higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

STORED PROGRAMME SYSTEMS
NQF LEVEL 3

17 November 2023

This marking guideline consists of 7 pages.

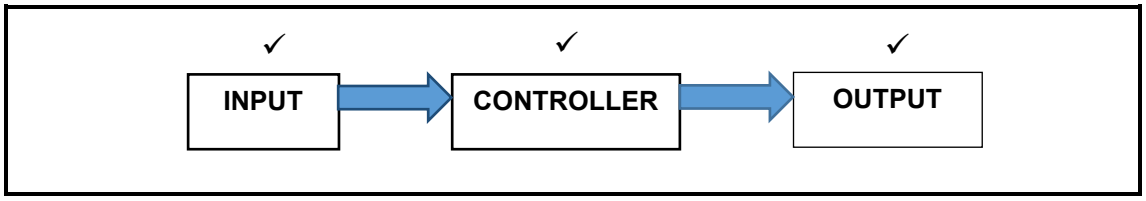
Copyright reserved

QUESTION 1

1.1 Automatic control is when action is performed automatically in response to a set of conditions.✓✓ (1 × 2) (2)

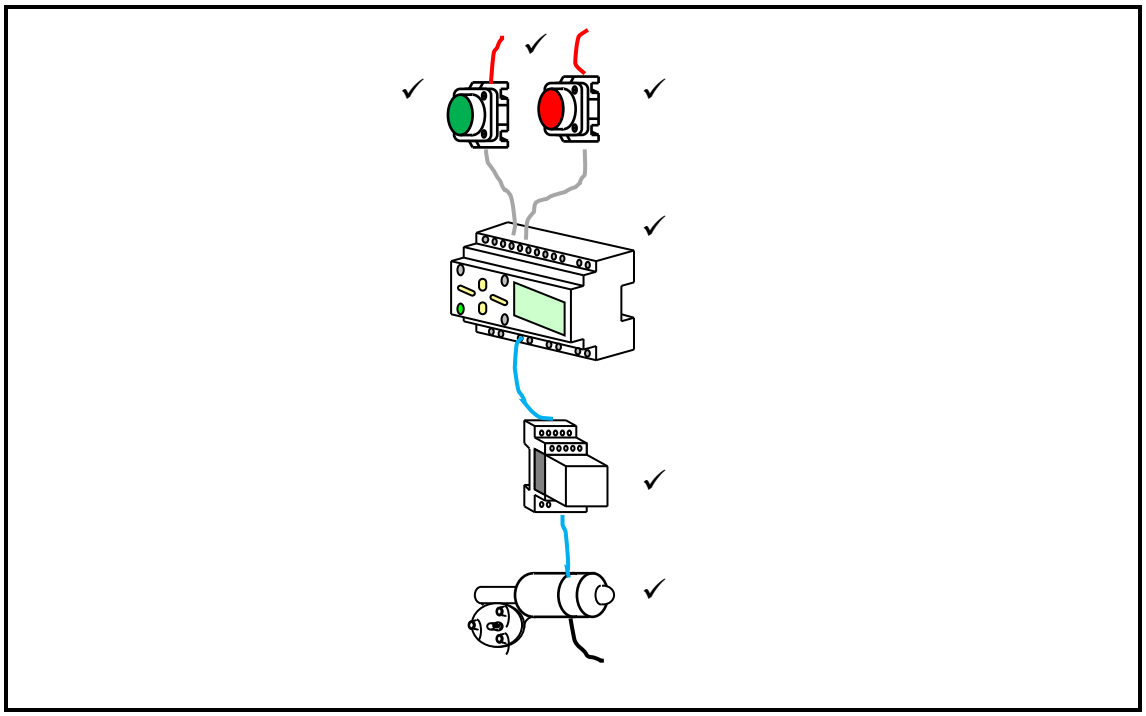
1.2
- The PLC controls machines and processes
- Monitors inputs
- Makes decisions
- Controls outputs in order to automate applications (4 × 1) (4)

1.3



(3 × 1) (3)

1.4



(Marker to use discretion) (6 × 1) (6)
[15]

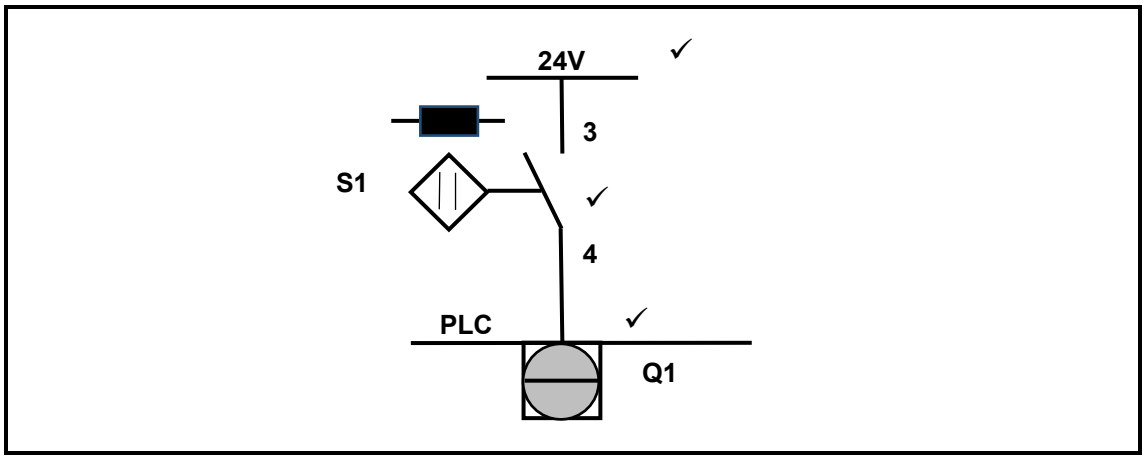
QUESTION 2

2.1 2.1.1 Sensors are input field devices. (1)

2.1.2
- They give information to the PLC on the status of a controlled application. They are never used as an output device.✓
- They are only connected to the input of the PLC unit.✓

(Any 1 × 1) (1)

2.2



(Marker to use discretion) (3 × 1) (3)

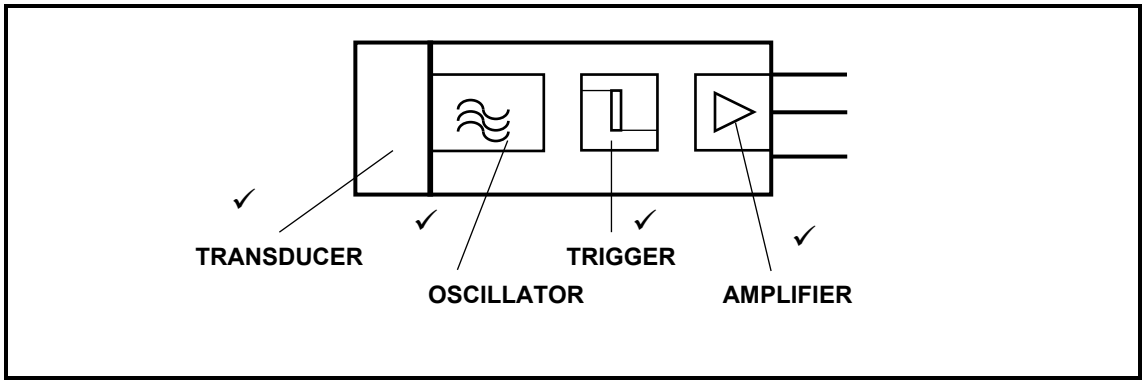
2.3
- A contact-type sensor makes contact with the object/target it is detecting and is normally a mechanical-type limit switch.✓✓
- A non-contact-type sensor does not make contact with the object/target it is detecting and is normally a proximity-type sensor.✓✓ (2 × 2) (4)

2.4 2.4.1 It is a physical input as it gives the systems changes (status) to the PLC.✓✓ (1 × 2) (2)

2.4.2
- Timers
- Counters (1 × 2) (2)

2.5
- Analogue – continuous
- Discrete – on/off
- Digital – coded (3 × 1) (3)

2.6



(Marker to use discretion) (4 × 1) (4)

[20]

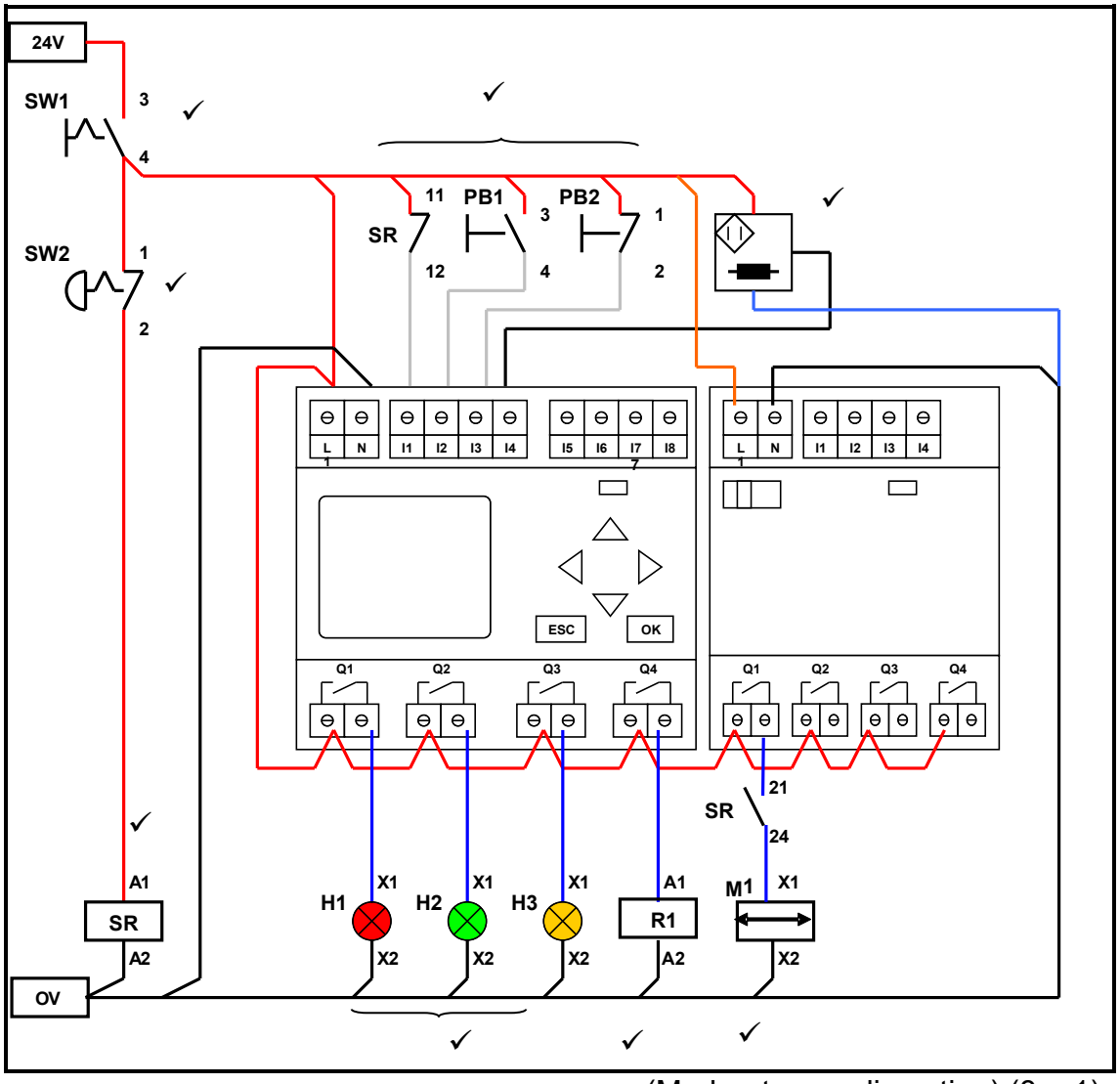
QUESTION 3

3.1 It is important to produce documentation to understand the operation of the system for troubleshooting and component replacement specifications amongst other related tasks.✓✓ (1 × 2) (2)

3.2 The address allocation list is the assigning of the physical I/Os to the various input and output PLC interfaces that can be used for programming.✓✓ (1 × 2) (2)

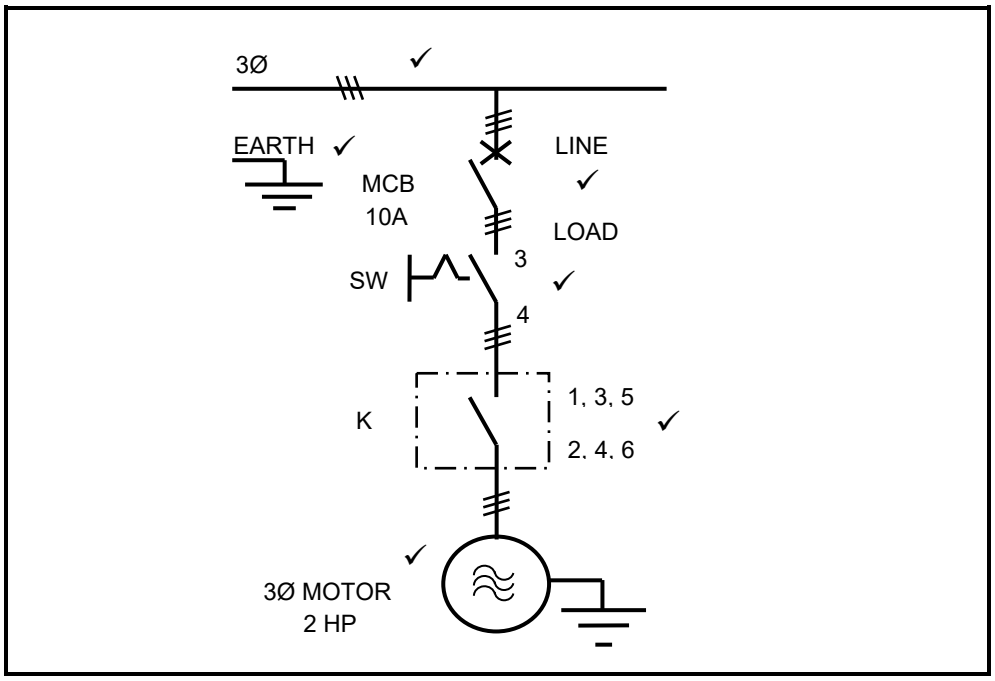
3.3 The linking device is there to prevent damage to the PLC output interface when a load draws excessive current.✓✓ (1 × 2) (2)

3.4 3.4.1



(Marker to use discretion) (8 × 1) (8)

3.4.2



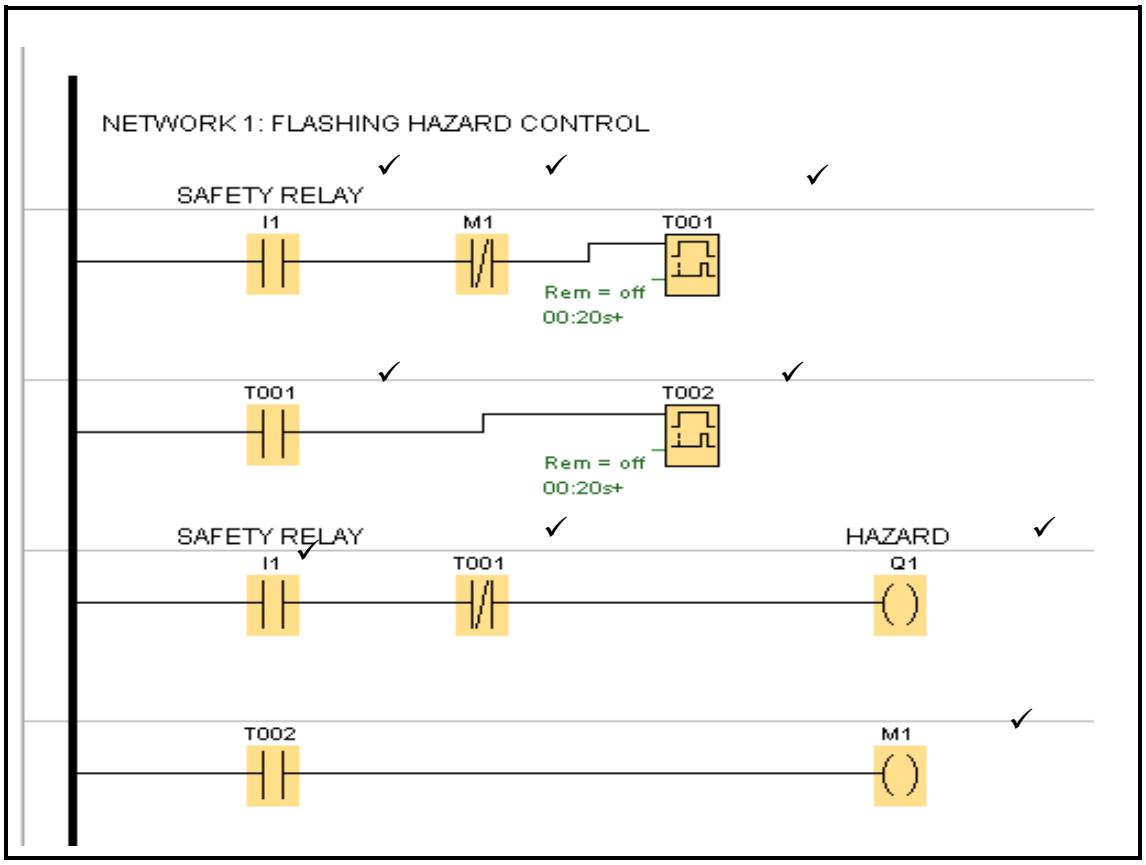
(Marker to use discretion) (6 × 1) (6)
[20]

QUESTION 4

4.1
- AND
- NOT
- OR
- SR functions (4 × 1) (4)

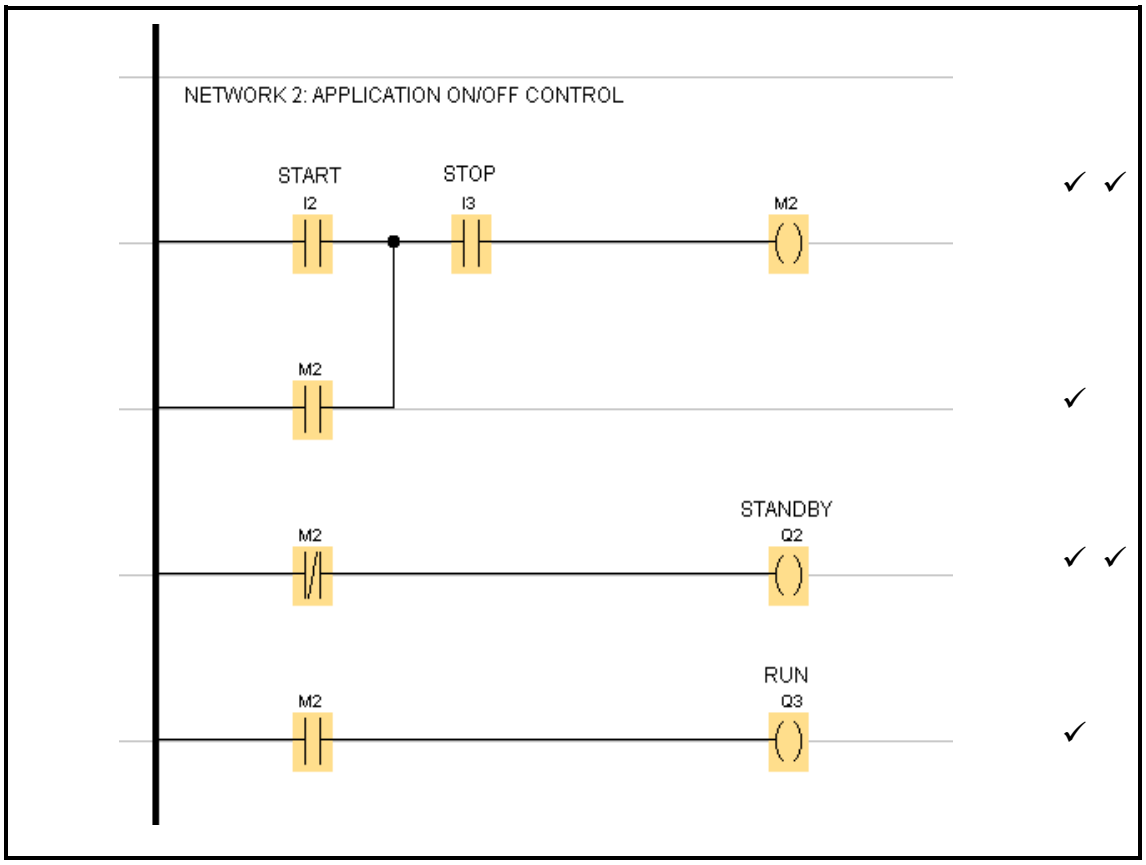
4.2 Because all PLC source codes are written in a sequence of steps, the SFC structure lends itself ideally to be a PLC programming design tool.✓✓ (1 × 2) (2)

4.3



(Marker to use discretion) (9 × 1) (9)

4.4



(Marker to use discretion) (6 × 1) (6)

4.5 The rule requires that once the emergency stop is activated, the supply to the PLC will continue to be available and the supply to the working load will be discontinued.✓✓ (1 × 2) (2)

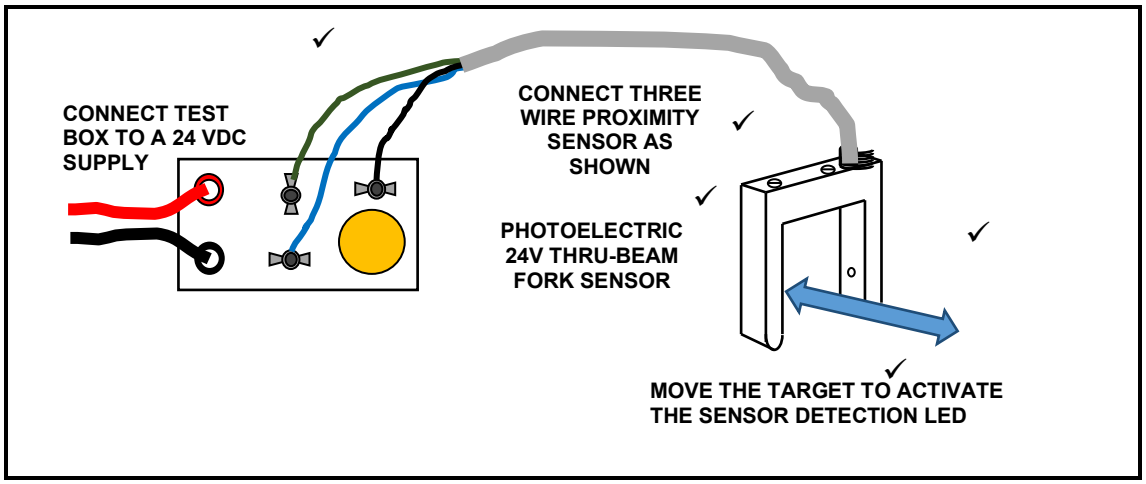
4.6
- Fields should be programmable by the user.
- Contains pre-programmed functions, e.g. logic, timing, counting, etc.
- Reduces hard-wiring and wiring costs.
- Packaged appropriately to use in an industrial environment.
- Monitoring, error checking and diagnostics capabilities.
- Analogue, digital and voltage inputs.
- Industry standard programmable languages.
- Competitive in both cost and space requirements.
- Industry standard I/O interfaces; capable of communicating with other PLCs, computers and intelligent devices.
- Scans memory and I/O in a cyclonic manner. (Any 7 × 1) (7)

[30]

QUESTION 5

5.1 Step 1: Carefully analyse the problem.
Step 2: Knowledge of system operation is essential.
Step 3: Check the state of the input interface LEDs.
Step 4: Check the state of the output interface LEDs.
Step 5: Check the state of the program logic conditions.
Step 6: Check that the various signal voltages are present. (6 × 1) (6)

5.2 Connect the sensor to the three-wire sensor as shown in the diagram and check whether the detection LED illuminates. ✓ (1)



(Marker to use discretion) (5 × 1) (5)

5.3
- Loose terminals
- Burnt-out components
- Damaged connection wires (Marker to use discretion)(3 × 1) (3)

[15]

TOTAL: 100

Copyright reserved