higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

MECHATRONICS SYSTEMS
NQF LEVEL 2

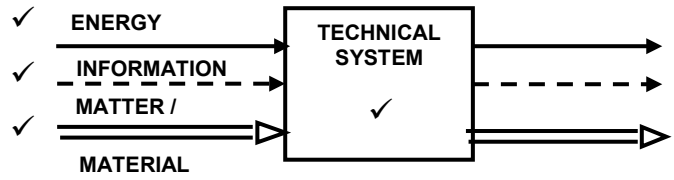
22 November 2024

This marking guideline consists of 6 pages.

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QUESTION 1

1.1

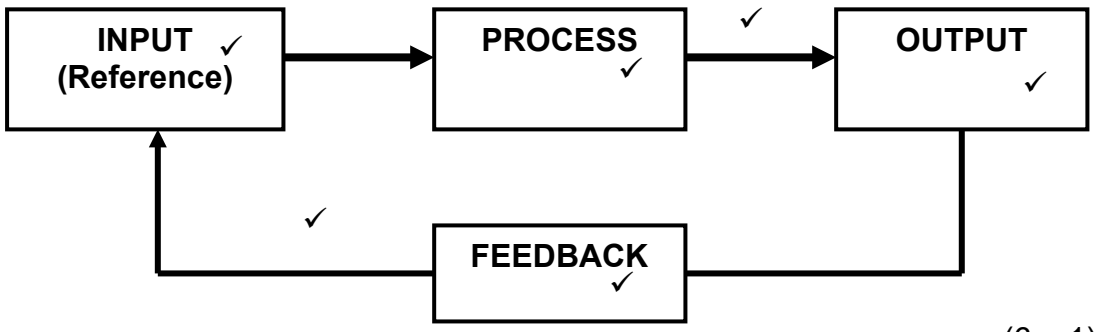


(4 × 1) (4)

1.2
- The energy flow and related conversion.
- The information flow.
- The material flow.
- The operator panel and related components.
- The machine/application and related components.
- The control panel and related components
- Feedback status sensors indicated.
- Open or closed loop control can be determined.

(Any other relevant information 8 × 1) (8)

1.3



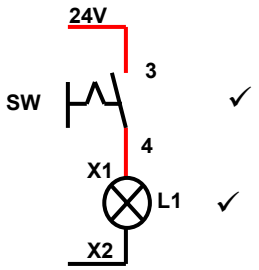
(6 × 1) (6)

1.4 The process of changing one form of energy into another, such as nuclear energy into heat or solar energy into electrical energy. (2)

[20]

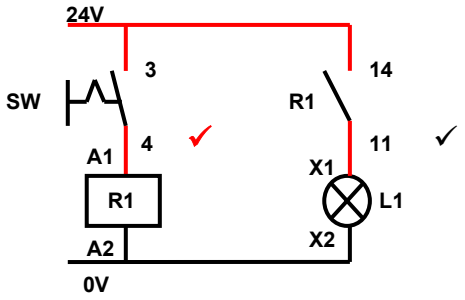
QUESTION 2

2.1



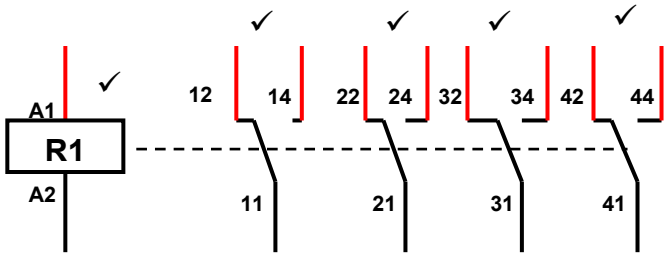
(2)

2.2



(2)

2.3



ONE mark, if all termninals are correctly labelled✓ (6)

2.4 Remote control is when the operator sits and monitors and manages the processes ✓a distance away from the actual work area.✓ (2)

2.5 Safety voltage refers to a voltage that is considered to be a low voltage (1–50V)✓ that will not shock a person under normal conditions is used in control circuits.✓ (2)

2.6 Intrinsic safety is the region where a flash over arc will not cause a fire or explosion✓ in an area where chemicals are used.✓ (2)

2.7
- Indication lamp
- Horn
- Siren
- Buzzer
- Dial
- Gauge

(Any 3 × 1) (3)

2.8 Indication lamp is commonly used. (1)

[20]

QUESTION 3

3.1
- Air generation
- Air distribution
- Air application (3)

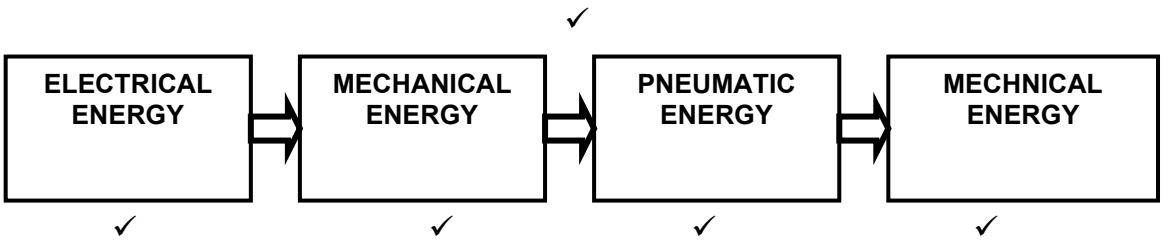
3.2 PVC tubing (1)

3.3 Pneumatic valve (1)

3.4 The spool by virtue of its position will control the flow of air in the application. (2)

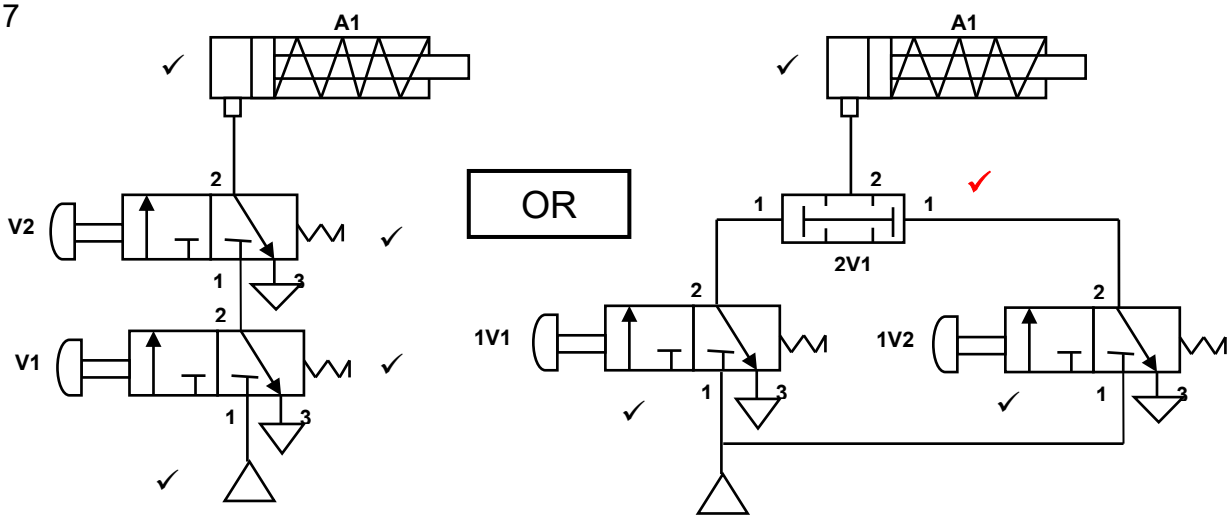
3.5
- Put the system into zero pressure.
- Reset all cylinders into the initial positions.
- Stop all cylinders in their current position.
- Combine two or more abovementioned options. (4)

3.6



(5 × 1) (5)

3.7



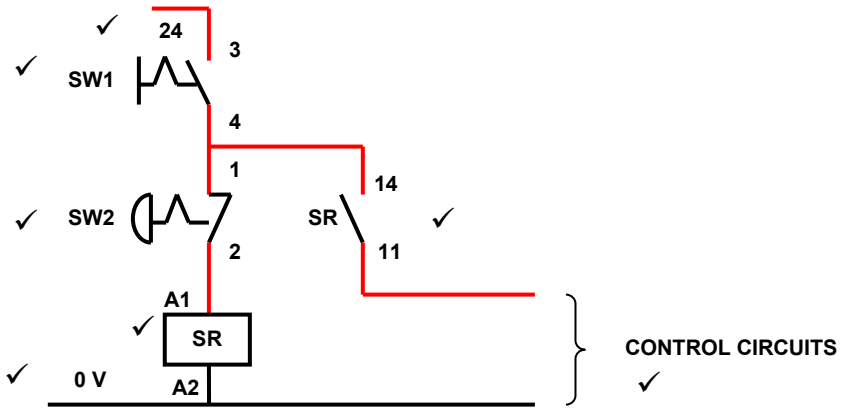
(Direct control or indirect control is acceptable 4 × 1) (4)

[20]

QUESTION 4

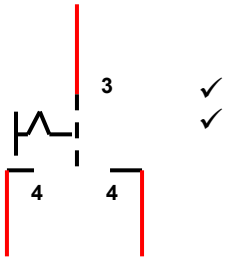
4.1 Emergency stops are used to prevent injury or death to workers or damage to machinery when a fault condition or hazardous condition exists✓ to ensure that the mechatronic system must be reset after the emergency stop has been activated✓ as required by legislation.✓ (3)

4.2



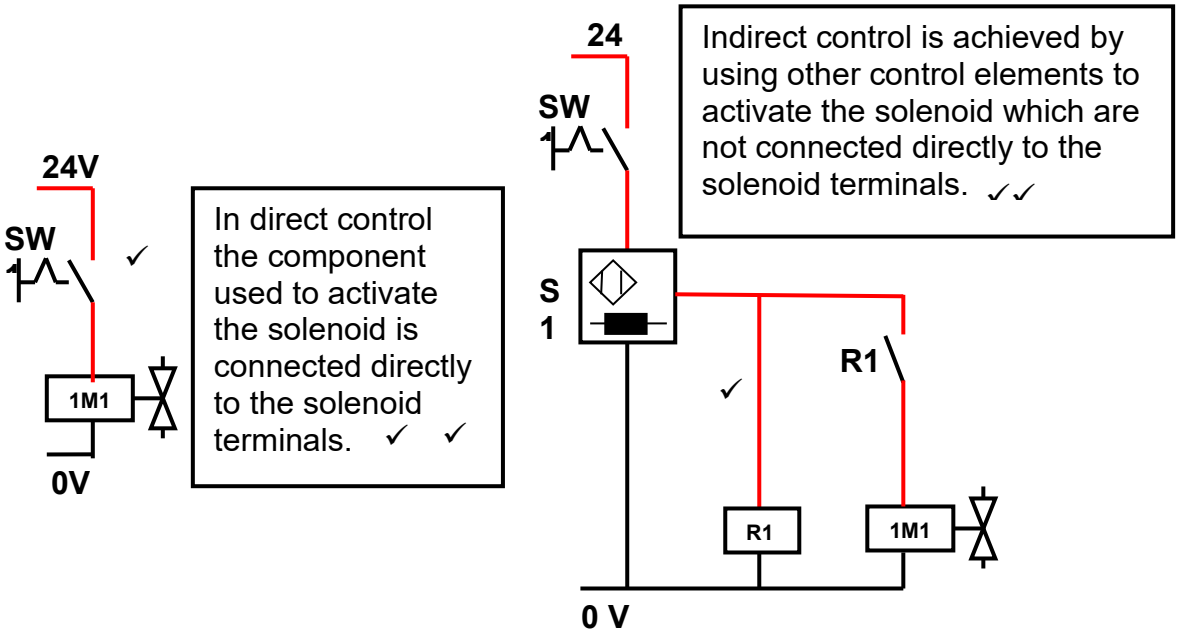
(7)

4.3



(2)

4.4



(6)

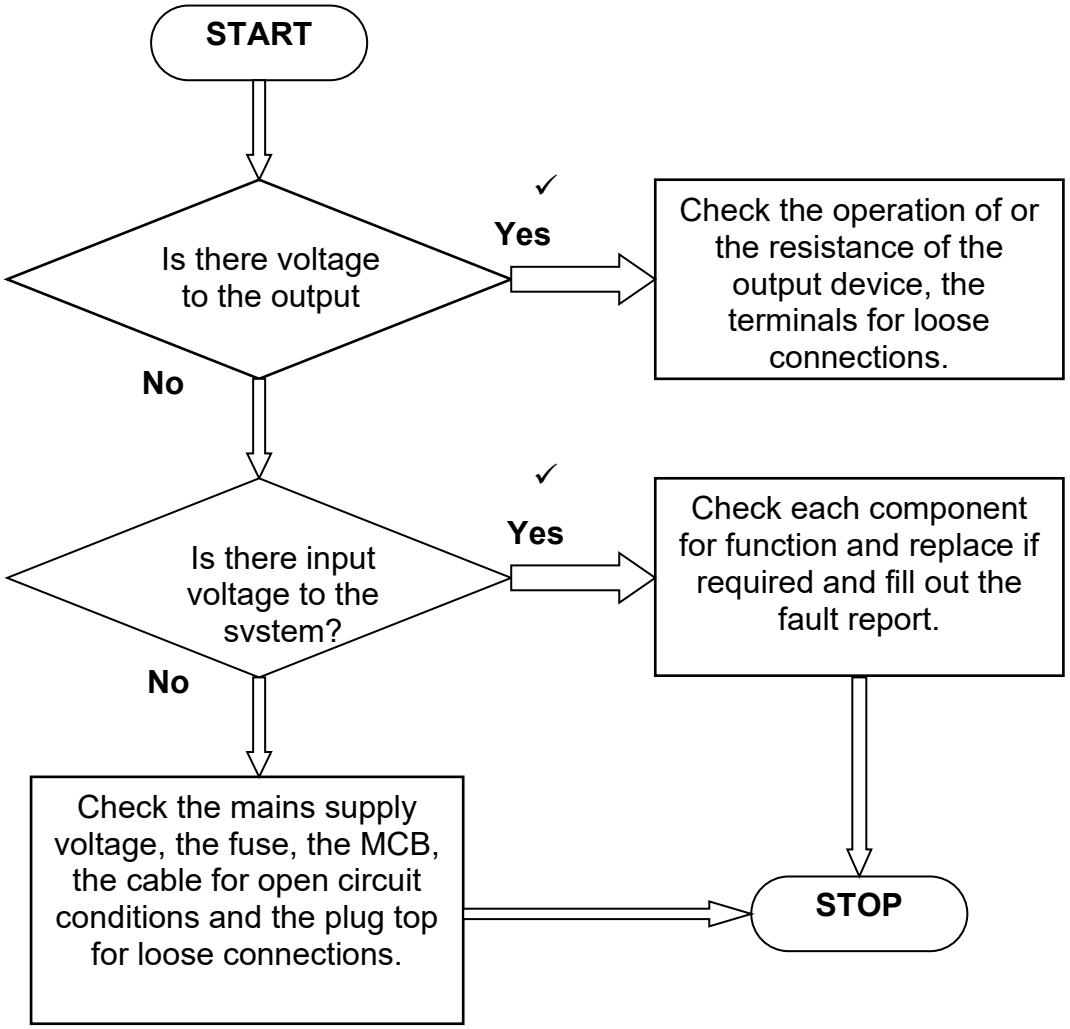
4.5 I = V/R✓
= 24/48
= 0,5 A✓ (unit must be shown to get the mark) (2)

[20]

QUESTION 5

5.1
- Check if water is coming out of the nozzle (output).
- Check if water is coming out the tap (input).
- Check along the hose pipe for cracks, breaks, kinks, blockages, etc. (through the circuit). (3)

5.2



(9)

5.3 The sole purpose of the mechatronic person is to ensure that fault elimination is carried out✓ with the minimum production down time✓ to maintain production.✓ (3)

5.4 Ensure that the supply is switched off✓ and locked out.✓ (2)

5.5
- Blocked lines
- Seizure of units
- Breakages
- Leakages
- Dropping of air pressure
- Incorrect switching (Any relevant faults 3 × 1) (3)

[20]

TOTAL: 100

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