higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ELECTRICAL SYSTEMS AND CONSTRUCTION
NQF LEVEL 2

28 November 2023

This marking guideline consists of 7 pages.

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QUESTION 1

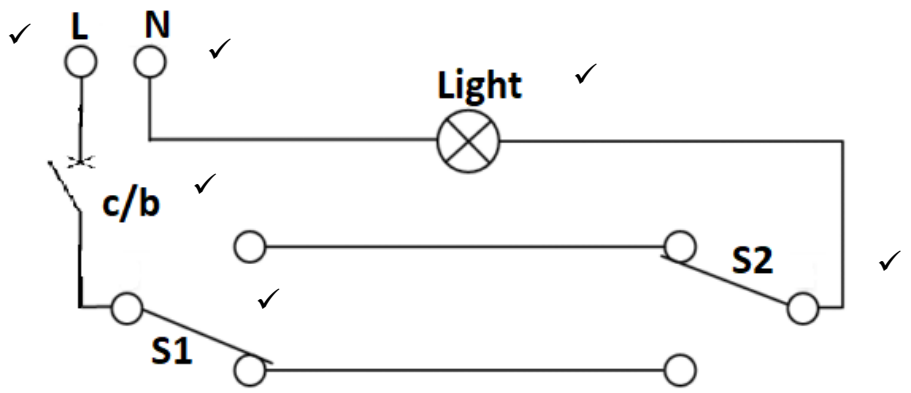
1.1

1.1.1	D
1.1.2	C
1.1.3	B
1.1.4	C
1.1.5	C

(5 × 1) (5)

1.2
- Set the instrument to be used to the resistance scale (ohms).
- Short the instrument test leads together, including any extension leads, and make a note of the reading on the instrument.
- To test, connect one test lead to the earth bar in the distribution board and the other test lead to the test point.
- Note the difference between the first and second reading.
- Compare this reading with the values in Table 8.1 of SANS10142-1:2012. A reading lower than the listed value is acceptable. (5)

1.3



(6)

1.4
- The work environment
- The use of machinery and substances
- Poor work design
- Inappropriate systems and procedures (4)

1.5
- Wiring diagram
- Block diagram
- Circuit diagram (3)

1.6 It is a terminal fitted to equipment or a device intended for the electric connection with earthing arrangement. (2)

[25]

QUESTION 2

2.1
2.1.1 True
2.1.2 True
2.1.3 False
2.1.4 False
2.1.5 False

(5 × 1) (5)

2.2
- Strip back 50 mm of insulation from the through-piece using cable knife.
- Strip back 120 mm of insulation from the end of the tee-piece.
- Tin the through-piece after cleaning it with emery paper.
- Separate the tee-piece into two. One side should have four strands and the other side three strands. Clean the wire and bring the two together.
- Neatly tighten the strands of a tee-piece in their respective directions around the through-piece, and cut off the excess lengths of wire.
- Solder the joint. (Any 5 × 1) (5)

2.3
- Environmental conditions
- Cable type and voltage rating
- Diameter of cable
- Size and type of armour
- Accessories required (5)

2.4
- Use the combined group effort of all members.
- Set clear goals.
- Have mutual trust in each other and support each other.
- Always use open communication.
- Use democratic process. (5)

[20]

QUESTION 3

3.1	3.1.1	tags		
	3.1.2	lock		
	3.1.3	equipment		
	3.1.4	activated		
	3.1.5	authority		
			(5 × 1)	(5)
3.2	• Slide rails			
	• Foundation studs			
	• Metallic bases			(3)
3.3	• Starting			
	• Stopping			
	• Reversing			
	• Running			
	• Speed control			
	• Safety of operator			
	• Protection from damage		(Any 5 × 1)	(5)
3.4	3.4.1	Series motor		
	3.4.2	Compound motor		
			(2 × 1)	(2)
				[15]

QUESTION 4

4.1	4.1.1	B		
	4.1.2	F		
	4.1.3	D		
	4.1.4	C		
	4.1.5	E		
			(5 × 1)	(5)
4.2	4.2.1	Earth leakage relay		(1)
	4.2.2	It will trip.		(1)
	4.2.3	• Check by means of an earth leakage tester. • The tester is inserted in one of the sockets that is protected by the earth leakage unit. • It stimulates a controlled earth fault and should trip between 15 mA and 30 mA. • If it trips during testing at, say, 50 mA, the earth leakage unit is unsuitable. • Replace it.		(5)
4.3	• Turn the power off and remove the fuse from the circuit. • Connect the probes to both ends of the fuse. • A good fuse should show continuity or read 0 Ω, and a blown fuse will read infinity.			(3)
				[15]

QUESTION 5

5.1
- How old the instruments are
- Using a meter beyond its limits
- Poor-quality meters
- Incorrectly installed meters
- Failure to use meters according to the manufacturer's recommendations
- Temperature
- Vibration and shock
- Stray magnetic fields
- Moisture, dirt, and corrosion
- Variation in voltage and frequency
- Not regularly calibrated (Any 6 × 1) (6)

5.2 It is a document that serves as written evidence of what was done. (1)

5.3
- Obtain authorisation for access.
- Agree on the date and time with the customer.
- Indicate how long the task will take. (3)

5.4
- They should be kept as short as possible.
- They should not interfere with accessibility for maintenance purposes.
- Avoid placing cabling in a hot environment.
- Wiring should be neat.
- Cable joints should be avoided, except for approved junction boxes or termination points.
- Ensure that instruments are properly earthed.
- All connections should be tight. (Any 5 × 1) (5)

[15]

QUESTION 6

6.1
- As they use sunlight for the conversion process, the input process is absolutely free.
- They require very little maintenance.
- They have no moving parts.
- They are highly reliable.
- They are modular in design; hence they are easily manageable and upgradeable.
- They can be easily installed at existing premises. (Any 5 × 1) (5)

6.2 6.2.1 36 V
6.2.2 6 A
(2 × 1) (2)

6.3 6.3.1 Converts electrical energy into kinetic energy (mechanical energy).
6.3.2 Used to amplify signals in a circuit.
6.3.3 Used to maintain a fixed voltage across its terminals.
(3 × 1) (3)
[10]

TOTAL: 100

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