higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ELECTRICAL WORKMANSHIP
NQF LEVEL 3

23 November 2023

This marking guideline consists of 5 pages.

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QUESTION 1

1.1
- Set the standards to facilitate control.
- Provide the direction.
- Minimise waste.
- Identify and commit resources to achieve your goals.
- Decide which tasks must be done to achieve these goals. (5)

1.2
- Lack of motivation or positive attitude,✓ for example a negative attitude✓
- Lack of knowledge or skill,✓ for example lacking the required skill to perform a task✓
- Physical or mental incompatibility,✓ for example a task requiring too much physical strength to accomplish✓ (3 × 2) (6)

1.3
- Wear and use the correct personal protective clothes at all times.
- Use proper barriers and signage.
- Observe safety rules and regulations at all times.
- Take the time to do the job correctly.
- Refuse to work in unsafe conditions.
- Learn to know the equipment and how to use it effectively.
- Report unsafe working conditions immediately. (Any 5 × 2) (10)

1.4 The employer must make the employees aware of the following:
- The hazards present in the workplace
- The legislation that protects them
- The potential for injuries and illness in the workplace
- Their rights and responsibilities (4)

[25]

QUESTION 2

2.1
- Voltmeter
- Ammeter
- Wattmeter
- kWh meter
- Multimeter
- Insulation tester
- Ohmmeter (Any 5 × 1) (5)

2.2.1 Insulation resistance test between conductor✓ and earth✓ (2)

2.2.2
- Make sure that the circuit has been de-energised and discharged before starting testing.
- Connect the test leads to the instrument.
- Select the required range by turning the function switch.
- Connect the test leads of the instrument to the circuit under test.
- Press the test button.
- The megaohms (MΩ) value will be digitally displayed on the LCD. (6)

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2.3
- Condition of use
- Rate of usage
- Skills levels of personnel
- Degree of accuracy expected
- Cost of calibration (Any 2 × 1) (2)

[15]

QUESTION 3

3.1
3.1.1 E
3.1.2 C
3.1.3 D
3.1.4 A
3.1.5 B

(5 × 1) (5)

3.2 3.2.1 Steam prevents the fabrics from being overheated. (2)

3.2.2 When the iron is on and the thermostat is set for a particular material to be ironed, the contacts are closed.✓ The current flows through the closed contact points of the thermostat,✓ allowing the indication light to light up and the element to heat up. When the selected temperature has been reached,✓ the heat given off by the element causes the thermostat bimetal strip to bend,✓ which opens the contact points, breaking the current flows to the light and element.✓ As the bimetal strip cools down, the contact closes again, allowing the current to flow again.✓ (6)

3.3 The aim of bonding is to bring all the bonded parts to the same electrical potential. (2)

[15]

QUESTION 4

4.1
- Voltage across undischarged capacitors
- Voltage between phase and earth
- Voltage between phases
- Voltage on disconnected conductors and surroundings
- De-energised circuits becoming re-energised
- Installation or system where unauthorised or undocumented modifications have been made
- Deterioration of insulation covering a conductor
- Multiple supply sources (Any 6 × 1) (6)

4.2 Step 2: Observe.
Step 3: Locate the fault.
Step 4 Identify the cause of the problem.
Step 5: Rectify the fault. (4)

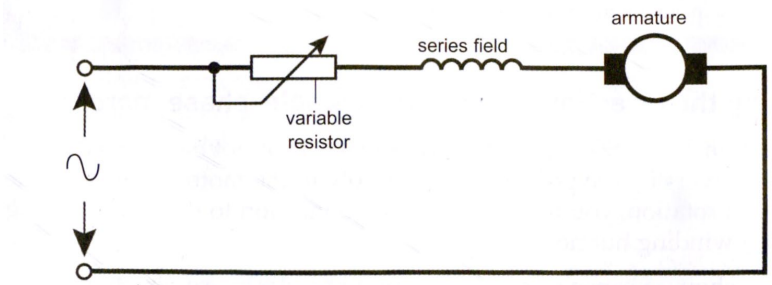
4.3
- Always keep the saw clean. Brush the air vents and dust extraction port, and wipe the casing clean.
- Do not use caustic cleaning solutions to clean the plastic housing.
- If excessive sparks are generated, check the carbon brush.
- Replace damaged or worn-out components with genuine parts.
- Lubricate the blade support roller from time to time with a drop of light machine oil. (5)

[15]

QUESTION 5

5.1
- Draw up the plan of action and determine the sequence of tasks.
- Select appropriate testing and measuring equipment and tools to meet the job requirements.
- Use the testing and measuring equipment correctly and safely.
- Test, inspect and commission the single-phase AC machine in accordance with statutory requirements.
- Record, interpret and report the test results.
- Obtain and interpret the safety procedure. (6)

5.2 5.2.1



1 mark = variable resistor
1 mark = series field
1 mark = armature
1 mark = AC supply (4)

5.2.2
- Tapped-field method
- Centrifugal method (2)

5.3
- Metal bases
- Foundation studs
- Slide rails (3)

[15]

QUESTION 6

6.1
- Type of metal
- Thickness of metal
- Groove design
- Joint alignment
- Welding position
- Welder's skills
- Penetration depth
- Weld bead finish (Any 5 × 1) (5)

6.2 A hazard is a source of or exposure to danger,✓ such as the risk of being electrocuted and excessive heat or noise levels.✓ (2)

6.3
- Fumes and gases
- Electric shock
- Electrocution
- Radiation
- Noise
- Fire (Any 4 × 1) (4)

6.4 6.4.1 There must be enough space for employees to work✓ and move around freely.✓

6.4.2 There must be adequate ventilation so that the workplace does not become hot and stuffy,✓ as this make working conditions unpleasant.✓

(2 × 2) (4)

[15]

TOTAL: 100

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