higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS TECHNOLOGY
NQF LEVEL 2

8 December 2020

This marking guideline consists of 5 pages.

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SECTION A

QUESTION 1

1.1 A
1.2 B
1.3 C
1.4 C
1.5 A

(5 × 1) **[5]**

QUESTION 2

2.1 C
2.2 B
2.3 F
2.4 G
2.5 I

(5 × 1) **[5]**

QUESTION 3

3.1 True
3.2 False
3.3 True
3.4 False
3.5 False

(5 × 2) **[10]**

TOTAL SECTION A: 20

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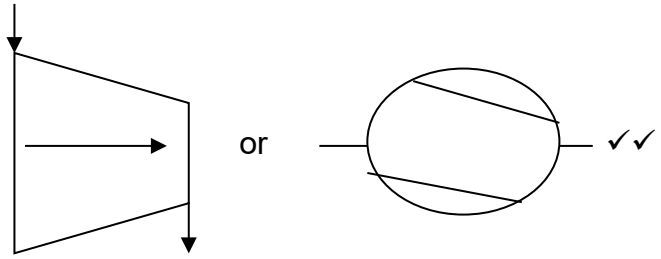
SECTION B

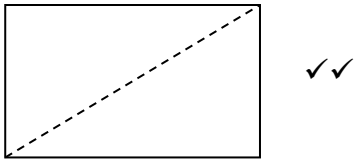
QUESTION 4

4.1
- Flanges
- Relief and safety valves
- Minor bypass lines
- Process control instrumentation
- Isolation and shutoff valves
- Maintenance vents and drains
- Pipe classes/Piping line numbers (Any 4 × 1) (4)

4.2 4.2.1



4.2.2



4.2.3



(3 × 2) (6)

4.3
- Seamless pipes
- Longitudinal welded pipes
- Spiral welded pipes
- Large diameter pipes (4 × 1) (4)

4.4
- Length of pipe
- Nominal diameter
- Outside diameter
- Wall thickness
- Inside diameter
- Pipe schedule (6 × 1) (6)

[20]

QUESTION 5

5.1
- Extraction of purified products from multiple component streams
- Removal of impurities
- Removal of dangerous or hazardous materials from process stream or product (3 × 1) (3)

5.2
- Household effluent
- Effluent caused by dead plants in water
- Effluent caused by industry processes (3 × 1) (3)

5.3 5.3.1 Removal of large particles from water

5.5.2 Process of adding chlorine to water to kill harmful microorganisms (2 × 2) (4)

5.4
- Highly efficient
- No slip
- Neat design (3 × 1) (3)

5.5 5.5.1 Deliver water even if fire trips electricity feed to plant

5.5.2 Use excess steam and also drive large pumps rather than small ones (2 × 2) (4)

5.6 Reclaimer moves on rails to selected stockpile with boom fully elevated.✓ Because of height of body it can move over full stockpiles.✓ Stacking system will have produced neatly shaped stockpile.✓ If not, the operator can set boom angle and use reclaimer to reclaim stock in such a way that appropriate pile is achieved.✓ Boom is then lowered to preset cut depth✓ and moves along stockpile✓ scraping material off side slope into reclaim conveyor.✓ Discharge rate can be adjusted by speed control of wheel drives or by depth of cut.✓ (8)

[25]

QUESTION 6

6.1 Standard operating procedures (1)

6.2
- Lids should be properly closed to prevent evaporation.
- Bulk solids should be covered with plastic or another type of cover when not being processed.
- Close the valves of gas containers properly to prevent leakages.
- Prevent spillages by working carefully.
- Prevent leakages from containers and immediately clean leakages.
- Do not allow any unauthorised personnel into the storage area.
- Never leave a storage area open.

(7 × 1) (7)

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6.3 Steel or plastic drums specifically designed for safe and economic transport and storage of damaged drums (2)

6.4
- Always inform someone else so you can get help.
- Raise a general alarm in more serious cases.
- All personnel not involved in the control of the hazardous spillage should be told to leave the vicinity.
- In serious cases the company's emergency personnel should be called to deal with the situation. (4 × 1) (4)

6.5 Liquified petroleum gas (1)
[15]

QUESTION 7

7.1 7.1.1 Small solid particles that remain suspended in water

7.1.2 Substance dissolved in water separating ions

7.1.3 Tank about 2,5 m deep with two or more layers of sand inside (3 × 2) (6)

7.2 Mixture is fed into centrifuge in batches.✓ Each batch goes through the same steps✓ and new batch is only started when previous batch has completed its cycle and has been removed.✓ (3)

7.3
- Susceptible to abrasion erosion
- Sensitive to changes in feed flow rate and quality
- Inflexible once installed because performance is determined by design feed flow rates
- Low efficiencies for very small particles
- High pump operating costs (Any 4 × 1) (4)

7.4 Supersaturation occurs because of nucleation.✓ Crystals need starting points in the form of either small particles or any other rough surface to form.✓ Crystals must be prevented from forming against sides of crystallisation equipment as it would block everything,✓ therefore these surfaces are kept smooth and clean and other nucleation starting points are provided called nuclei.✓ Small crystals or nuclei are generally mixed with water to form magma✓ which is added to the process to act as nucleation zones for crystal growth.✓ Crystal size, quantity and time at which they are added to the solution determine growth rate and form of crystals.✓ (7)
[20]

TOTAL SECTION B: 80
GRAND TOTAL: 100

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