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higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

NOVEMBER EXAMINATION

ELECTRICAL TRADE THEORY N1

17 NOVEMBER 2016

This marking guideline consists of 5 pages.

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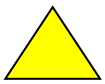
QUESTION 1

1.1 True
1.2 True
1.3 True
1.4 False
1.5 True
1.6 True
1.7 False
1.8 True
1.9 False
1.10 True
1.11 False
1.12 True
1.13 True
1.14 True
1.15 True
1.16 False
1.17 True
1.18 True
1.19 True
1.20 False

(20 × 1) **[20]**

QUESTION 2

	Geometric Shape	Meaning	Colour
2.1		Warning	Yellow
2.2		Prohibition (Do not!)	Red
2.3		Mandatory (Must do!)	Blue
2.4		Information (General)	Green
2.5		Information (Fire equipment)	White (with red border

[15]

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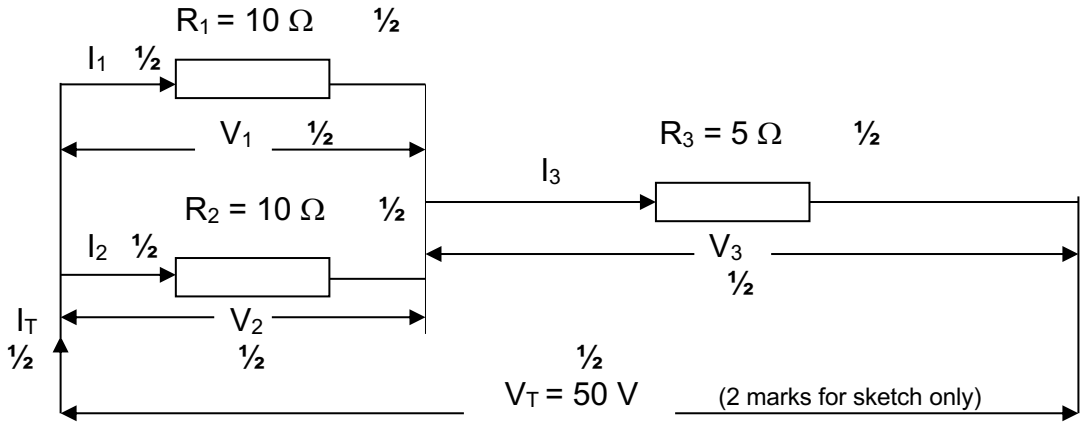
QUESTION 3

3.1

	Symbol	Quantity	Standard Unit
3.1.1	Q	Heat energy generated	Joule
3.1.2	I	Current flow	Ampere
3.1.3	R	Resistance	Ohm
3.1.4	t	Time elapsed	Second

(8 × 1) (8)

3.2



(6)

3.2.1 $R_T = R_P + R_3$

Where $R_P = \frac{(R_1 R_2)}{(R_1 + R_2)}$

$= \frac{(10 \times 10)}{(10 + 10)}$

$= 5\ \Omega$

$\therefore R_T = 5 + 5$

$= 10\ \Omega$ (5)

3.2.2 $I_T = V_T \div R_T$

$= 50 \div 10$

$= 5\ A$ (2)

3.2.3 $P_T = I^2_T R_T$

$= 5^2 \times 10$

$= 250\ W$ (2)

3.2.4 $Q_T = P_T \times t$

$= 250 \times 1 \times 60 \times 60$

$= 900\ 000J$

$= 900kJ$ (3)

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QUESTION 4

4.1 An ideal transformer means a transformer with no losses (1)

4.2 Transformer oil (1)

4.3 4.3.1 Turns ratio = $N_1 : N_2$
= 200 : 50
= 4 : 1 (2)

4.3.2 $V_1 \div V_2 = N_1 \div N_2$
$V_2 = V_1 (N_2 \div N_1)$
= 220 (50 ÷ 200)
= 55 V (2)

4.3.3 $N_1 \div N_2 = I_2 \div I_1$
$I_2 = I_1 (N_1 \div N_2)$
= 20 (200 ÷ 50)
= 80 A (2)

4.4
- The number of the plates
- The size of the plates
- The rate of discharge
- The temperature
- The age of the cell
- The condition of the cell (6)

[14]

QUESTION 5

5.1

Means of Producing Electricity	Example
Chemical reaction	Primary and secondary cells and batteries
Electromagnetic induction	AC and DC generators
Solar energy conversion	Solar cells
Heat	Thermocouple pyrometer
Friction	Rubbing silk against glass

(Any FOUR pairs)(4 × 2) (8)

5.2
- Potential transformers
- Current transformers (2)

[10]

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QUESTION 6

6.1
- Copper
- Aluminium
- Silver
- Carbon
- Gold

(Any 4 × 1) (4)

6.2 An insulator is any solid material preventing flow of electrical current (3)

6.3 No.
If connected directly to the supply, the current flowing through the diode would rise excessively. (2)
[9]

QUESTION 7

7.1 A capacitor is an electronic device that takes up and stores electrical charge when connected across a DC supply.

A capacitor is a device comprising two conductors, known as plates, separated by an insulation material known as a dielectric. (2)

7.2 $1/C_T = 1/C_1 + 1/C_2 + 1/C_3$
$= 1/5 + 1/10 + 1/20$
$= (4 + 2 + 1)/20$
$= 7/20$
$\therefore C_T = 20/7$
$= 2{,}857\ \mu F$ (4)
[6]

TOTAL: 100

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