higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 2

12 November 2024

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 D
1.2 G
1.3 A
1.4 K
1.5 B
1.6 C
1.7 E
1.8 J
1.9 F
1.10 H

(10 × 1) **[10]**

QUESTION 2

2.1 Fluxing agent
2.2 Potassium oxide
2.3 Conditioning
2.4 Forming
2.5 Inspection

(5 x 1) **[5]**

QUESTION 3

3.1 An organic compound consisting of only carbon✓ and hydrogen✓ (2)

3.1 3.2.1
- Oxygen – 21%
- Nitrogen – 79% (2)

3.2.2
- Air can be recovered by using a large vacuum pump✓ that uses differences in pressure to force the gas to move in the direction of the lower pressure.✓
- This allows air to be sucked into a tank, where it can be stored and purified.✓ (3)

3.3
- Floatation is used when materials have different densities,✓ which cause some materials to float while others sink to the bottom of liquid suspension.✓
- This is often used for copper-nickel ore processing.✓ (3)

3.4
- Helium
- Oxygen
- Nitrogen
- Xenon (4 × 1) (4)

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3.5
- Biomass
- Limestone
- Rock
- Natural gas
- Metal
- Mineral deposit (6 × 1) (6)

[20]

QUESTION 4

4.1
- Chemical reaction requiring pure water
- Drinking water
- Used in equipment to prevent minerals or salts from clogging equipment
- Products may need to be washed with no traces of contaminants
- May be the final product, as with bottled water (5)

4.2 4.2.1 Potable means fit for drinking. (1)

4.2.2
- Chlorine is commonly added as a gas or as salt, such as sodium hypochlorite.✓ One way to add the chlorine gas to the water is by bubbling the gas from nozzles in the bottom of the tank up through the water.✓
- It is important to check the level of chlorine in the purified water, because although chlorine is good for disinfection,✓ too much chlorine can be poisonous if the water is used for drinking.✓

(2 × 2) (4)

4.3
- Reverse osmosis is one of the finest filtration methods to purify water by removing salts✓ and other impurities at the same time.✓
- The process is so effective that even the smallest particles such as ions✓ and bacteria are removed from the water.✓
- The process is based on pressure pushing incoming water through a filtration membrane with holes✓ that are big enough to allow only water molecules to pass through✓ and trap impurities on the membrane.✓
- Reverse osmosis is the most effective way of demineralising water.✓

(4 × 2) (8)

4.4 A – Raw water
B – Add heat
C – Water boils
D – Evaporation
E – Salts remain
F – Condenser
G – Distilled water

(7 × 1) (7)

[25]

QUESTION 5

5.1 5.1.1

- Hydrogen
- Oxygen
- Nitrogen
- Argon
- Carbon dioxide

5.1.2

- Oxygen
- Nitrogen
- Hydrogen
- Acetylene

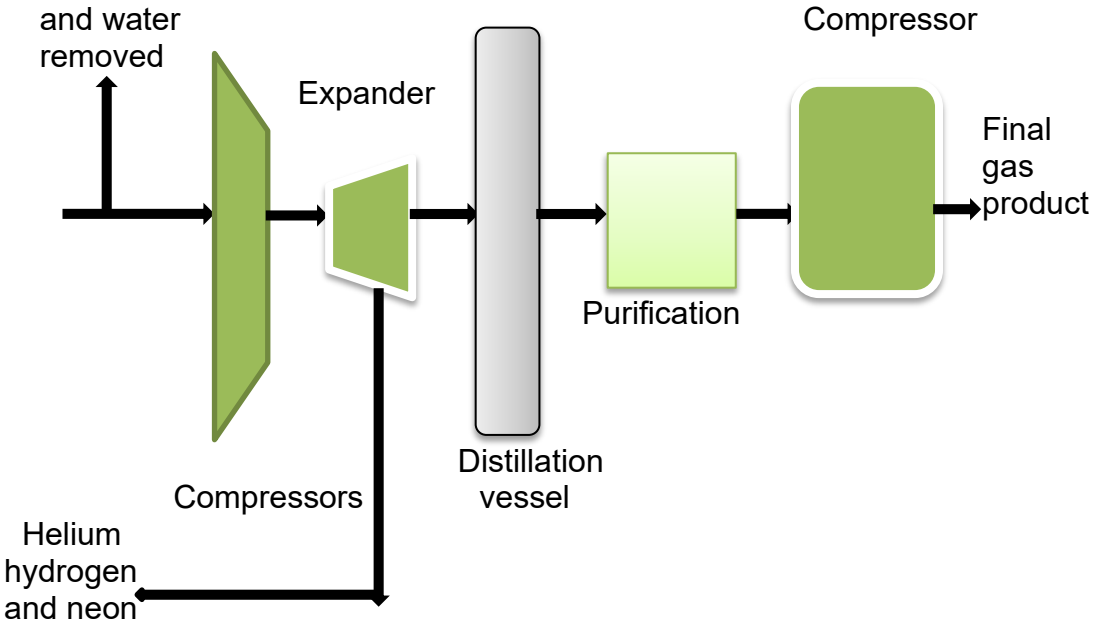
5.1.3

- Carbon dioxide
- Nitrogen
- Oxygen (Any 3 × 1) (3)

5.2

- Pollution
- Dangerous working conditions
- Money goes to select few
- Danger of developing and spoiling South Africa's natural beauty (4)

5.3



(8)
[15]

QUESTION 6

6.1 Gas release agent✓

- A gas release agent removes bubbles from glass by directly allowing them to escape the liquid glass mixture.✓
- Sodium sulphate is an example of such a releasing agent.✓

Physical property changing agent✓

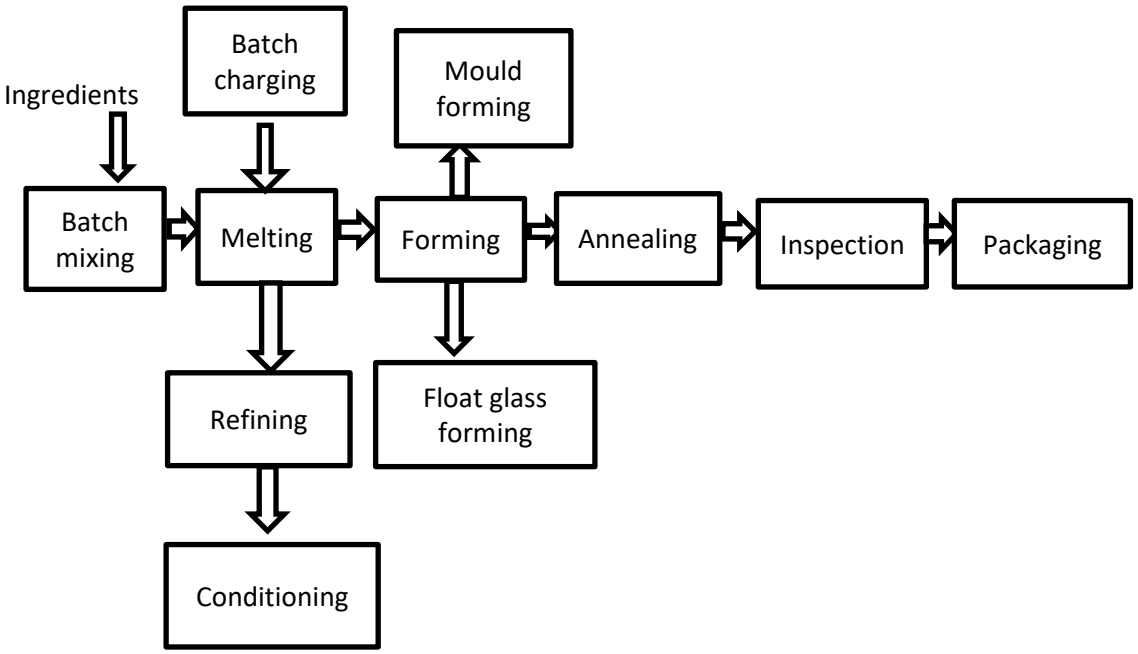
- These refining agents work by changing the properties of the glass so that the bubbles can escape more easily.✓
- They work by lowering the surface tension of the glass, allowing for better bubble removal.✓

Solution agent

- Solution agents act by allowing gas bubbles to dissolve in glass.
- Arsenic oxide is an example of such an agent. It works by reacting with oxygen bubbles that are contained within the glass.

(Any 2 × 3) (6)

6.2



(Any correct labels) (9 × 1) (9)

[15]

QUESTION 7

7.1
- Water
- Foam
- Dry chemical powder
- CO_2
- Wet chemical (5 × 1) (5)

7.2 7.2.1 Protect the wearer against noise

7.2.2 Protect feet from exposure to chemical residue

7.2.3 Protects the face when working with chemicals and against any airborne particles or objects

7.2.4 Protect hands when working with chemicals

7.2.5 Protects the head against falling objects

(5 x 1) (5)
[10]

TOTAL: 100

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