higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NASIONALE SERTIFIKAAT

INDUSTRIËLE ELEKTRONIKA N1

28 JULIE 2021

Hierdie nasienriglyn bestaan uit 6 bladsye.

Kopiereg voorbehou

VRAAG 1

1.1 1.1.1 D
1.1.2 D
1.1.3 C
1.1.4 D
1.1.5 B

(5 × 1) (5)

1.2 1.2.1 Twee; diëlektrikum (2)

1.2.2 Versterkers; skakelaars (2)

1.2.3 Vier (1)

1.2.4 Herlaai; primêre (2)

1.2.5 Lengte; deursneeoppervlakte; soort materiaal (3)

1.3 $R_t = R_o(1+\alpha\Delta t)$

$R_0 = \frac{Rt}{1+\alpha\Delta t}$ ✓ ✓

$= \frac{48,6}{1+0,00428\times 50}$ ✓

$= 40\ \Omega$ ✓ (4)

1.4 1.4.1 Waar

1.4.2 Onwaar

1.4.3 Waar

1.4.4 Onwaar

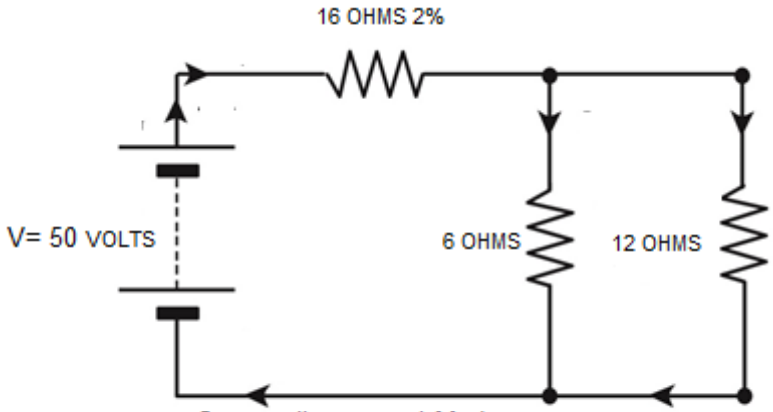
1.4.5 Onwaar

1.4.6 Onwaar

(6 × 1) (6)
[25]

VRAAG 2

2.1 2.1. 1



Correct diagram = 1 Mark
Each resistor correctly labelled = 1 mark (3)
Supply voltage = 1 mark (5)

2.1.2

$$R_{//} = \frac{R_{6\Omega} \times R_{12\Omega}}{R_{6\Omega} + R_{12\Omega}} \checkmark$$
$$= \frac{6 \times 12}{6 + 12} \checkmark$$
$$= \frac{72}{18}$$
$$= 4\Omega \checkmark$$

$$R_T = R_S + R_{//} \checkmark$$
$$= 16 + 4 \checkmark$$
$$= 20\Omega \checkmark$$

(6)

2.1.3

$$I = \frac{V}{R} \checkmark$$
$$= \frac{50}{20} \checkmark$$
$$= 2,5A \checkmark$$

(3)

2.1.4 Bruin; blou; swart; rooi (4)

2.2 2.2.1

$$a = \frac{\pi d^2}{4} \checkmark$$
$$= \frac{3,142(6 \times 10^{-3})^2}{4} \checkmark \checkmark$$
$$= 28,278 \times 10^{-6} m^2 \checkmark$$

(4)

2.2.2

$$R = \frac{\rho l}{a}$$
$$= \frac{(1,728 \times 10^{-6}) \times 25}{(28,278 \times 10^{-6})} \checkmark \checkmark$$
$$= 1,5277\Omega \checkmark$$

(3)
[25]

VRAAG 3

3.1 3.1.1

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

$$\frac{1}{C_T}=\frac{1}{5}+\frac{1}{15}+\frac{1}{25}$$ ✓

$$\frac{1}{C_T}=0,2+0,067+0,04$$ ✓

$$\frac{1}{C_T}=0,307$$

$$C_T=\frac{1}{0,307}=3,257\mu F$$ ✓ ✓ (eenheid = 1 punt) (4)

3.1.2

$$Q=C\times V$$

$$=3,257\times 50$$ ✓

$$=162,85\mu C$$ ✓ ✓ (eenheid = 1 punt)

or

$$Q=1,6285\times 10^{-4}C$$ (3)

3.2 3.2.1

$$\frac{V_p}{V_s}=\frac{N_p}{N_s}$$

$$V_s=\frac{V_p\times N_s}{N_p}$$ ✓

$$=\frac{240\times 1}{5}$$ ✓

$$=48V$$ ✓ (3)

3.2.2

$$\frac{I_s}{I_p}=\frac{N_p}{N_s}$$

$$I_p=\frac{I_s\times N_s}{N_p}$$ ✓

$$=\frac{1,5\times 1}{5}$$ ✓

$$=0,3A$$ ✓ (3)

3.2.3 $\frac{V_p}{V_s} = \frac{N_p}{N_s}$

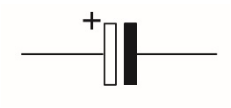
$N_p = \frac{V_p \times N_s}{V_s}$ ✓

$= \frac{240 \times 100}{48}$ ✓

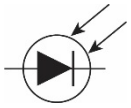
= 500windings ✓ (3)

3.2.4
- Oormatige stroom lei tot te veel hittekwytraking
- Isolasiedeurslag kan meebring dat wikkelings kortsluit en oorverhit (Enige redelike antwoord) (3)

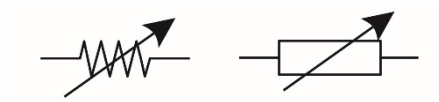
3.3 3.3.1



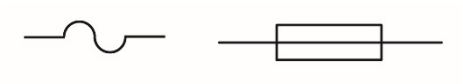
3.3.2



3.3.3



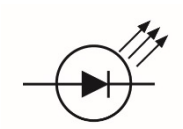
3.3.4



3.3.5



3.3.6



(6 × 1) (6)

VRAAG 4

4.1 4.1.1 Die vorming van waterstofborrels om die koperelektrode wat verhoed dat 'n chemiese reaksie plaasvind

4.1.2 'n Halfgeleiermateriaal, bv. silikon, waarby geen onsuiwerhede gevoeg is nie

4.1.3 Die verskil in elektriese potensiaal tussen twee punte

4.1.4 'n Binding wat gevorm word wanneer elektrone tussen twee atome gedeel word

4.1.5 Die toevoeging van onsuiwerhede tot suiwer silikonmateriaal

4.1.6 Die proses waardeur 'n atoom of molekule 'n negatiewe of positiewe lading kry deur elektrone by te kry of te verloor

(Enige toepaslike 6 × 2) (12)

4.2 4.2.1 EMK $= 4 \times 2,1 =$ 8,4V (1)

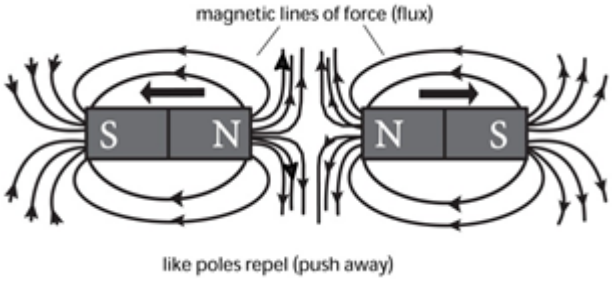
4.2.2 $R_T = R_{\text{int}} + R$ ✓

$= (0,5 \times 4) + 20$ ✓

$= 22\ \Omega$ ✓ (3)

4.2.3 $R_{\text{int}} = 0,5 \times 4 = 2\Omega$ (1)

4.3



VYF punte vir korrekte diagram
DRIE punte vir byskrifte

(8)
[25]

TOTAAL: 100

Kopiereg voorbehou