



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NASIONALE SERTIFIKAAT

INDUSTRIËLE ELEKTRONIKA N2

20 November 2025

Hierdie nasienriglyn bestaan uit 8 bladsye.

VRAAG 1

- 1.1 B
- 1.2 B
- 1.3 C
- 1.4 C
- 1.5 C
- 1.6 A
- 1.7 C
- 1.8 A
- 1.9 B
- 1.10 A

(10 × 1) [10]

VRAAG 2

2.1 2.1.1

$$I_L = \frac{V_L}{R_L}$$

$$I_L = \frac{30}{300} \checkmark$$

$$I_L = 0,1 \text{ A} \checkmark$$

$$V_{R2} = I_L \times R_2$$

$$V_{R2} = 0,1 \times 15 \checkmark$$

$$V_{R2} = 1,5 \text{ V} \checkmark$$

(4)

2.1.2

$$V_{R3} = V_L + V_{R2}$$

$$V_{R3} = 1,5 + 30 \checkmark$$

$$V_{R3} = 31,5 \text{ V} \checkmark$$

(2)

2.1.3

$$I_1 = \frac{V}{R}$$

$$I_1 = \frac{31,5}{300} \checkmark$$

$$I_1 = 0,105 \text{ A} \checkmark$$

$$I_T = I + I$$

$$I_T = 0,105 + 0,1 \checkmark$$

$$I_T = 0,205 \text{ A} \checkmark$$

(4)

2.1.4

$$V_{R1} = I_T \times R_1$$

$$V_{R1} = 0,205 \times 20$$

$$V_{R1} = 4,1 \text{ V}$$

$$V_{R5} = I_T \times R_5$$

$$V_{R5} = 0,205 \times 20$$

$$V_{R5} = 4,1 \text{ V}$$

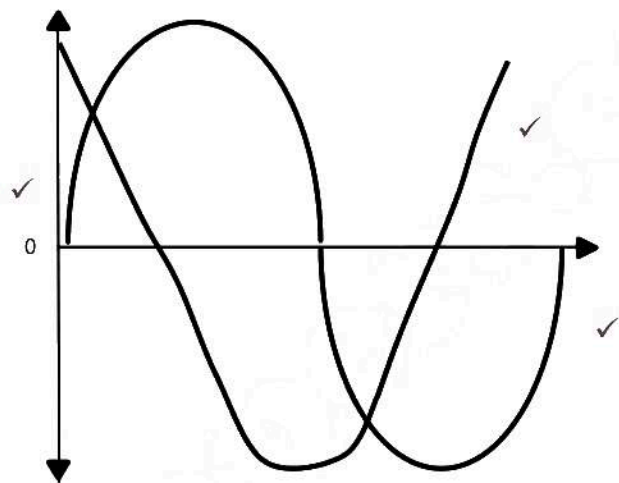
$$E_T = V + V + V$$

$$E_T = 4,1 + 31,5 + 4,1$$

$$E_T = 39,7 \text{ V}$$

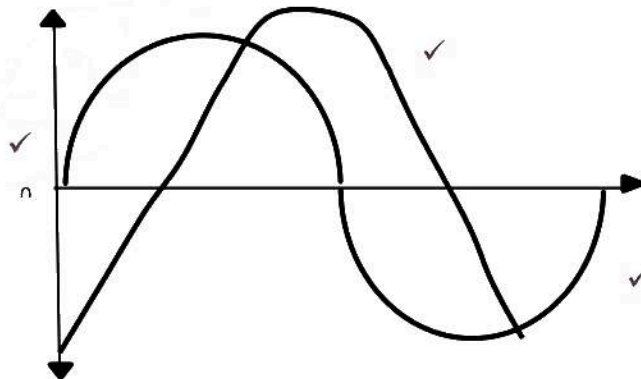
(4)

2.2 2.2.1



(3)

2.2.2



(3)

[20]

VRAAG 3

$$\begin{aligned}
 3.1 \quad V_T &= \sqrt{V_R^2 + (V_L - V_C)^2} \\
 V_T &= \sqrt{(85)^2 + (105 - 95)^2} \checkmark \checkmark \\
 V_T &= \sqrt{7\,325} \\
 V_T &= 85,586 \text{ V} \checkmark \checkmark
 \end{aligned} \tag{4}$$

$$\begin{aligned}
 3.2 \quad Z &= \frac{V_T}{I_T} \\
 Z &= \frac{85,586}{6} \checkmark \checkmark \\
 Z &= 14,264 \, \Omega \checkmark
 \end{aligned} \tag{3}$$

$$\begin{aligned}
 3.3 \quad X_L &= \frac{V_L}{I} \\
 X_L &= \frac{105}{6} \checkmark \\
 X_L &= 17,5 \, \Omega \checkmark \\
 X_L &= 2\pi fL \\
 L &= \frac{X_L}{2\pi f} \\
 L &= \frac{17,5}{2\pi(50)} \checkmark \\
 L &= 0,0557 \text{ H} \checkmark
 \end{aligned} \tag{4}$$

$$\begin{aligned}
 3.4 \quad X_C &= \frac{V_C}{I} \\
 X_C &= \frac{95}{6} \checkmark \\
 X_C &= 15,833 \, \Omega \checkmark \\
 X_C &= \frac{1}{2\pi fC} \\
 C &= \frac{1}{2\pi(50)(15,833)} \checkmark \\
 C &= 0,00020104205 \text{ f} \\
 C &= 201,042 \times 10^{-6} \text{ f or } 201,042 \mu\text{f} \checkmark
 \end{aligned} \tag{4}$$

$$\begin{aligned}
 3.5 \quad R_T &= \frac{V_T}{I} \\
 &= \frac{85}{6} \checkmark \\
 &= 14,1667 \, \Omega \checkmark
 \end{aligned} \tag{2}$$

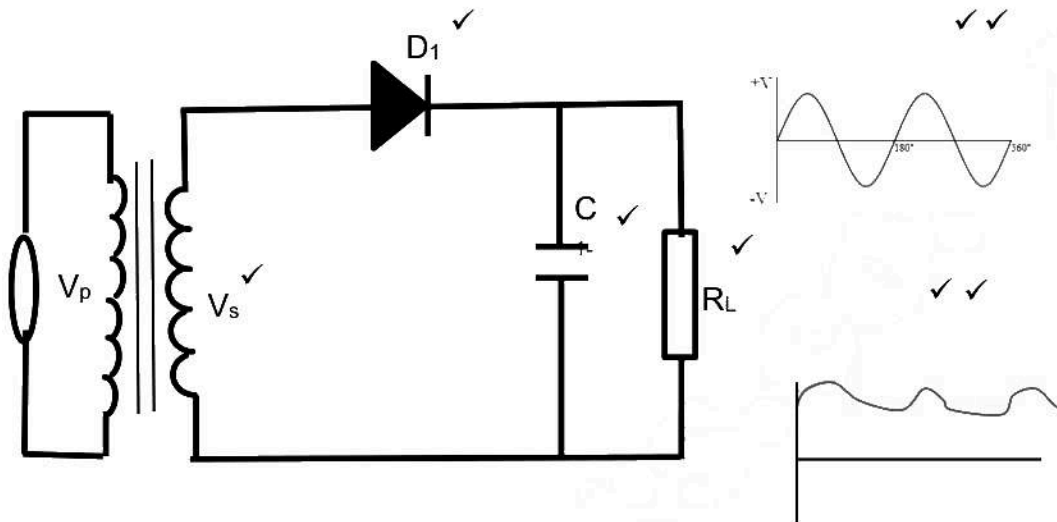
$$\begin{aligned}
 3.6 \quad \cos\theta &= \frac{R}{Z} \\
 \theta &= \cos^{-1}\left(\frac{14,1667}{14,264}\right) \checkmark \checkmark \\
 \theta &= 6,696^\circ \checkmark
 \end{aligned}$$

VRAAG 4

- 4.1
- Isolator: Dis 'n materiaal wat nie elektrisiteit gelei nie.
 - Isolator: Atome met presies agt valensie-elektrone; dit wen of verloor nie elektrone nie.

(2)

4.2



(8)

4.3

4.3.1

$$A_p = 10 \log \frac{P_{uit}}{P_{in}}$$

$$A_p = 10 \log \frac{100}{100 \times 10^{-3}} \checkmark$$

$$A_p = 10 \log (1000)$$

$$A_p = 30 \text{ dB} \checkmark$$

(2)

4.3.2

$$P_{uit} = \frac{V^2}{R_{uit}}$$

$$100 = \frac{V^2}{20} \checkmark$$

$$\sqrt{V^2} = \sqrt{100 \times 20}$$

$$V^2 = 44,721 \text{ V} \checkmark$$

$$A_v = 20 \log \frac{V_{uit}}{V_{in}}$$

$$A_v = 20 \log \left(\frac{44,721}{20} \right) \checkmark$$

$$A_v = 20 \log (2,23605)$$

$$A_p = 6,989 \text{ dB} \checkmark$$

(4)

4.3.3

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

$$I^2 = \frac{100}{20}$$

$$\sqrt{I^2} = \sqrt{5}$$

$$I = 2,236 \text{ A} \checkmark$$

$$P = V_{in} \times I_{in}$$

$$I_{in} = \frac{P}{V_{in}}$$

$$I_{in} = \left(\frac{100 \times 10^{-3}}{20} \right)$$

$$I_{in} = 0,005 \text{ A} \checkmark$$

$$A_i = 20 \log \frac{I_{uit}}{I_{in}}$$

$$A_i = 20 \log \left(\frac{2,236}{0,005} \right) \checkmark$$

$$A_i = 20 \log (447,2)$$

$$A_i = 53,01^\circ \checkmark$$

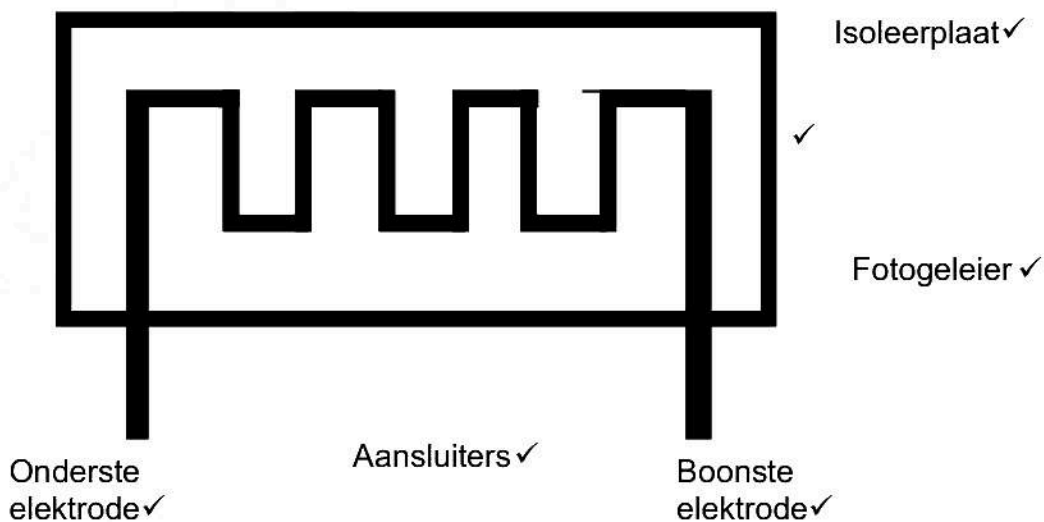
(4)
[20]

VRAAG 5

- 5.1
- Klokradio's
 - Veiligheidsalarms
 - Straatligte
 - Kameraligmeters

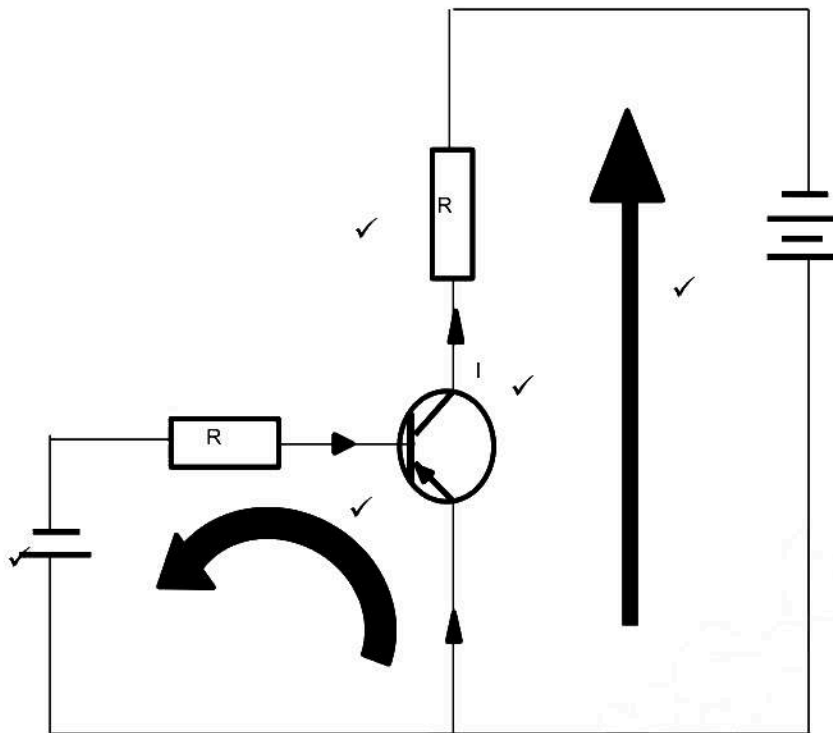
(4)

5.2



(6)

5.3



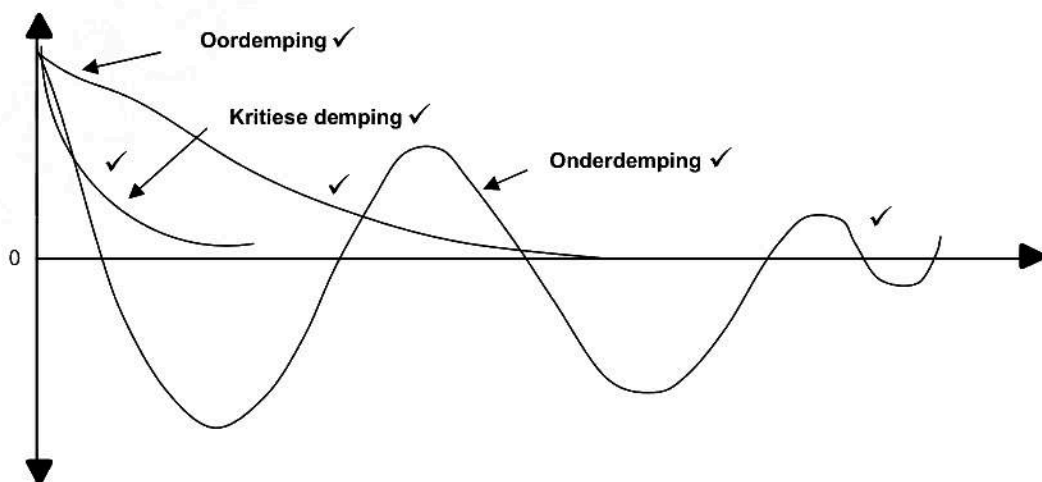
(5)

As die basis van die transistor meer negatief (sowat $-0,6\text{ V}$ of minder as $-0,7\text{ V}$) gemaak word as die pulssender, en die kollektor baie meer negatief as die basis is, dan het die transistor meevoorspanning (is aangeskakel). 'n Klein stroom (konvensionele stroom) sal vanaf die pulssender na die basis toe vloei, en 'n veel groter stroom sal vanaf die pulssender na die kollektor (C) toe vloei. ✓✓✓✓✓

(5)
[20]

VRAAG 6

6.1



(6)

- 6.2
- Dit dra inligting vinnig en akkuraat oor.
 - Dis betroubaar, aanpasbaar en kompak.
 - Die sender en ontvanger kan ver van mekaar wees.
 - Dit gebruik baie min elektrisiteit.
 - Kontak tussen die sender en die ontvanger kan wees deur middel van 'n elektriese draad, radiofrekwensies, radar, infrarooi en afstandsmeters.

(Enige VIER korrekte antwoorde) (Enige 4×1)

(4)

[10]

TOTAAL:

100