



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE ELECTRICAL TRADE THEORY N1

5 APRIL 2018

This marking guideline consists of 5 pages.

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 x 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 $I_T = I_{R1} + I_{R2}$ ✓
 $I_T = 1,5 + 2,5$ ✓
 $I_T = 4 \text{ A}$ ✓ (3)
- 3.3.2 $R_T = V_T \div I_T$
 $R_T = 12 \div 4$ ✓
 $R_T = 3 \Omega$ ✓✓ (3)
- 3.3.3 $R_1 = V_T \div I_{R1}$ $R_2 = V_T \div I_{R2}$
 $R_1 = 12 \div 1,5$ ✓ $R_2 = 12 \div 2,5$ ✓
 $R_1 = 8 \Omega$ ✓ $R_2 = 4,8 \Omega$ ✓ (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 $\text{mmf} = N \times I$ (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 $(V_1 \div V_2) = (N_1 \div N_2)$
 $N_2 = (V_2 \div V_1) \times N_1$
 $N_2 = (220 \div 11\ 000) \times 3\ 600$ ✓
 $N_2 = 72 \text{ turns}$ ✓

4.4.3 $(V_1 \div V_2) = (I_2 \div I_1)$
 $I_1 = (V_2 \div V_1) \times I_2$
 $I_1 = (220 \div 11\ 000) \times 200 \checkmark$
 $I_1 = 4\ \text{A} \checkmark$

(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 \checkmark that a wave completes in one second. \checkmark It is measured in hertz (Hz). \checkmark (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 \checkmark into electrical energy \checkmark or stores energy \checkmark (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 \checkmark while the primary winding carries current \checkmark as all the primary ampere-turns are then available to produce flux. \checkmark
 - The iron loss due to the high flux density \checkmark causes excessive heating of the core \checkmark and a dangerously high EMF can be induced in the secondary winding. \checkmark
 - If the ammeter has to be removed from the secondary circuit, the secondary winding must be short-circuited. \checkmark
- (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