higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CHEMISTRY
NQF LEVEL 4

2 March 2020

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 True
1.2 False
1.3 True
1.4 False
1.5 True

(5 × 1) **[5]**

QUESTION 2

2.1 D
2.2 H
2.3 A
2.4 F
2.5 C

(5 × 1) **[5]**

QUESTION 3

3.1 Hydrocarbons
3.2 Smelter
3.3 Thermal cracking
3.4 Fractional distillation/Distillation
3.5 Yeast/Bacteria/Fungi

(5 × 1) **[5]**

QUESTION 4

4.1 4.1.1
- Polyester
- Polypropylene
- Polyamide
- Polyethylene
- Ethylene vinyl acetate
- Polystyrene
- Polyethylene glycol
- Polyoxymethylene

(Any 3 × 1) (3)

4.1.2
- Mattresses
- Sanitary towels
- Diapers

(3)

4.2
- Sasol polymers
- Safripol
- SANS fibres
- Karbochem

(4)

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4.3 Ethylene gas is produced as a by-product of petroleum production from crude oil,✓ while chlorine gas is made by electrolysis of salt; sodium chloride via electrolysis.✓ The chlorine gas is mixed with ethylene gas and a catalyst ✓ to form ethylene dichloride.✓ To produce VCM, ethylene dichloride is heated up to 500 °C.✓ At this temperature ethylene chloride breaks down to form the VCM and hydrochloric acid.✓

(6)

4.4 4.4.1
- Nonstick surfaces in cookware
- Seal tape used as sealant in plumbing
- Electrical insulation
- Medical applications
- As a sliding agent (Any 4 × 1) (4)

4.4.2
- Window guides
- Bearings
- Coasters
- Piston guides (Any 3 × 1) (3)

4.5 4.5.1 Bonds get stronger when heated/Thermal strengthening of bonds
4.5.2 Recyclable
4.5.3 Cross-linked chains
4.5.4 Lightweight

(4 × 1) (4)
[27]

QUESTION 5

5.1
- Mining
- Mineral processing
- Smelting
- Converting
- Refining
- Marketing (6)

5.2
A PGM concentrate
B Dissolution filtration
C Solvent extraction
D Solvent extraction
E Distillation
F Neutralisation
G Precipitation
H Leaching precipitation
I Reductive stripping
J Scrubbing and stripping (10)

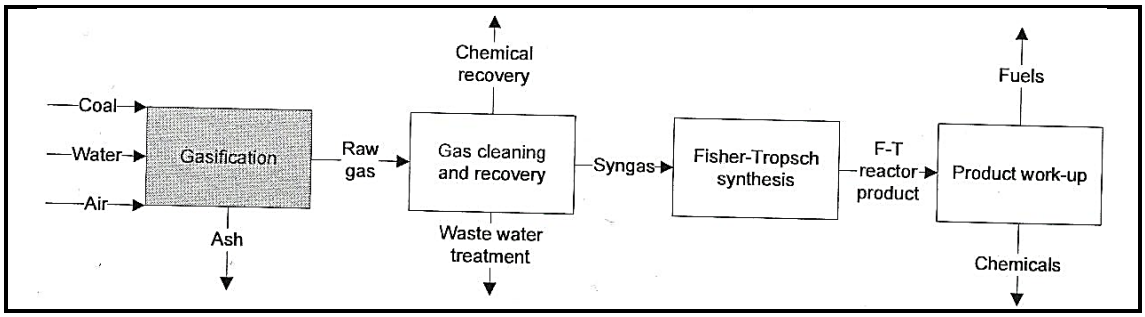
5.3
- Deoxidant in steel making
- Alloying element in steel, cast iron and aluminium
- Raw material in a range of chemical products
- Basis for semiconductor materials
- Electronic insulation at high temperatures
- Paint for high temperatures
- Water-proofing for masonry, glass and ceramics (Any 4 × 1) (4)

5.4 It is a chemical reaction that releases heat. (2)
[22]

QUESTION 6

6.1
- Production of polyethylene
- Production of styrene
- Manufacture of detergents and surfactants
- Production of ethanol
- Production of vinyl chloride monomer (VCM)
- Accelerated fruit ripening
- Production of ethylene glycol (Any 5 × 1) (5)

6.2



(15 × 1) (15)

6.3
- Petrol/Gasoline
- Liquid petroleum gas (LPG)/Natural gas
- Paraffin/Kerosene
- Coal (4)
[24]

QUESTION 7

7.1 7.1.1 Organic and inorganic materials produced to provide nutrients to plants

7.1.2 Chemical substances used to control or destroy spreading pests (2 × 2) (4)

7.2 The mash mixer forces the mash downwards and then up the side of the vessel to avoid scorching the mash,✓ while heated water at 65 °C is added during the mashing process.✓ The mixer is equipped with a paddle that mashes and agitates the mixture to achieve a homogeneous mixture.✓ The process takes about an hour to complete after which the mash is send to the lauter tun.✓ (4)

7.3
- Operates at lower temperatures
- Offers greater selectivity
- Cheaper than other processes (3)

7.4 Centrifugal contactor/Centrifugal extractor/Annular centrifugal contactor (1)

[12]

TOTAL: 100

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