higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

ELECTRICAL TRADE THEORY N1

(11041861)

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09:00–12:00

This question paper consists of 5 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
ELECTRICAL TRADE THEORY N1
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Use only a black or blue pen.
5. Write neatly and legibly.

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QUESTION 1

1.1 List THREE disadvantages of poor housekeeping. (3)

1.2 Define the term, *accident*. (3)

1.3 Explain the following safety devices briefly:

1.3.1 Interlock switches

1.3.2 Isolating link

(2 × 2) (4)
[10]

QUESTION 2

2.1 What are the causes of fire? (5)

2.2 Explain the term *power tool*. (1 × 2) (2)

2.3 State THREE care and good maintenance practices relating to power tools. (3 × 1) (3)
[10]

QUESTION 3

3.1 Choose a description from COLUMN B that matches an item in COLUMN A. Write only the letter (A–E) next to the question number (3.1.1–3.1.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
3.1.1	An electric current	A	is the opposition offered to the flow of electric current
3.1.2	Electromotive force	B	is that force which maintains the potential difference while a current is flowing
3.1.3	A resistance	C	is the movement of electrons in a specific direction through a material
3.1.4	Power	D	is the rate of doing work
3.1.5	Energy	E	is the capacity of a physical system to perform work

(5 × 1) (5)

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3.2 Three resistors of 12 Ω, 7Ω and 5 Ω are connected in series. The circuit is then connected across a 120 V supply.

Calculate the following:

3.2.1 Total resistance of the circuit (2)

3.2.2 Total current flow through the circuit (2)

3.2.3 Voltage drop across each resistor (6)

3.2.4 Energy consumed by the circuit in KJ after 20 seconds (4)

3.3 Calculate the resistance of a conductor of 30 metres long. The cross-sectional area of the conductor is 12,57 x 10^{-6} m^2 and the resistivity of the conductor is 1,725 x 10^{-8} ohm per metre. (3)

3.4 Differentiate between *primary* and *secondary cells*. (4)

3.5 The open circuit EMF of a certain cell was measured and found to be 1,48 V. When a 2-ohm resistor was connected across the terminals, a current of 0,6 A was measured.

Determine:

3.5.1 The internal resistance of the cell

3.5.2 The terminal voltage with the 2 ohm-resistor connected

(2 × 2) (4)

[30]

QUESTION 4

4.1 What are the basic requirements of insulators? (4 × 1) (4)

4.2 Name ONE advantage of polycarbonate compounds. (1 × 1) (1)

4.3 Complete the following table. Write only the answer next to the question number (4.3.1–4.3.5) in the ANSWER BOOK.

Sub-circuits	**Circuit breaker size**	**Conductor size**
Stove	4.3.1	4 mm^2
Geyser	20 A	4.3.2
Socket outlet	4.3.3	2,5 mm^2
4.3.4	10 A	1,5 mm^2
Main switch	4.3.5	10 mm^2 or 16 mm^2

(5 × 2) (10)

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4.4 Describe the operation of a circuit breaker under the following conditions:

4.4.1 Overload current (4)

4.4.2 Short-circuit current (5)

4.5 What does SANS 10142-1 state with regard to the following?

4.5.1 Domestic lighting

4.5.2 Water heaters

(3 × 2) (6)
[30]

QUESTION 5

5.1 Name FIVE tests that must be carried out before an electrical installation may be connected to the supply. (5 × 1) (5)

5.2 Name TWO types of magnets used in magnetism. (2 × 1) (2)

5.3 State FOUR characteristics of magnetic lines of force. (4 × 2) (8)

5.4 Name FIVE types of renewable energy. (5 × 1) (5)
[20]

TOTAL: 100

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