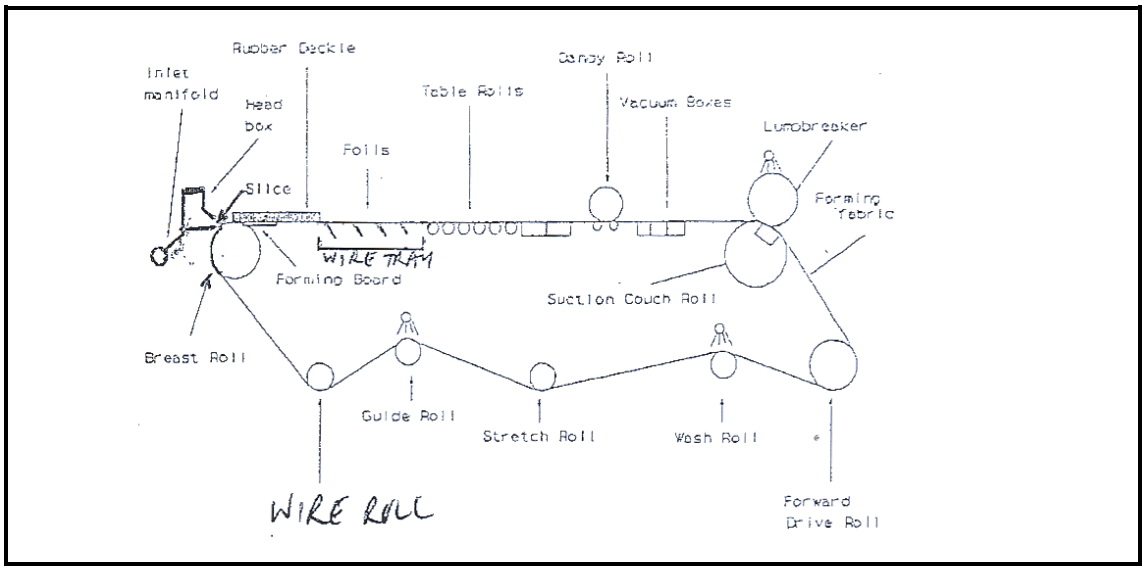
Segments, zones, knock-off showers, vat, clear ww, cloudy ww, drop leg (6)
[8]

QUESTION 4

4.1 4.1.1 Sheet formation (1)

4.1.2 Thick stock enters silo, diluted to 1%, raise vertical slice, head box level drops, fan pump speeds up to maintain level (4)

4.2



Breast roll, wire, foils, table rolls, vacuum boxes, dandy, couch, forward drive, wire rolls, stretch roll, guide roll (5)
[10]

QUESTION 5

5.1
- Fillers
- Dyes and OBAs (optical brightening agents)
- Defoamers
- Sizing agents
- Wet and dry strength enhancers
- Retention and drainage aids
- Biocides
- Deposit and pitch control agents (Any 5 × 1) (5)

5.2
- It is economically important for the retention of high-cost chemicals.
- It improves sheet formation as a result of lower solids in the head box.
- It reduces the load on the white-water save-all system.
- It reduces the load on the effluent plant and the discharge load of pollutants.

(4 × 2) (8)
[13]

QUESTION 6

6.1 6.1.1 Increase in load or dwell time increases water removal (3)

6.1.2 Higher basis mass results in lower water removal (2)

6.1.3 Higher temperature results in better water removal (1)

6.2
- Bucket siphons – used in speed machines up to 300 m/minute
- Rotating syphons – used in paper machines for all speeds with good condensate removal
- Stationary siphons – sit in a bearing outside the dryer cylinder and enter through the cylinder bearing (3 × 2) (6)

[12]

QUESTION 7

7.1
- Solids
- Viscosity
- Sheet porosity
- Moisture (4)

7.2 Weight of bearings and journals at edge of roll (2)

7.3 Rider roll loading, drum torque differential, tension (5)
[11]

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QUESTION 8

8.1
8.1.1 Increases
8.1.2 Increases
8.1.3 Decreases
8.1.4 Increases
8.1.5 Decreases
8.1.6 Increases

(6 × 1) (6)

8.2
- The runnability of the machine may be reduced, resulting in overall production losses.
- The quality of the paper may be negatively affected.
- An increase in the production cost per ton of paper may be experienced due to overall energy and fabric costs.

(3 × 2) (6)
[12]

QUESTION 9

9.1 Economic considerations – discussion on felt life vs. cost of felt and tonnage, high-pressure showers, vacuum, lubricating showers, chemical/caustic, cleaning showers

9.2 Mechanical cleaning – discussion on felt life vs. cost of felt and tonnage, high-pressure showers, vacuum, lubricating showers, chemical/caustic, cleaning showers

9.3 Chemical cleaning – discussion on felt life vs. cost of felt and tonnage, high-pressure showers, vacuum, lubricating showers, chemical/caustic, cleaning showers

(3 × 3) **[9]**

TOTAL SECTION B: 75
GRAND TOTAL: 100

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