higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

PROCESS CONTROL
NQF LEVEL 4

23 November 2023

This marking guideline consists of 5 pages.

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SECTION A

QUESTION 1

1.1 A
1.2 B
1.3 B
1.4 C
1.5 D

(5 × 2) **[10]**

QUESTION 2

2.1 C
2.2 F
2.3 J
2.4 D
2.5 E

(5 × 1) **[5]**

QUESTION 3

3.1 True
3.2 True
3.3 False
3.4 True
3.5 True

(5 × 1) **[5]**

TOTAL SECTION A: 20

SECTION B

QUESTION 4

4.1 It is the criterion that determines acceptability by the customer. (2)

4.2 They ensure that the process produces quality products. (2)

4.3
- Man
- Machine
- Method
- Material
- Mother nature
- Measurement (6)

4.4
- Who can identify non-conforming products.
- Who can move or handle non-conforming products.
- Who can authorise discarding of non-conforming products.
- Who can discard non-conforming products. (4)

4.5
- The company may be subjected to financial fines.
- Higher taxes may be imposed.
- Authorities may completely shut down a company if there are most serious offenses.
- Discontinuation may be ordered by authorities if an organisation continues to produce non-conforming products. (Any 1 × 1) (1)

4.6
- Eliminating the influence of external disturbances.
- Ensuring the stability of a process.
- Optimising the performance of a process. (3)

4.7
- Sample extraction
- Sample conditioning
- Sample transfer and preparation
- Component separation and isolation
- Concentration or signal transducer
- System control and signal manipulation
- Information display and documentation (Any 3 × 1) (3)

4.8
- Direct sensing
- Indirect sensing
- Single-point measurement
- Free-flowing solid-level sensing (4)

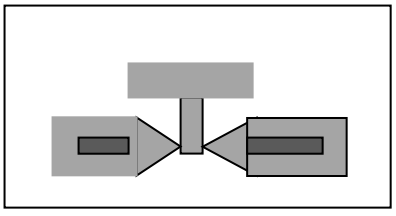
[25]

QUESTION 5

5.1 It is an instrument used to measure disturbances and other causes of effects in a process. (2)

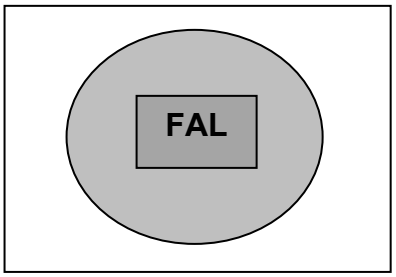
5.2
5.2.1 Seismometer
5.2.2 Remote terminal unit (RTU)
5.2.3 Transducer
(3 × 2) (6)

5.3 5.3.1 Shut-down valve.



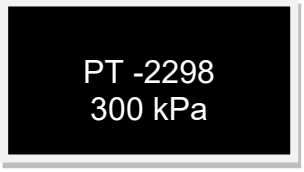
✓✓✓

5.3.2 Flow alarm low



✓✓✓

5.3.3 Pressure transmitter no. 2298 reading.



✓✓✓

(3 × 3) (9)

5.4 They indicate a number of possible problems. (2)

5.5 5.5.1
- Flow meter
- Feed tank
- Valves
- Pumps
- Whole system (Any 3 × 1) (3)

5.5.2
- Broken flow meter
- Empty feed tank
- Broken pump
- Stopped or non-operating pumps
- Closed valves
- Blocked system
- Leaking system (Any 3 × 1) (3)

5.5.3
- Do a visual inspection of the tank level or use a tank dipstick or sight glass.
- Check whether the pump motor is running.
- Check the position of the valve, whether it is closed, stuck or open.
- Check the control-valve position indicator, whether it is closed or open.
- Check for leakages in the system. (Any 3 × 1) (3)

5.5.4
- Switch to a stand-by pump.
- Open the valve if it is closed.
- Adjust the level of the tank by increasing the volume of the water.
- Open the control valve if it is closed.
- Seal leakages where possible. (Any 2 × 1) (2)

5.5.5
- He can use logic if he understands the system well enough,✓
- i.e. the process flow, control logics, equipment working principles and failure mechanisms.✓✓ (Any 2 × 1) (2)

5.5.6
- Shut the system down.
- Increase the inflow of water.
- Bypass the equipment or system.
- Re-route the process, system or equipment.
- Replace or use alternative equipment.
- Temporarily fix the problem. (Any 3 × 1) (3)

[35]

QUESTION 6

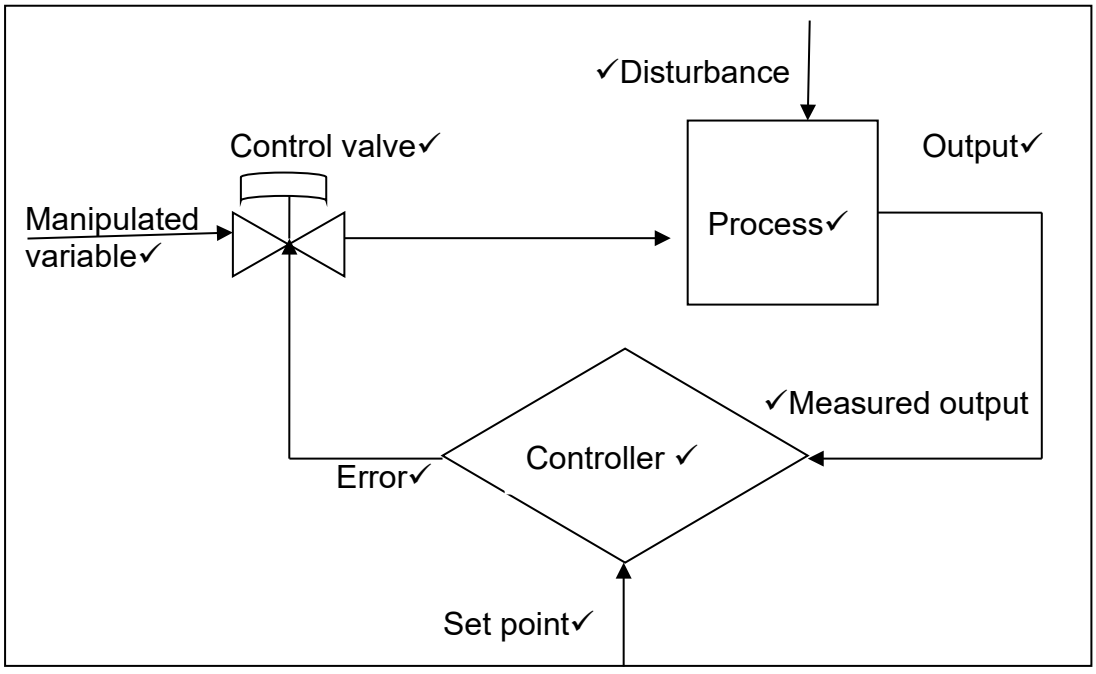
6.1
- Manual control
- Automatic control
- Cascade control (3)

6.2
- Process flow sheets
- Start-up manual
- Operating start-up manual (3)

6.3 High selector switch (1)

6.4 It is a variable that cannot be controlled. (2)

6.5



(9)

6.6 It would compensate or take into account the delays in the control loop. (2)

[20]

TOTAL SECTION B: 80
GRAND TOTAL: 100

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