higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

ELECTRICAL TRADE THEORY N1

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This marking guideline consists of 5 pages.

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QUESTION 1

1.1 True
1.2 True
1.3 False
1.4 True
1.5 True
1.6 True
1.7 True
1.8 True
1.9 True
1.10 False
1.11 True
1.12 True
1.13 False
1.14 True
1.15 True

(15 × 1) **[15]**

QUESTION 2

2.1
- Isolate the supply before doing maintenance.
- Ensure that the equipment is earthed properly.
- Unwind extension leads before using them.
- Always use extension cords that are correctly rated for the job at hand.
- Keep water and moisture away from electrical equipment and wiring.
- Never do maintenance on moving or rotating equipment or live equipment.

(Any 5 × 1) (5)

2.2
- Avoid standing in dampness or water.
- Ensure that your footing is firm and secure.
- Ensure that the trigger switch can be released easily.
- Use a portable earth leakage if the device is not protected by an earth leakage. (4)

2.3
- Leather gloves
- Insulating gloves
- Rubber gloves

(Any 2 × 1) (2)
[11]

QUESTION 3

3.1
- Electric cell or battery
- Electric generator
- Photo-electric cell
- Thermocouple
- Alternator (Any 2 × 1) (2)

3.2 The current flowing in a circuit✓ is directly proportional to the voltage✓ and inversely proportional to the resistance in the circuit.✓ Temperature remains constant.✓ (4)

3.3 3.3.1
$I_T = I_{R1} + I_{R2}$ ✓
$I_T = 1,5 + 2,5$ ✓
$I_T = 4$ A ✓ (3)

3.3.2
$R_T = V_T \div I_T$
$R_T = 12 \div 4$ ✓
$R_T = 3\ \Omega$ ✓✓ (3)

3.3.3
$R_1 = V_T \div I_{R1}$
$R_1 = 12 \div 1,5$ ✓
$R_1 = 8\ \Omega$ ✓

$R_2 = V_T \div I_{R2}$
$R_2 = 12 \div 2,5$ ✓
$R_2 = 4,8\ \Omega$ ✓ (4)

3.4 It causes an internal voltage drop✓ when a current flows,✓ which causes the terminal voltage to drop. ✓

OR

A drop in terminal voltage takes place✓ due to the internal voltage dropping within the cell✓ when the circuit is closed. ✓ (3)
[19]

QUESTION 4

4.1
- Natural magnet
- Permanent magnet
- Electromagnets (3)

4.2 mmf = N x I (2)

4.3 It is a transformer assumed to have no losses. (2)

4.4 4.4.1
$(V_1 \div V_2) = (N_1 \div N_2)$
$V_1 : V_2$
11 000 : 220 ✓
50 : 1 ✓

4.4.2
$(V_1 \div V_2) = (N_1 \div N_2)$
$N_2 = (V_2 \div V_1) \times N_1$
$N_2 = (220 \div 11\ 000) \times 3\ 600$ ✓
$N_2 = 72$ turns ✓

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4.4.3 $(V_1 \div V_2) = (I_2 \div I_1)$
$I_1 = (V_2 \div V_1) \times I_2$
$I_1 = (220 \div 11\ 000) \times 200$ ✓
$I_1 = 4$ A ✓

(3 × 2) (6)
[13]

QUESTION 5

5.1 Used to make an electrical connection with the rotating coils of the alternator (2)

5.2 The number of cycles✓ that a wave completes in one second.✓ It is measured in hertz (Hz).✓ (3)

5.3
- It is cheaper to generate.
- It is cheaper to transmit.
- Three-phase motors are simpler.
- It is less expensive.
- It is more powerful.

(Any 4 × 1) (4)
[9]

QUESTION 6

6.1 Device in which chemical energy is converted✓ into electrical energy✓ or stores energy✓ (3)

6.2
- Compact
- Can easily be transported without spilling any electrolytes
- Does not need frequent maintenance
- Suitable for intermittent use
- Cheaper
- Different sizes

(Any 4 × 1) (4)

6.3
- The secondary circuit of the current must not be opened✓while the primary winding carries current✓as all the primary ampere-turns are then available to produce flux. ✓
- The iron loss due to the high flux density✓ causes excessive heating of the core✓and a dangerously high EMF can be induced in the secondary winding. ✓
- If the ammeter has to be removed from the secondary circuit, the secondary winding must be short-circuited. ✓ (7)

6.4
- Very accurate
- Almost uniform scale
- Well shielded from stray magnetic fields

(Any 2 × 1) (2)

6.5 500/1 000 V DC (1)
[17]

QUESTION 7

7.1 7.1.1 C
7.1.2 D
7.1.3 A
7.1.4 B

(4 × 2) **[8]**

QUESTION 8

8.1
- Stores electrical energy
- Blocks the flow of direct current
- Permits the alternating current to flow to an extent dependant on the capacitor's frequency and capacitance
- Introduces capacitance into a circuit
- Stores a charge (Any 4 × 1) (4)

8.2
- Red
- Green
- Blue
- Gold (4)

[8]

TOTAL: 100

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