higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS TECHNOLOGY
NQF LEVEL 2

XX February 2020

This marking guideline consists of 5 pages.

Copyright reserved

SECTION A

QUESTION 1

1.1 A
1.2 B
1.3 C
1.4 D
1.5 D

(5 × 1) **[5]**

QUESTION 2

2.1 True
2.2 True
2.3 True
2.4 False
2.5 False

(5 × 1) **[5]**

QUESTION 3

3.1 Filtration
3.2 anions
3.3 rake
3.4 screens
3.5 pressure

(5 × 1) **[5]**

TOTAL SECTION A: 15

SECTION B

QUESTION 4

4.1
- Indicate the flow of a process
- Help operators to understand how a process work
- Trace a process through a plant
- Identify a process or a stream
- Keep track of piping and equipment in a processing plant

(Any 2 × 1) (2)

4.2 4.2.1 Minor process or utility
4.2.2 Lagged pipe
4.2.3 Pipe with heat tracing

(3 × 1) (3)

4.3 Corrosion is the process by which a material deteriorates slowly or quickly either due to the chemical reaction of the material with the environment or as a result of chemicals in contact with the material. (2)

4.4
- Lift check valve
- Piston check valve
- Swing check valve
- Tilting-disc check valve
- Stop check valve (Any 3 × 1) (3)

4.5
- Steam production
- Food and beverage production
- Ingredient in chemical processing
- Specialised cleaning functions (Any 3 × 1) (3)

4.6 Clarifiers remove activated sludge added in the aeration tank and any remaining suspended solids from the wastewater or it fairly treats diluted liquids. (2)

[15]

QUESTION 5

5.1
- Volute casing
- Circular casing
- Horizontal split casing (3)

5.2
- Idler gear
- Casing
- Discharge port
- Driven gear
- Suction port (5)

5.3 5.3.1 Ventilation (2)

5.3.2 Blowers are used due to the high delivery-pressure drop needed to overcome the pressure drop in the ventilation system. (2)

5.4
- Easy to install
- No oil carry-over
- Low initial costs
- Achieve very high pressures
- High efficiency when the compressor is new and after overhauls

(Any 3 × 1) (3)

5.5 5.5.1 Intermittently switching the equipment on and off or not switching on or off at all (2)

5.5.2 Alert the shift manager who will call an electrical technician to investigate and take appropriate action. (3)

[20]

QUESTION 6

6.1 Horizontal tanks (2)

6.2
- They do not take up space above the ground at the filling station.
- They are quite safe from fire and other accidents underground. (2)

6.3
- Storm-water basins to provide temporary storage for runoff water
- Solar evaporation (2)

6.4 6.4.1 Protects products from contamination with foreign materials

6.4.2 Prevents any excess pressure or vacuum from forming in the seal area of mechanical seals

6.4.3 Prevents the floating roof from dropping to the floor of the tank when the tank is emptied completely

(3 × 2) (6)

6.5 This type of protection is used for underground storage tanks.✓ Pieces of zinc, aluminium or magnesium are attached to the vessel.✓ Since steel is nobler than these metals, the alloys supply the steel with a constant stream of electrons,✓ which protect the steel from reacting with oxygen that gets into contact with it.✓ This process causes these alloys to have an electron shortage,✓ making them corrode more quickly or sacrificially than they normally would.✓ If there is access to the anodes, they are replaced when completely corroded away.✓ (7)

6.6 Liquid petroleum gas (1)

[20]

QUESTION 7

7.1
- Inadequate flocculation
- Filter clogging
- Mud-ball formation
- Filter cracking (4)

7.2
- Hydraulics
- Mechanical pressure (2)

7.3 Removes small amounts of fine suspended solids from a stream to produce a clear liquid (2)

7.4
- Motor
- Feed inlet
- Wash line
- Spray nozzle
- Housing
- Liquid outlet
- Solids outlet
- Plow
- Drive shaft (9)

7.5
- Feed-inlet velocity
- Size of suspended particles (2)

7.6 A cyclone uses gravity and centrifugal force to separate solid particles from a gas or liquid stream.✓ The feed solution is fed tangentially through the feed inlet opening.✓ The angle of entry results in a swirling motion inside the cyclone.✓ The cyclone causes a centrifugal force which separates the dense particles from the less dense ones.✓ The swirling motion goes down into the cyclone, with the heaviest particles against the outside rim.✓ When the swirling material comes to the bottom of the cleaner, the lightest fraction forms a vortex✓ in the middle of the cyclone which makes its way upwards.✓ The light fraction leaves through the overflow pipe.✓ The rest of the solids are removed through the underflow orifice at the bottom of the cyclone.✓ (9)

7.7 kg/ℓ or mg/ℓ (2)
[30]

TOTAL SECTION B: 85
GRAND TOTAL: 100

Copyright reserved