higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ELECTRICAL SYSTEMS AND CONSTRUCTION
NQF LEVEL 4

28 November 2023

This marking guideline consists of 6 pages.

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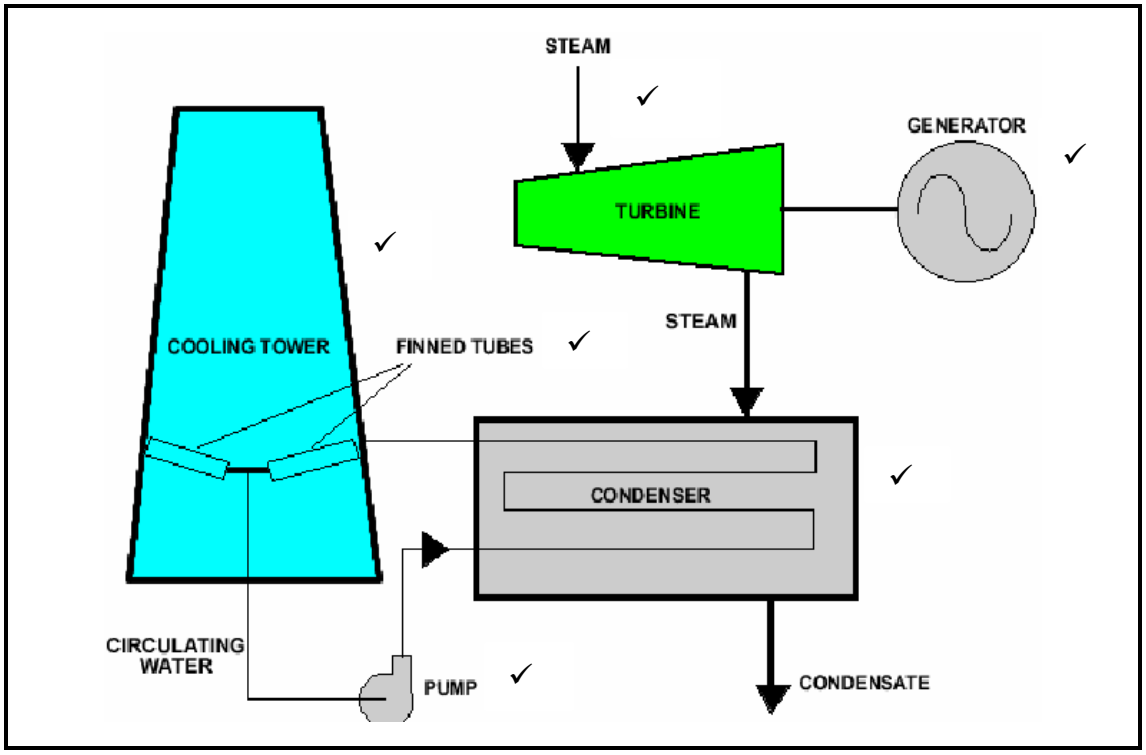
QUESTION 1

1.1

1.1.1	True
1.1.2	False
1.1.3	True
1.1.4	True
1.1.5	False
1.1.6	True
1.1.7	False
1.1.8	True
1.1.9	True
1.1.10	False

(10 × 1) (10)

1.2



(6)

1.3

- Stay insulators
- Composite stay insulators
- Pin insulators
- Composite tension insulators
- Glass tension insulators

(Any 4 × 1) (4)

[20]

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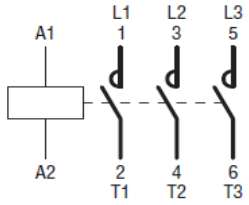
QUESTION 2

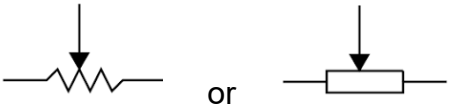
2.1 2.1.1



2.1.2



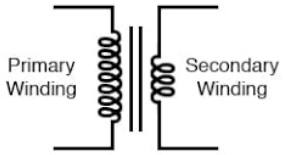
2.1.3



2.1.4



2.1.5



2.1.6



(6 × 1) (6)

2.2
- This diagram uses simplified symbols or pictures to show the components or part. ✓
- It shows the electrical flow of the system, using horizontal and vertical lines. ✓
- It shows the equipment✓ and wiring as close as possible to how it should be in the actual circuit. ✓ (4)

2.3
- To protect people from being injured.
- To prevent unauthorised people from tampering with installations.
- To notify people that work is being done.
- To inform people of the type of danger involved in the construction.

(Any 2 × 1) (2)

2.4 2.4.1 An accredited person (1)

2.4.2
- Test the installation
- Inspect the installation

(2 × 1) (2)
[15]

QUESTION 3

3.1 3.1.1
- The Occupational Health and Safety Act. ✓
- This document contains measures to ensure the safety of workers✓ in a working environment. ✓ (3)

3.1.2
- Eskom Reticulation specifications ✓
- This provides for the creation of a network of electrical wires around a town or province✓ and is regulated by Eskom.. ✓ (3)

3.2 The higher the poles, the wider✓ the spacing between the poles.✓ (2)

3.3 3.3.1 Tests that are done to confirm that all requirements have been met✓ according to the required standards (end results) and the scope of work has been achieved.✓

3.3.2 The project is handed over to the transmission grid✓ for operation.✓
(2 × 2) (4)

3.4 3.4.1 C
3.4.2 D
3.4.3 A
(3 × 1) (3)
[15]

QUESTION 4

4.1
- Plugs (socket outlet)
- Lighting fixtures
- Conduits
- Distribution boards

(4 × 1) (4)

4.2 4.2.1 Open or enclosed route✓ or support such as a rack, tray, ladder, ducting, trunking, sleeving or conduit✓ that is intended to contain conductors or cables.✓ (3)

4.2.2
- Lay-in wireway
- Pull-through wireway
- Cable-through

(3 × 1) (3)

4.3 4.3.1 Above 800 kV
4.3.2 Extra-high voltage
4.3.3 Low voltage
4.3.4 Between 69 kV and 230 kV
4.3.5 Between 1 kV and 69 kV

(5)

4.4 It seeks to measure and mitigate various risk exposures or hazards a business, a company or a project faces.✓
Or it is to identify the hazards in a specific work situation. (1)

4.5
- Identify
- Assess/ evaluate
- Treat
- Monitor
- Complete reports
- Review

(Any 4 × 1) (4)
[20]

QUESTION 5

5.1
- What was done.
- How it was done.
- When it was done.
- Anything out of the ordinary that was observed during maintenance.
- An evaluation of the maintenance procedure.

(5 × 1) (5)

5.2
- Anything that can go wrong or cause faults in the future.
- Chafed wires.
- Broken components.
- Reduced power output.
- Excessive noise.
- Burnt components.
- High temperatures.
- Poor performance.

(Any 4 × 1) (4)

5.3
- Smoke coming from the motor
- Burnt paint on the motor or bubbled paint

(2 × 1) (2)

5.4 High series resistance is where the conductor connected to ground or to another conductor✓ is bigger than 200 W.✓ The conductor may only hold high voltage for a brief period of time.✓ (3)

5.5 It is very simple, and it will usually reveal any type of fault. (1)
[15]

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QUESTION 6

6.1 6.1.1 Units consumed by lights = (20 × 8)/1 000 × 8
= 1,28 kWh✓

Units consumed by computers = (150 × 8)/1 000 × 4
= 4,8 kWh✓

Units consumed by CNC machines = (1 500 × 6)/1000 × 6
= 54 kWh✓ (3)

6.1.2 The total number of units of energy = 1,28 + 4,8 + 54
= 60,08 kWh✓ (1)

6.1.3 The cost of electrical energy per month = 60,08 × 30 × 2,8 ✓
= R 5 046,72✓ (2)

6.2 6.2.1 The amount of energy that the client will be consuming per day.✓

6.2.2 The maximum amount of energy that should be taken from batteries.✓
OR
The percentage of the capacity of the batteries to which they can be discharged without damaging the batteries.

6.2.3 Number of days without sunshine or wind for wind turbines.✓
(3 × 1) (3)

6.3 6.3.1 Shadows and dirt on solar panels reduce the amount of radiant energy they collect, ✓ therefore solar panels must be kept clean and their exposure to the sun unobstructed. ✓

6.3.2 It is used to protect partially shaded photovoltaic cells array inside solar panels. ✓ Bypass diodes allow current to bypass shaded solar panel. ✓

OR

The main function is to eliminate hot-spot phenomena which can damage PV cells and even cause fire if the light hitting the surface of the PV cells in a module is not uniform.
(2 × 2) (4)

6.4
- Inverters
- Charge controllers
- Bypassing diodes

(Any 2 × 1) (2)
[15]

TOTAL: 100

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