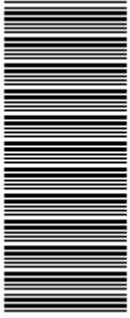


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**higher education  
& training**

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

**T430(E)(N19)T  
NOVEMBER EXAMINATION**

**NATIONAL CERTIFICATE**

**ELECTRICAL TRADE THEORY N1**

**(11041861)**

**19 November 2015 (X-Paper)  
9:00–12:00**

**This question paper consists of 5 pages and 1 formula sheet.**

**DEPARTMENT OF HIGHER EDUCATION AND TRAINING**  
**REPUBLIC OF SOUTH AFRICA**  
NATIONAL CERTIFICATE  
ELECTRICAL TRADE THEORY N1  
TIME: 3 HOURS  
MARKS: 100

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**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. Write neatly and legibly.
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**QUESTION 1**

- 1.1 Give FIVE examples of danger zones where applicable flameproof electrical appliances must be used. (5)
- 1.2 State FIVE aspects with regard to good housekeeping in the workshop. (5)
- 1.3 Bad quality work is often blamed on incorrect/improper tools being used.
- Is the above-mentioned statement TRUE or FALSE? Give TWO reasons to support your answer. (3)
- [13]**

**QUESTION 2**

- 2.1 Define Ohm's Law. (4)
- 2.2 THREE similar resistors of  $3 \Omega$  each are connected in parallel. This combination is connected across a battery with a voltage of 6 V.
- 2.2.1 Draw a neat fully labelled diagram of the circuit mentioned above. (4)
- Calculate the following:
- 2.2.2 The total resistance of the circuit (4)
- 2.2.3 The current flow through each resistor (7)
- 2.2.4 The total current flowing through the circuit (2)
- 2.2.5 The power used by the circuit (2)
- 2.2.6 The energy required by the circuit in ONE HOUR (4)
- [27]**

**QUESTION 3**

- 3.1 Make a neat, fully labelled sketch of a current-carrying conductor showing the magnetic lines of force and their relative direction. (6)
- 3.2 State THREE ways in which the magnetic flux of a solenoid can be strengthened. (3)
- 3.3 A single-phase transformer with a voltage of 6 600 V on the primary draws a current of 5 A from the supply.
- If the transformer ratio is 25 : 1 and there are 110 turns on the secondary side, calculate the following:
- 3.3.1 The current flowing through the secondary coil
- 3.3.2 The number of turns on the primary coil (2 x 2) (4)
- [13]**

**QUESTION 4**

- 4.1 Compare, by making use of a suitable TABLE, FIVE aspects with regard to the advantages and disadvantages of primary cells and secondary cells (lead-acid). (10)
- 4.2 What material is used to make generator brushes? (1)
- 4.3 What instrument is used to measure the relative density of the electrolyte in a lead-acid cell? (1)
- [12]**

**QUESTION 5**

- 5.1 What happens when the conductors of an alternator move at right angles through a magnetic field? (1)
- 5.2 Describe the following terms with reference to a sine wave:
- 5.2.1 Period (1)
- 5.2.2 Root-mean-square (RMS) value (6)
- 5.3 Show, by means of a neat, fully labelled circuit diagram, how a voltmeter can be connected directly across the supply. (5)
- [13]**

**QUESTION 6**

- 6.1 Define an *insulator*. (3)
- 6.2 Give FIVE examples of insulators which are generally used in the electrical industry. (5)
- 6.3 What do you understand by the term *earthed*? (5)
- [13]**

**QUESTION 7**

- 7.1 What FOUR tests does the Code of Practice stipulate for all electrical installations to ascertain that they are safe and function properly? (4)
- 7.2 THREE similar capacitors of 240  $\mu\text{F}$  are connected in series.  
Calculate the total capacitance. (5)
- [9]**

**TOTAL: 100**

**ELECTRICAL TRADE THEORY N1****FORMULA SHEET****RESISTORS**

$$R = \frac{V}{I}$$

$$R_T = R_1 + R_2 + R_3 + \dots$$

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots$$

**POWER**

$$P = V \times I$$

$$P = I^2 \times R$$

$$P = \frac{V^2}{R}$$

**ENERGY**

$$W = P \times t$$

$$W = VI \times t$$

$$W = I^2 R \times t$$

$$W = \frac{V^2}{R} \times t$$

**CELLS**

$$E = V + (I \times r)$$

$$R_T = R + r$$

$$I = \frac{V}{R}$$

$$I = \frac{E}{(R + r)}$$

**RESISTIVITY**

$$R = \frac{\rho \times \ell}{a}$$

$$a = \frac{\pi \times d^2}{4}$$

**TEMPERATURE COEFFICIENT**

$$R_t = R_o(1 + L_o t)$$

**TRANSFORMERS**

$$\frac{V_1}{V_2} = \frac{N_1}{N_2} = \frac{I_2}{I_1}$$

**CAPACITORS**

$$C_T = C_1 + C_2 + C_3 + \dots$$

$$\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \dots$$

**FREQUENCY**

$$f = np$$

$$f = \frac{1}{T}$$