higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

MECHATRONIC SYSTEMS
NQF LEVEL 4

28 November 2023

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 1.1.1 This plan indicates the actions to be taken, when each action will take place and sets out the interrelationships and dependencies between the actions. ✓✓

1.1.2 The analysis of a problem or need is to look at each section of it and determine the core issues to be addressed. ✓✓

(2 × 2) (4)

1.2 1.2.1 Modern-looking✓✓
1.2.2 Electro-pneumatic✓✓
1.2.3 Not expensive to manufacture✓✓

(3 × 2) (6)
[10]

QUESTION 2

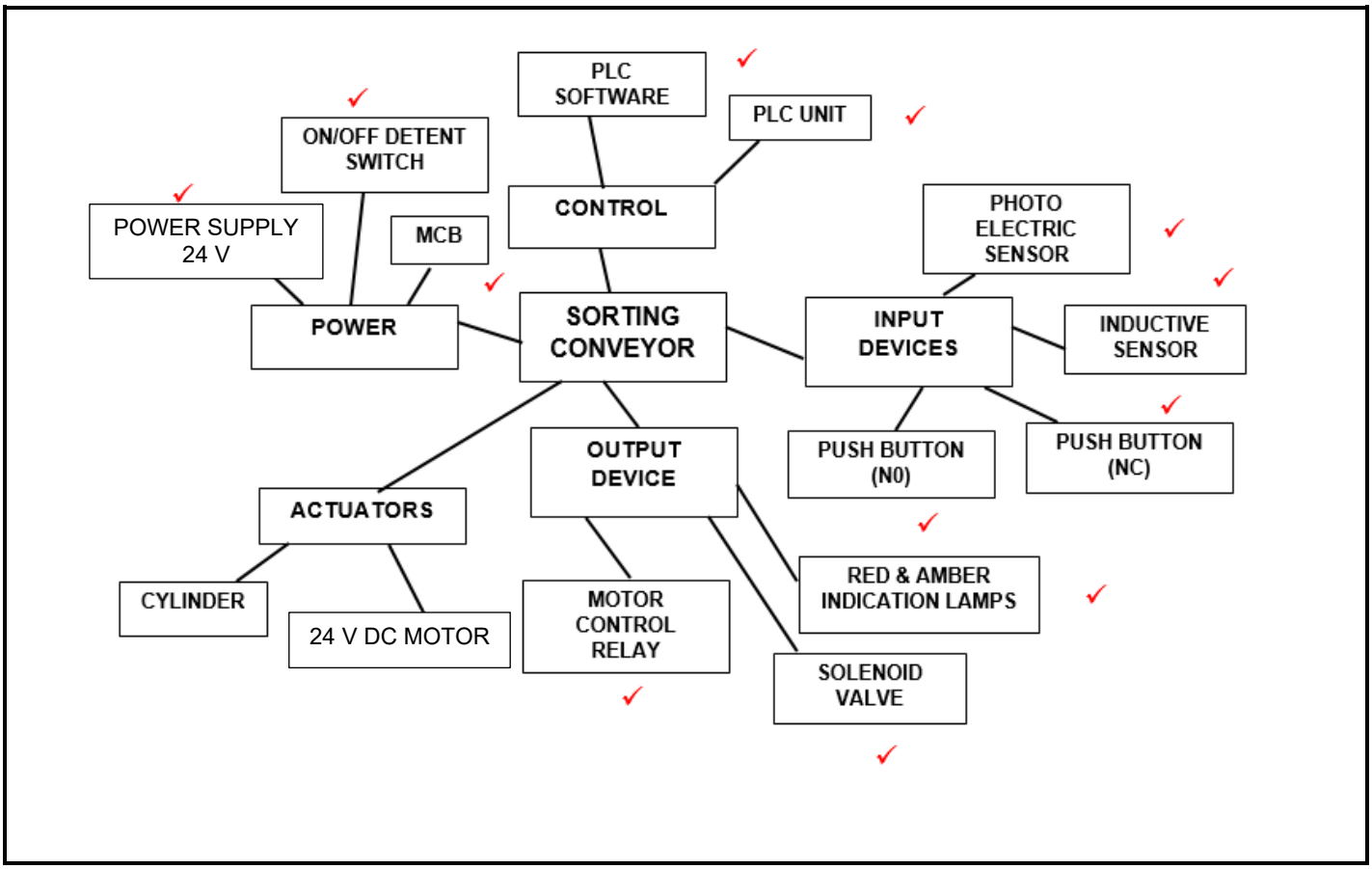
2.1 Criteria are principles or standards by which something may be judged or decided. ✓✓ (2)

2.2 It is a process-based activity that leads from the identification of a need or a problem to the implementation of a solution or design. The possible solution or design can also be considered for preparation and evaluation for a project or it can be considered as a creative step in the process of designing. ✓✓ (2)

2.3 2.3.1 It is a technique usually used in groups to create ideas. ✓✓ (2)

2.3.2
- Other sorting conveyor designs ✓
- Technical manuals ✓
- Internet ✓ (Any other relevant sources) (3 × 1) (3)

2.3.3



(Markers should use their discretion) (12 × 1) (12)

2.3.4 (a) The budget refers to the total costs related to meeting the design brief. ✓✓

(b) The manufacturing costs only refer to the materials/ components, assembly and labour costs. ✓✓

(2 × 2) (4)
[25]

QUESTION 3

3.1 3.1.1 Technical drawings refer to free-hand, electrical, construction drawings and engineering drawings. ✓✓

3.1.2 Engineering drawings refer to drawings where components have to be manufactured from raw materials and/or assembled from assembly drawings. ✓✓

(2 × 2) (4)

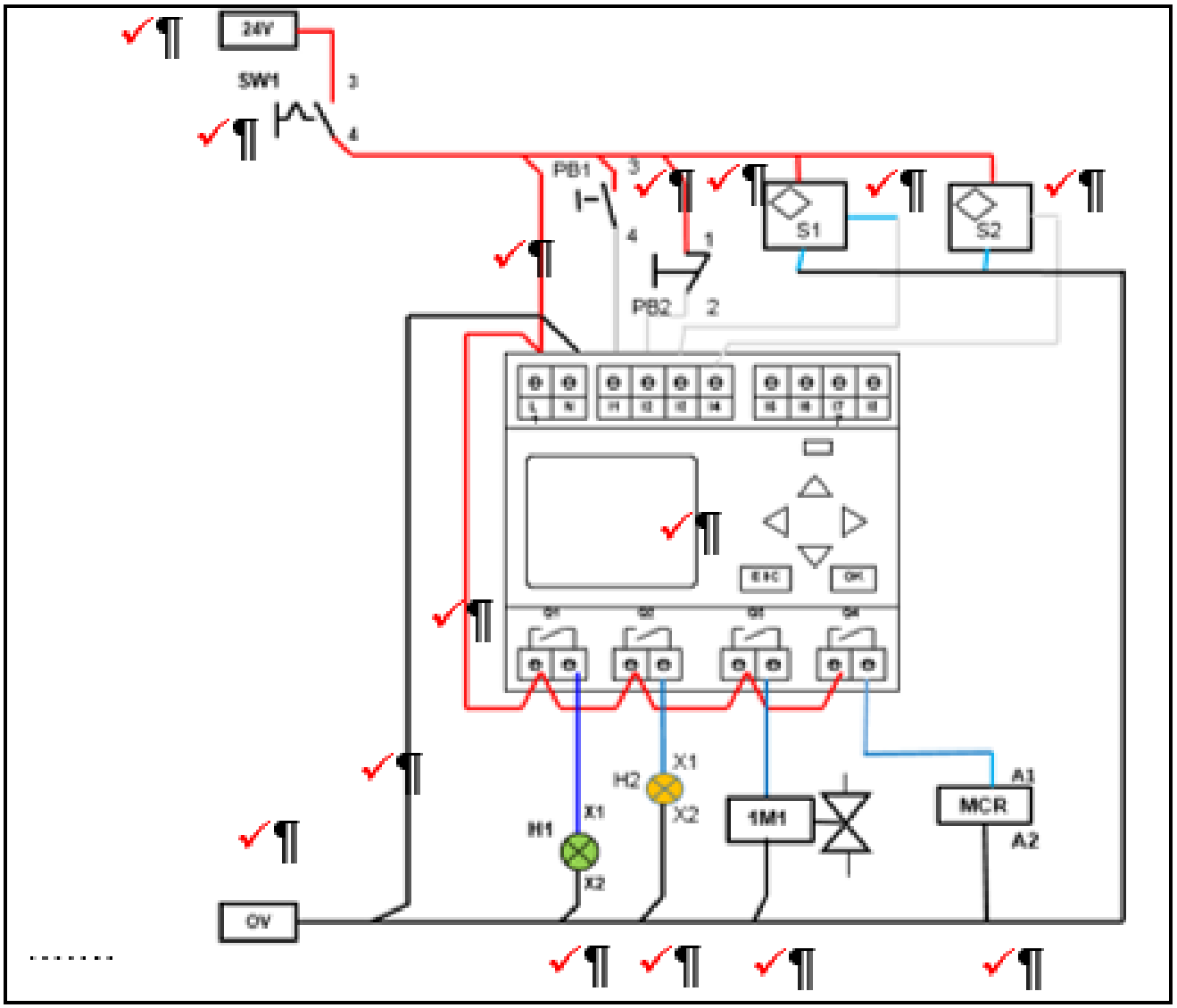
3.2
- Specific tasks: What will be done and by whom? ✓
- Time horizon: When will it be done? ✓
- Resource allocation: What specific funds are available for specific activities? ✓ (3)

3.3 It is a list of the subelements of a project with intended starting and finishing dates. ✓✓ (2)

3.4
- Safety requirements✓
- Requirements regarding tools✓
- Requirements regarding materials✓
- Sequence of events for performing the various work processes✓ (4)

3.5
- PERT chart
- GANTT chart (2)

3.6



(15)
[30]

QUESTION 4

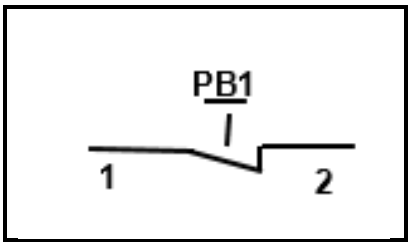
4.1
- These activities include the training of operations and maintenance staff during commissioning.✓
- Functional performance tests✓
- and deferred functional performance tests are conducted on each subsystem. ✓

(3 × 1) (3)

4.2
- A document that includes as-built drawings
- Equipment specifications
- Equipment manuals which include:
  - Installation instructions
  - Operating instructions
  - Maintenance instructions

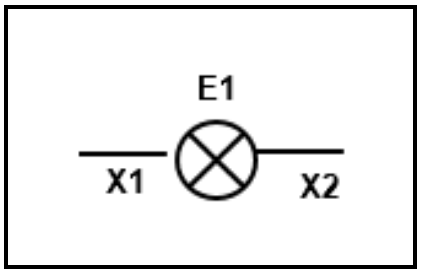
(Any relevant 4 × 1) (4)

4.3 4.3.1



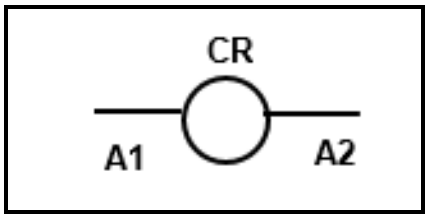
✓

4.3.2



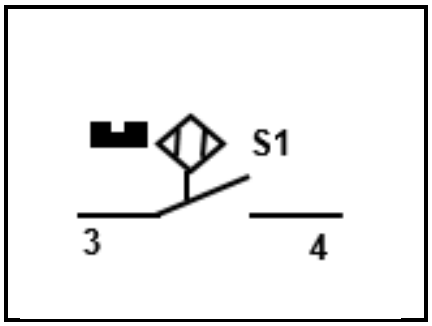
✓

4.3.3



✓

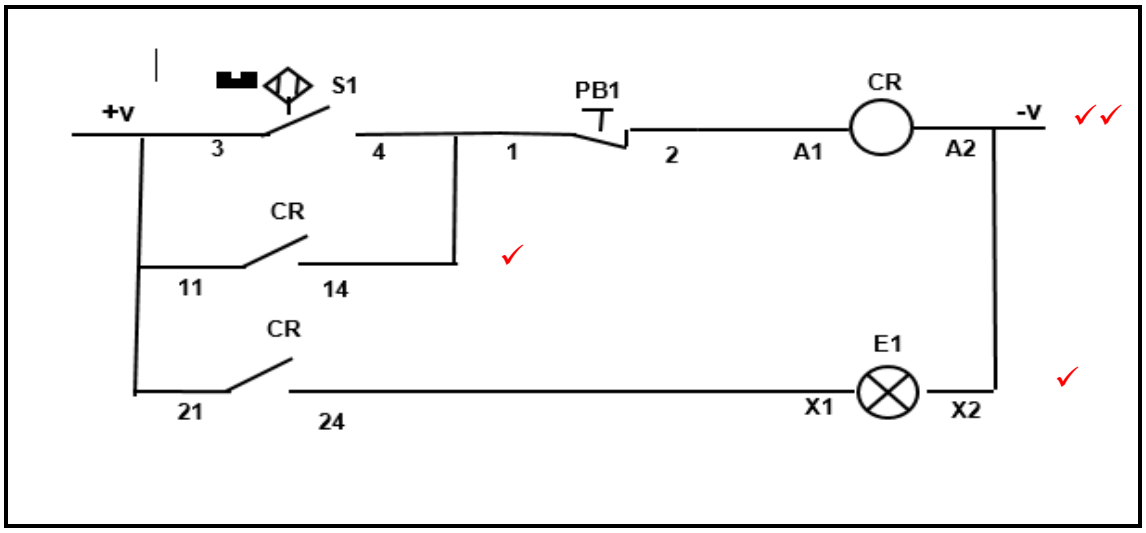
4.3.4



✓

(4 × 1) (4)

4.4



(4 × 1) (4)

[15]

QUESTION 5

5.1
- The black-box method is used to test the input to the suspected faulty component, subsystem and output.
- If there is no output the component would be replaced or a sequence test would be carried out. ✓✓ (2)

5.2 STEP 1: Check the feed to the motor (output). ✓
STEP 2: Check the supply to the circuit (control and main). ✓
STEP 3: Check the main circuit-related components and wiring. ✓
STEP 4: Check the control circuit-related components and wiring. ✓ (4)

5.3 **INDEX**
- Design brief ✓
- Power source ✓
- Related safety ✓
- Materials list ✓
- Component specifications ✓
- Pneumatic working circuit ✓
- Electrical working circuit ✓
- Control circuit ✓
- System operation ✓
- System troubleshooting guide ✓ (Any other relevant document) (10 × 1) (10)

5.4
- Dead-circuit testing requires that the power should be switched off and the lock-out procedure followed. ✓✓
- Live-circuit testing requires that people are informed that live testing is ongoing as it is dangerous if a system's wiring is exposed. ✓✓ (2 × 2) (4)

[20]

TOTAL: 100

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