higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 3

XX February 2020

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 1.1.1
- Compost
- Blood meal
- Bone meal
- Brassin
- Seaweed extract (Any 4 × 1) (4)

1.1.2
- High nutrient content
- Constant composition
- No pathogens present
- Available all year round (Any 3 × 1) (3)

1.1.3 Soil fertilisers are applied directly onto or into soil where nutrients are required.✓ It is very easy to apply✓ and may be in dry or liquid form.✓ (3)

1.1.4 When the pellets are close to the plant roots, over-fertilisation may occur and the plant often dies. It is difficult to accurately control the correct nutrient levels as the plant grow older. (2)

1.2 1.2.1
- Boron (B)
- Chlorine (Cℓ)
- Manganese (Mn)
- Iron (Fe)
- Copper (Cu)
- Selenium (Se)

1.2.2
- Calcium
- Sulphur
- Magnesium

1.2.3
- Nitrogen
- Phosphorus
- Potassium

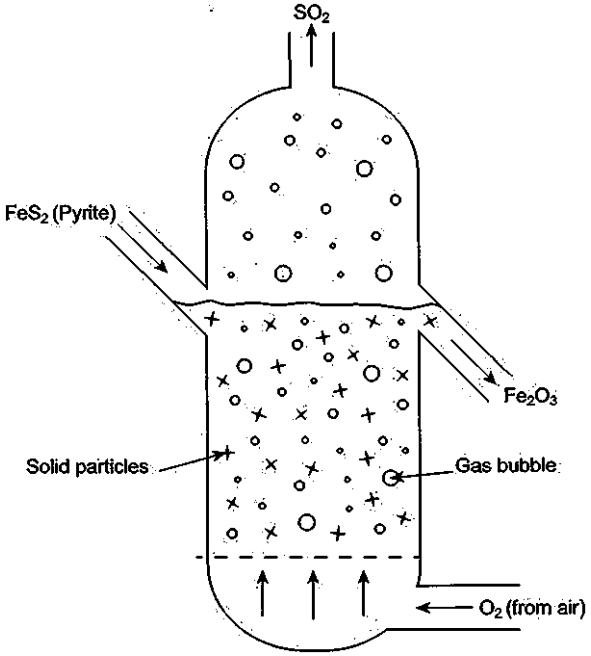
(Any 3 × 1) (3)

1.3 1.3.1 $2SO_2\ (g) + O_2\ (g) \rightarrow 2SO_3\ (g)$

1.3.2 $2NO\ (g) + O_2\ (g) \rightarrow 2NO_2\ (g)$

(2 × 2) (4)

1.4



(6)
[25]

QUESTION 2

2.1 2.1.1 Limestone is a sedimentary rock mainly composed of calcium carbonate.

2.1.2 Clay is the main component of sand and composed of silica, alumina and iron oxide.

2.1.3 Ash is a waste product of the burning of coal from power stations and other chemical industries.

2.1.4 Gypsum is a soft calcium-sulphate mineral.

2.1.5 Shale is sedimentary rock formed by clay, mud and silt.

(5 × 1) (5)

2.2 2.2.1
- Mining of raw materials
- Separation and mixing of raw materials
- Smelting
- Slag granule formation
- Grinding and blending of the slag (5)

2.2.2 Open-pit mining is used to extract concentrated deposit of coal or ore by digging a succession of horizontal benches or steps from the ground downward.✓ The vertical surfaces between the benches are called the faces.✓ To remove the overburden which covers the ore, the face is systematically removed using explosives and earth-moving equipment.✓ To transport the ore and waste to the ground surface from the face and the bottom of the pit, trucks drive on the benches connected to each other by ramps.✓ (4)

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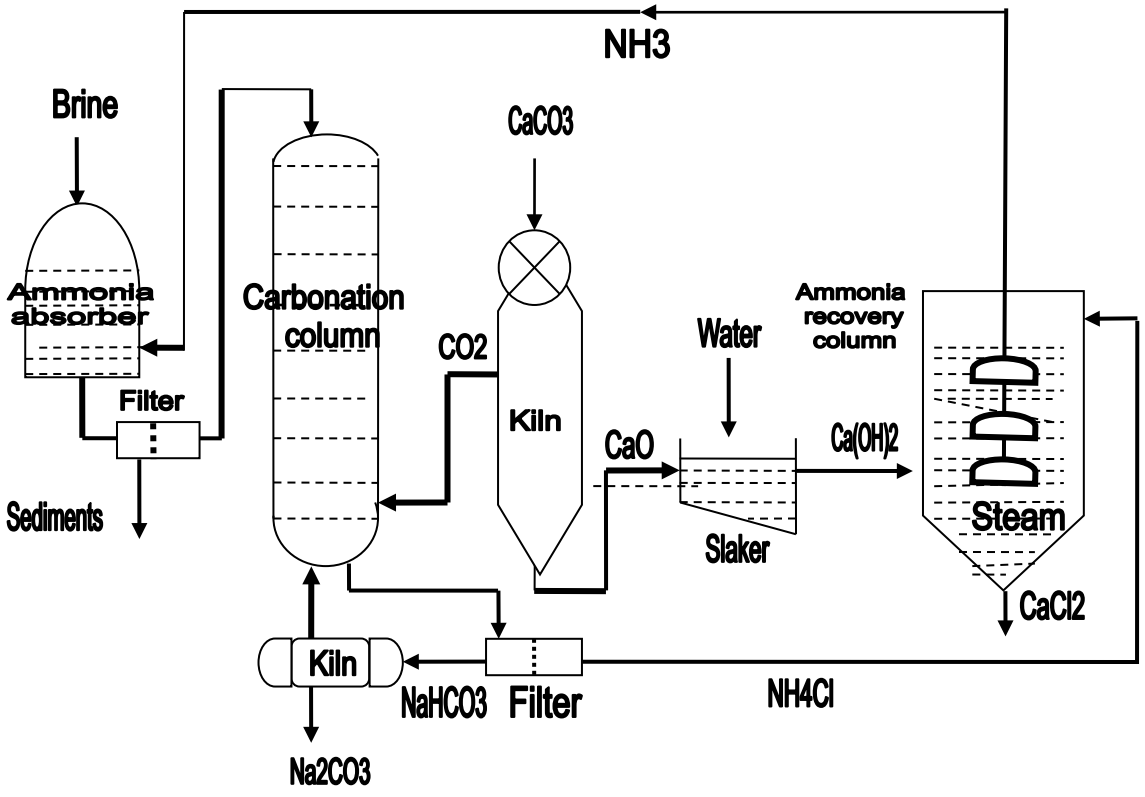
2.3 2.3.1
- Bleaching agent
- Building industry: whitewashing walls
- Pulp and paper industry: whitening paper
- Metal industry: manufacturing metal alloys
- Water-treatment industry: purifying drinking water
- Removing phosphates from sewage

2.3.2
- Pulp and paper industry: improving the printing properties of paper
- Plastic industry: fillers
- Paint industry: extender more weather-resistant, less abrasive and dries quicker
- Agricultural industry: fertilisers
- Raw material in the cement production process (Any 2 × 3) (6)

[20]

QUESTION 3



(Any 15 labels × 1) **[15]**

QUESTION 4

4.1 4.1.1 Oleic acid
4.1.2 Lauric acid
4.1.3 Palmitic acid

(3 × 1) (3)

4.2 4.2.1 Additives improve the visual properties of the object being cleaned. (2)

4.2.2
- Modify foaming properties
- Increase or decrease the viscosity of the detergent solution
- Decrease the corrosive effect of detergents (3)

4.2.3
- Carboxymethyl cellulose
- Fluorescent optical brighteners
- Enzymes
- Perfumes and colorants (4)

4.3
- Improve livestock and crop production
- Improve livestock and crop quality
- Control invasion of pests (3)

4.4 4.4.1 Dehydrates the insect and stops the insect's metabolism from functioning properly

4.4.2 Deactivate the enzymes necessary for proper nerve functioning in the insect's body

4.4.3 Stomach poison that kills insects that chew or suck leaves of plants sprayed with Paris green

4.4.4 Deactivate the enzymes necessary for proper nerve functioning in the insect's body

4.4.5 Stop the nerves of the insect from transmitting signals to cells

(5 × 1) (5)
[20]

QUESTION 5

5.1
- Sappi
- Kimberly-Clark
- Mondi
- Nampak (4)

5.2 5.2.1 Softwood has long rough fibres and a bigger diameter that strengthen paper. Hardwood has weaker and short fibres for making paper with a smooth surface. (2)

5.2.2
- Virgin fibre
- Secondary fibre (2)

5.2.3
- Lignin residues
- Hemicellulose
- Inorganic chemicals (Any 2 × 1) (2)

5.3
- Chips are cooked in a digester.
- Cooked chips are blown into a blow tank that breaks the chips into fibre.
- Pulp is washed to remove the cooking liquor. (3)

5.4
- Sandpaper
- Carbon tissue
- Photographic paper
- Wallpaper
- Conductive paper (5)

5.5 Lamination is the application of an adhesive such as starch, vegetable protein, synthetic resin or a plastic sheet to a paper or board. (2)

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TOTAL: 100

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