higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ELECTRICAL WORKMANSHIP
NQF LEVEL 3

14 November 2022

This marking guideline consists of 6 pages.

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QUESTION 1

1.1
- Unexpected absenteeism of staff.
- When ordered equipment or parts arrive late or when only half of it is delivered.
- An emergency situation at the workplace that requires some or even all workers to first attend to it before they return to their scheduled tasks.
- When a task that has to be completed before the next step can be taken, is not completed in time.
- Budget constraints may delay installations for a while or may even lead to the cancellation of a task.
- Bad weather can cause a delay when work has to be done outside.

(6)

1.2
- To keep control of tasks that need to be completed.
- It acts as a reminder.
- A task list indicates what still has to be done.
- It indicates the dates to start and complete a task.
- Material, tools and machinery are available at the right time.
- It indicates the names of the staff that will do the work.
- It helps to prioritise tasks. (Any 4 × 1) (4)

1.3 1.3.1 A hazard is a source of exposure to danger✓ such as the risk of being electrocuted, excessive heat or noise, and so on.✓ (2)

1.3.2
- Isolate a hazard
- Eliminate a hazard
- Reduce or minimize a hazard (3)

1.4
- Identify potential hazards and potential major incidents in the workplace.
- Attend health and safety committee meetings.
- Review the effectiveness of health and safety measures.
- Inspect the workplace at intervals as agreed on with the employer.
- Participate in discussions with inspectors at the workplace and receive information from them.
- Make representations regarding safety at the workplace to the employer or the health and safety committee. If your representations have been unsuccessful, then make representations to an inspector.
- In conjunction with the employer, examine the causes of incidents at the workplace.
- Investigate any employee's complaints about his or her health and safety at work. (Any 5 × 1) (5)

1.5
- Collect information
- Analyse the information
- Make recommendations
- Take all relevant information into consideration
- Come to a conclusion (5)

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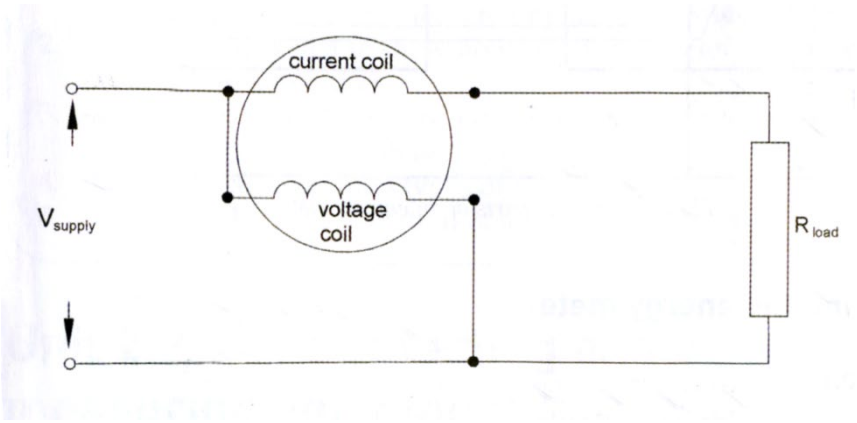
QUESTION 2

2.1 2.1.1



Coils = 2 marks
Supply = 1 mark
Load = 1 mark (4)

2.1.2 A wattmeter consists of two fixed coils,✓ the current coils which are connected in series, and one moving coil, the voltage coil.✓ The interaction of the two magnetic fields produced by the fixed and moving coils causes the moving voltage coil and its pointer to rotate proportional to the voltage.✓ (3)

2.2
- Using a meter beyond its limits.
- Temperature.
- Not regularly calibrated.
- Stray magnetic field.
- Moisture, dirt and corrosion.
- Vibration in voltage and frequency.
- Failure to use a meter in line with the manufacturer's recommendations.
- Incorrectly installed meter.
- Age of the instrument.
- The material a meter is made of is of inferior quality. (Any 3 × 1) (3)

2.3 2.3.1 Adjust the reading of the instrument✓ so that its readings are the same as those of the standard.✓ (2)

2.3.2
- To determine the accuracy of the instrument readings
- To establish the accuracy of an instrument
- To ensure that the readings from an instrument are consistent with a standard (3)

[15]

QUESTION 3

3.1 3.1.1
- Cordless automatic kettle
- Automatic kettle
- Basic kettle (3)

3.1.2 When in the ON position, power is applied to the kettle element to start heating the water.✓ A bimetallic strip is built into the kettle.✓ As the water heats up, steam is produced.✓ The heat act on the metallic strip which starts bending.✓ This movement is coupled to the switch which is pushed to the OFF position.✓ This prevents the water from boiling away and damaging the heating element.✓ (6)

3.2 Thermostat control the oven temperature by turning the element on or off✓ as determine by the setting chosen on the oven selector switch and temperature control dial.✓ (2)

3.3
- All water heaters including geyser shall be bonded.✓
- The aim of bonding is to bring all the bonded parts to the same electrical potential.✓
- Dedicated circuits shall be provided for water heaters✓ and there may be more than one water heater on each circuit.✓ (4)

[15]

QUESTION 4

4.1
- After being used a long time, the tool wears out.
- If power tools are misused or overloaded, it puts great strain on the motor.
- Tools are poorly maintained or not maintained at all.
- Possible failure due to a manufacturing fault. (4)

4.2
- Working on a customer's premises can create additional risk if the electrical installation on it has not been properly maintained.
- Avoid having children around while you repair appliances as they may distract you.
- Socket outlets not protected by earth leakage units are dangerous.
- Failure to use correctly insulated tools.
- Be careful to avoid touching live conductors and an appliance's earth metal casing simultaneously.
- Water appliances pose a greater risk than other appliances since water is a conductor of electricity and could reduce the resistance of your skin. (6)

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4.3
- Buy a heater that is the correct size for the area you want to heat.
- Read and follow the manufacturer's operating instructions. Keep the owner's manual in a convenient and logical place so that you can refer to it when necessary.
- Keep children and pets away from heaters because the surfaces of some heaters are extremely hot.
- Never leave a heater on when you go to bed or leave the room.
- Do not place heaters near furniture and curtains.
- Never use a heater to dry clothes or shoes and do not place a heater where towels or other objects could fall on it and start a fire.
- Do not use an extension cord unless it is necessary. (Any 5 × 1) (5)

[15]

QUESTION 5

5.1 Machinery that are earthed✓ will discharge the electrical energy to earth should there be any unexpected surges or should the electricity go on again.✓✓ (3)

5.2 5.2.1
- Washing machine
- Tumble dryer
- Vacuum cleaner
- Fridge compressor
- Water pump (Any 3 × 1) (3)

5.2.2
- Drills
- Grinders
- Saws
- Weed trimmers
- Blenders
- Food mixers (Any 3 × 1) (3)

5.3
- Main winding
- Start winding
- Capacitor
- Centrifugal switch (4)

5.4 To reverse the direction of rotation, change the connection to either the start winding✓ or the run winding, but not both.✓ (2)

[15]

QUESTION 6

6.1
- Diameter of the cable that is used
- Amperage required
- Diameter of the electrode
- Rather use the jaw or twist-lock types (4)

6.2
6.2.1 C
6.2.2 D
6.2.3 F
6.2.4 E
6.2.5 A
6.2.6 B

(6 × 1) (6)

6.3
- Partial-penetration joint✓
  This type of joint has an unfused area because the weld metal does not penetrate the joint completely.✓ The rating of the joint is based on the percentage of weld metal depth compared to that of the total joint. In other words, the weld metal penetrates the joint only midway (50%).✓
- Full-penetration joint✓
  The weld metal spreads over the entire cross section of the weld joint.✓ (5)

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TOTAL : 100

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