higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS TECHNOLOGY
NQF LEVEL 2

10 November 2022

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 D
1.2 A
1.3 C
1.4 B
1.5 D

(5 × 1) **[5]**

QUESTION 2

2.1
- Temperature controller
- Pressure controller
- Flow controller
- Level controller

(4)

2.2 To show the relationship between all the major process steps in a process environment. (2)

2.3
2.3.1 Gate valve
2.3.2 Reducer
2.3.3 Main process

(3 × 1) (3)

2.4 The main purpose of piping and fittings is to transport fluids between equipment in a process plant. (2)

2.5
- Stainless steel
- Aluminium
- Copper
- Polymers
- Steel

(Any 4 × 1) (4)

2.6
- Tungsten inert-gas welded pipe
- High-frequency and low-laser welded pipe
- Electric-resistance welded pipe
- Laser-welded pipe
- Submerged and double-submerged arc-welded pipe

(Any 3 × 1) (3)
[18]

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QUESTION 3

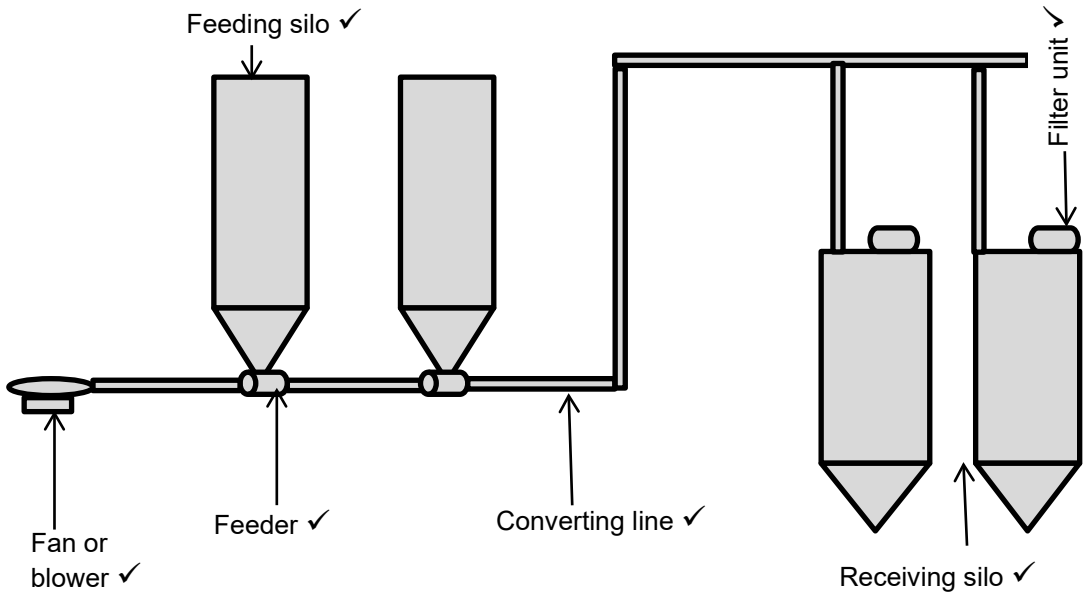
3.1
3.1.1 True
3.1.2 False
3.1.3 False
3.1.4 False
3.1.5 True

(5 × 1) (5)

3.2
- To move large volumes of air or gas through ducts
- To supply air for dying
- To convey material suspended in the gas stream
- To remove fumes
- Cooling towers
- Combustion air
- Other high-flow, low-pressure applications

(Any 5 × 1) (5)

3.3



(6)

3.4
- The seal faces being open
- The heat causing a problem
- The chemical environment causing material failure

(3)
[19]

QUESTION 4

4.1
- Act immediately when you see a leaking container, since the fluid that is leaking can be detrimental to the environment.
- Always dispose of old or poor-quality items properly, with due consideration for the environment.
- Ensure that dangerous gases do not leak into the atmosphere.
- Do not allow chemicals to react with one another as this reaction may also damage the environment or may even cause an explosion.

(Any 2 × 2) (4)

4.2
- Wear appropriate PPE.
- Look where you are going and ensure that you do not bump into anything as this may cause the container to become damaged and leak.
- Keep fire-fighting equipment close by.
- Do not smoke when transporting containers.
- Ensure that there are no other sources of ignition nearby, such as welding.

(Any 4 × 1) (4)

4.3
- It is a very safe method of storing liquids.
- Large amounts of liquid can be stored at once.
- It is easily accessible.
- Its features make filling and emptying easy. (4)

4.4
- Positive extraction to remove heat, fumes, steam and dust
- Reduced structural damage
- Protection of the stored goods (3)

4.5 A – Sphere
B – Bullet
C – LNG tank
D – Cryogenic tank
E – Gas cylinder (5)

[20]

QUESTION 5

5.1
- To extract purified products from multiple component streams
- To remove impurities
- To remove dangerous or hazardous materials from a stream or product (3)

5.2
- Pre-treatment
- Primary sedimentation
- Activated sludge treatment
- Disinfection
- Solids treatment (5)

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5.3 Screening is the removal of large contaminants✓ using a perforated mesh or similar item.✓ (2)

[10]

QUESTION 6

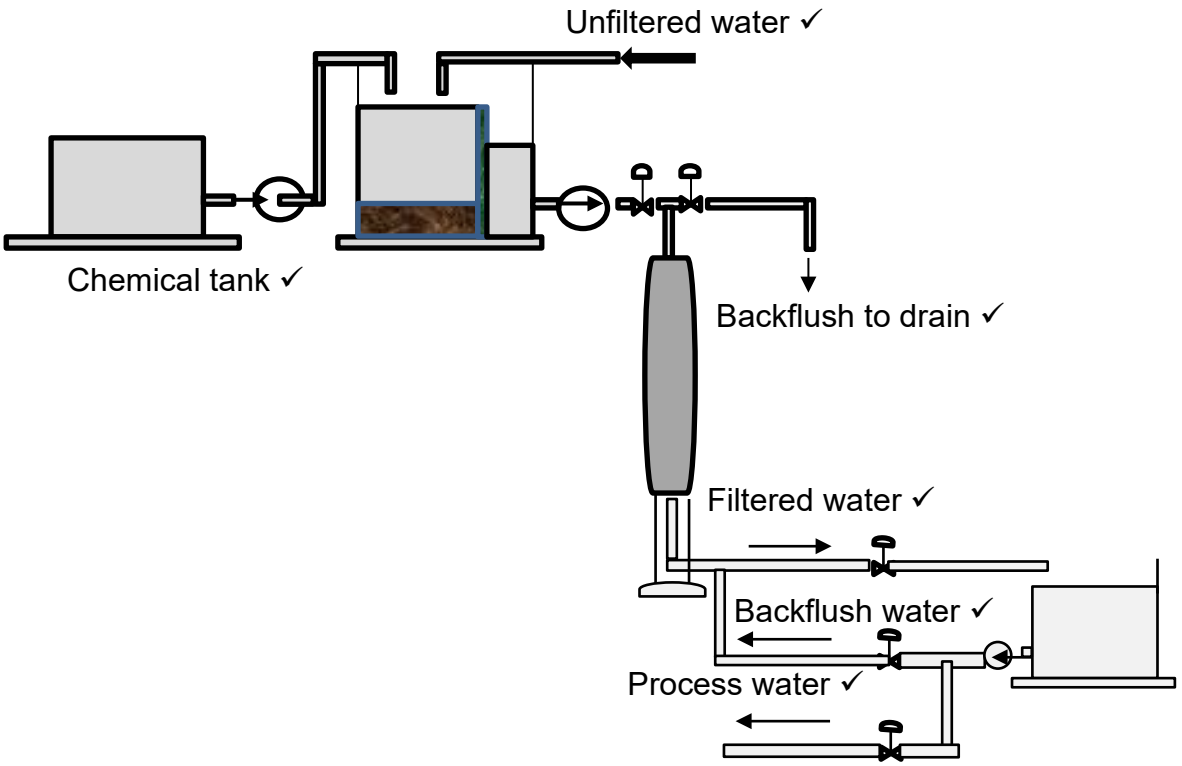
6.1
- Filtration: Uses size exclusion to remove solids from a liquid suspension
- Density separation: Uses the density differences of components of the suspension to separate them
- Electrical method: Uses electrical properties of a species in an ionic solution
- Adsorption filters: Use a filter medium that has absorption properties so that solid particles can adhere to it as the suspension is passed through.

(4 × 2) (8)

6.2
- To recover valuable solids from the liquid and dispose of the liquid
- To remove and dispose of unwanted solids in order to purify the liquid
- To recover both solids and liquid individually

(3 × 2) (6)

6.3



(6)

6.4 A diffuser is a device that spreads the air over an area, ✓ reducing the size of the bubbles. ✓ (2)

6.5 The concentrated solution is fed through the feed inlet into a pipe leading to the cooler.✓ Supersaturation takes place after cooling the solution.✓ The supersaturate solution flows through another pipe into a tank filled with a solution that already has the crystals growing known as the magma.✓ The solution flows through the crystals and its supersaturation is reduced by further formation of crystals.✓ The solution then overflows into the feed pipe and mixes with the feed solution and then the cycle repeats. ✓ Crystals settle at the bottom of the tank and are collected when they are large enough. ✓ (6)

[28]

TOTAL: 100