higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 2

XX February 2020

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 Desalination
1.2 Oxygen
1.3 Disinfection
1.4 Lead glass
1.5 Protons

(5 × 1) **[5]**

QUESTION 2

2.1 2.1.1 South African Pulp and Paper Industries (1)

2.1.2
- Office paper
- Treated paper (glossy magazine)
- Kraft
- Newsprint
- Tissue products (Any 3 × 1) (3)

2.1.3 Paper is made by stripping wood fibres and treating it chemically.✓ The moist pulp is pressed together into sheets✓ and dried to form a thin sheet called paper.✓ (3)

2.1.4
- Writing or printing
- Wrapping
- Packaging
- Wiping (Any 3 × 1) (3)

2.2 2.2.1 Chemicals used in the agricultural industry (1)

2.2.2
- Fruit
- Vegetables
- Eggs
- Meat
- Cotton
- Wool
- Leather (Any 5 × 1) (5)

2.3 Natural gas is recovered from underground gas reservoirs✓ by drilling a hole into the reservoir✓ and collected as the gas rises out of the ground.✓ Natural gas can also be collected from crude-oil reservoirs as light organic gas.✓ (4)

[20]

QUESTION 3

3.1
3.1.1 $CaSO_4$
3.1.2 Cu
3.1.3 $FeC\ell_2$
3.1.4 Mn
3.1.5 $A\ell_2(SO_4)_3$

(5 × 1) (5)

3.2
3.2.1 Nephelometric turbidity unit (NTU)
3.2.2 Mol/ℓ or mol/dm^3
3.2.3 No units

(3 × 1) (3)

3.3
- Rivers
- Dams
- Streams
- Lakes
- Oceans
- Groundwater
- Rainwater

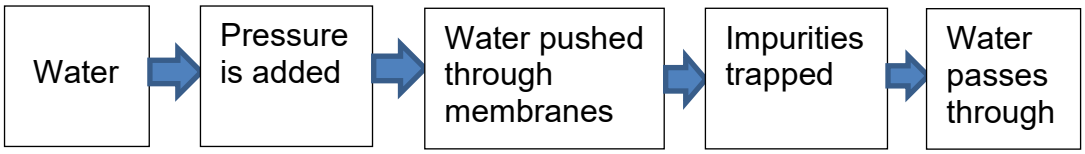
(Any 5 × 1) (5)

3.4
- Bilharzia
- Cholera
- Typhoid
- Dysentery
- Gastroenteritis
- Polio
- Hepatitis

(Any 4 × 1) (4)

3.5 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 like 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.✓ (5)

3.6



(5)
[27]

QUESTION 4

4.1 4.1.1 0,035% by volume (1)

4.1.2
- Colourless
- Odourless
- Tasteless
- Soluble in water (4)

4.1.3 Photosynthesis is a process through which plants use energy from the sun to produce their own food. (2)

4.1.4
- Carbon dioxide
- Methane
- Nitrous oxide
- Chlorofluorocarbons (Any 3 × 1) (3)

4.1.5
- Carbonated beverages
- Fire extinguishers
- Dry ice as cooling agent
- Steel as a hardening agent
- Propellant in aerosol sprays and cans
- Oil-well drills to increase the pressure and reduce the viscosity of oil
- Production of methanol (alcohol) (Any 5 × 1) (5)

4.2 Before the cylinders are filled, their weight is accurately weighed✓ and recorded.✓ They are then filled with a specific mass of liquid gas through a valve.✓ The cylinders are then wiped with soapy water to identify any leaks.✓ (4)

[19]

QUESTION 5

5.1 5.1.1
- Silica 70–80%
- Boric oxide 7–13% (2)

5.1.2 Very low thermal shock (1)

5.1.3
- Glass cookware
- Aquarium heaters
- Lenses for high-quality flashlights
- Laboratory glassware
- Artworks
- Windows of space shuttles
- Storage of nuclear waste (Any 4 × 1) (4)

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5.2 5.2.1 Blue
5.2.2 Brown or amber
5.2.3 Pink
5.2.4 Green

(4 × 1) (4)

5.3
- Molten glass is fed through various canals at 1 200 °C into a ton bath containing molten tin.✓ The flow speed determines the thickness of the glass – a slower speed is used for thinner glass sheets and faster flow speeds for thicker ones.✓
- The molten glass flows over the tin surface forming a perfectly flat surface.✓
- Temperatures are gradually reduced from 1 100 °C to 600 °C as the glass moves down the tin bath.✓
- At approximately 600 °C the now semisolid glass is removed from the tin bath and put into the lehr where annealing takes place.✓
- Glass sheets are cut to the specifications as desired.✓ (6)

5.4
- Cracks known as checks
- Foreign substances called stones
- Gas bubbles called blisters
- Uneven shape and thickness (Any 2 × 1) (2)

[19]

QUESTION 6

6.1 6.1.1 Water
6.1.2 Dry chemical powder or CO_2
6.1.3 Dry chemical powder, CO_2 or foam
6.1.4 Foam
6.1.5 Wet chemical

(5 × 1) (5)

6.2 6.2.1 The containers might contain toxic chemical leftovers that can pose a serious health risk to the people using them.✓ The container material may have absorbed the chemical substance and may also release when filled with water.✓ (2)

6.2.2
- Containers must be free of chemical residuals.
- Containers must be triple rinsed.
- Product labels must be removed or defaced.
- Container lids or caps must be removed.
- Holes must be punched in the bottom of metal and plastic containers before disposal to avoid reuse. (Any 3 × 1) (3)

[10]

TOTAL: 100

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