1.3 A✓✓

1.6 A✓✓

QUESTION 11/*VRAAG 11*

11.1.1 (a) $V_1 = 24$ (V)✓ (1)

(b) $A_1 = 0$ (A)✓ (1)

11.1.2

OPTION 1/*OPSIE 1*	**OPTION 2/*OPSIE 2***
$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$ ✓ $= \frac{1}{8} + \frac{1}{8}$ ✓ $R_p = 4\ \Omega$ $R_T = R_s + R_p$ $= 8 + 4$✓ $= 12\ \Omega$✓	$R_p = \frac{\text{product / produk}}{\text{sum / som}}$ ✓ $= \frac{(8)(8)}{8+8}$ ✓ $= 4\ \Omega$ $R_T = R_s + R_p$ $= 8 + 4$✓ $= 12\ \Omega$✓

(4)

11.1.3

OPTION 1/*OPSIE 1*

V divides in a ratio 8 : 4 ✓ (series)/*V verdeel in 'n verhouding 8 : 4 (serie)*

$V_2 = \frac{8}{12} \times 24$✓ or/*of* $V_2 = \frac{2}{3} \times 24$

$= 16$ V ✓

OPTION2 / OPSIE 2

POSITIVE MARKING FROM 11.1.2/*POSITIEWE NASIEN VANAF 11.2.1*

$V = IR$

$24 = I(12)$

$I = 2$ A

$V = IR$✓

$= (2)(8)$✓

$= 16$ V ✓

(3)

11.1.4 $A_2 = A_3$. ✓ (1)

11.2.1 Resistance is directly proportional to the length of the conducting wire. ✓/ *Weerstand is direk eweredig aan die lengte van die geleidingsdraad.*

OR/*OF*

As the length of the wire increases, the resistance increases./*Soos die lengte van die geleidingsdraad toeneem, neem die weerstand toe* (1)

11.2.2 1,35 Ω ✓ (Range/*Variasiewydte*: 1,3 Ω to/*tot* 1,4 Ω) (1)

[12]

1.10 D✓✓ (2)

QUESTION/*VRAAG 11*

11.1 Work done per unit charge by the source (battery) ✓✓
Die arbeid verrig per eenheidslading deur die bron (battery) ✓✓ (2)

11.2 $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$

$= \frac{1}{1,5} + \frac{1}{1,5}$ ✓

$= \frac{2}{3} + \frac{2}{3}$

$= \frac{4}{3}$

$\therefore R_P = \frac{3}{4} = 0,75\ \Omega$ ✓

$R_p = \frac{R_1 x\ R_2}{R_1 + R_2}$

$= \frac{1,5 \times 1,5}{1,5 + 1,5}$ ✓

$\therefore R_P = 0,75\ \Omega$ ✓

(2)

11.3.1 1,5 A ✓ (1)

11.3.2

$V_T = V_1 + V_2$

$9 = V_1 + 2V_1$ ✓

$9 = 3V_1$ ✓

$V_1 = 3$ V✓

Accept:/*Aanvaar*
V = IR ✓
V = 1,5(2) ✓
V= 3V✓ (3)

11.4
- INCREASE✓/*TOENEEM* ✓
- If 1,5 Ω resistor is added, the <u>resistance of the whole circuit decreases</u> ✓
  Indien 1,5 Ω resistor bygevoeg word, neem die totale <u>weerstand van die stroombaan af.</u> ✓
- Since R $\alpha \frac{1}{I}$, if R decreases, ∴ V is constant and <u>I of the circuit</u> <u>increases</u>✓
  Aangesien R $\alpha \frac{1}{I}$, indien R afneem en V konstant bly, sal <u>I van die stroombaan toeneem</u>. ✓

(3)
[11]

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1.10 B ✓✓ (2)

QUESTION 11/*VRAAG 11*

11.1.1

OPTION 1/*OPSIE 1*	OPTION 2/*OPSIE 2*

$\frac{1}{R_{//}} = \frac{1}{R_1} + \frac{1}{R_2}$ ✓
$= \frac{1}{6} + \frac{1}{3}$ ✓
$\therefore R_{//} = 2\Omega$
 	
$\therefore R_{total/totaal} = 4 + 2$ ✓
$= 6\ \Omega$ ✓
	$R_{//} = \frac{R_1 \times R_2}{R_1 + R_2}$ ✓
	$= \frac{6 \times 3}{6+3}$ ✓
	$= 2\Omega$
	
	$\therefore R_{total/totaal} = 4 + 2$ ✓
	$= 6\ \Omega$ ✓

(4)

11.1.2

	ACCEPT/ AANVAAR:
$R_{//}$: R_{series} 2Ω : 4Ω ✓ ∴ potential difference is also in ratio of *Potensiaal verskil is ook in die verhouding* 2: 4 or 1:2 ✓ ∴ 12V ÷ 3 parts/*dele* = 4V ∴ $V_{series} = 2 \times 4 = 8V$ ✓	$R_{4\Omega} = \frac{V_2}{I_T}$ ✓ $4 = \frac{V_2}{2}$ ✓ $\therefore V_2 = 8\ V$ ✓

(3)

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11.1.3

$R \alpha \frac{1}{I}$ or in words: resistance is inversely proportional to current and ∴ ratio of resistors is 6 : 3✓ 2 : 1 ∴ ratio of current is 1 : 2 ✓ $A_2 : A_3$ $\therefore I_{A2} = \frac{2}{3} \times 1$ $\therefore I_{A2} = 0,67$ A ✓ *$R \alpha \frac{1}{I}$ in woorde:* *weerstand is omgekeer eweredig aan stroom* *∴ verhouding van resistors is 6 : 3✓* *2 : 1* *∴ verhouding van stroom is 1 : 2 ✓* *$A_2 : A_3$* *$\therefore I_{A2} = \frac{2}{3} \times 1$* *$\therefore I_{A2} = 0,67$ A* ✓	**ACCEPT/*AANVAAR:*** $I = \frac{V}{R}$ ✓ $= \frac{12 - 8}{6}$ ✓ = 0,67 A ✓

(3)

11.1.4

$A_1 = 2$ A
∴ $Q = I \Delta t$ ✓
$= 2 \times 120$ ✓
= 240 C ✓

(3)

11.2 Decrease ✓
Afneem

(1)

11.3 **NEGATIVE MARKING FROM 11.2**
NEGATIEWE MERK VANAF 11.2

- If the 6 Ω resistor is removed, the resistance of the whole circuit increases ✓
- Since $R \alpha \frac{1}{I}$ ✓, if R increases, and V is constant ✓ and I of the circuit decreases

- *Indien die 6 Ω-resistor verwyder word, sal die totale weerstand van die stroombaan verhoog.*
- *$R \alpha \frac{1}{I}$ ✓, so indien R verhoog en V bly konstant✓, sal die stroom (I) verlaag.*

(3)
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1.10 C ✓✓ (2)

QUESTION 11/*VRAAG 11*

11.1.1 Current/*Stroom.*✓ (1)

11.1.2 The bulbs are identical and in series✓/the same current flows through each of the bulbs
Die gloeilampe is identies en in series/dieselfde stroom vloei deur elk van die gloeilampe

OR/*OF*

The same amount of charge passes through each of them in any given time.
Dieselfde aantal lading beweeg deur elk van hulle in enige gegewe tyd.

OR/*OF*
The potential difference across each of them is the same hence current is the same.
Die potensiaalverskil oor elk van hulle is dieselfde en gevolglik is die stroom dieselfde. (1)

11.1.3 Decrease/*Afneem* ✓ (1)

11.2.1 Potential difference across a conductor is the energy per unit charge flowing through it. ✓✓
Die potensiaalverskil oor 'n geleier is die energie per eenheidslading wat deur dit vloei.

OR/*OF*
Work done per unit charge across the conductor. ✓✓
Arbeid verrig per eenheidslading oor die geleier. (2)

11.2.2

$\frac{1}{R_{//}} = \frac{1}{R_1} + \frac{1}{R_2}$ ✓
 	
$= \frac{1}{2} + \frac{1}{6}$ ✓
$\therefore R_{//} = 1,5\ \Omega$ ✓
	OR/*OF*
	$R_{//} = \frac{R_1 R_2}{R_1 + R_2}$ ✓
	$\frac{2 \times 6}{2 + 6}$ ✓
	$\therefore R_{//} = 1,5\ \Omega$ ✓

(3)

11.2.3

POSITIVE MARKING FROM QUESTION 11.2.2 ***POSITIEWE NASIEN VANAF VRAAG 11.2.2***	
OPTION 1/*OPSIE 2*	**OPTION 2/*OPSIE 2***
A series circuit acts as a potential divider./ *'n Serieskakeling dien as 'n potensiaalverdeler* $V_p = \frac{R_p}{R_{tot}}(V_{tot})$ ✓ $4 = \frac{1,5✓}{(1,5+4)✓} \times V_{tot}$ $\therefore V_1 = V_{tot} = 14,67\ V$✓	$V = IR$✓ $4 = I(1,5)$ $I = 2,667A$ $V_2 = IR = 2,667(4)$✓ $= 10,67\ V$ $V_1 = V_{tot} = (4 + 10,67)$✓ $= 14,67\ V$✓

(4)

11.2.4

POSITIVE MARKING FROM QUESTION 11.2.3 ***POSITIEWE NASIEN VANAF VRAAG 11.2.3***	**OR/*OF***
$V_2 = V_{tot} - V_{//}$ $= (14,67 - 4)$ ✓ $= 10,67\ V$✓	$V_2 = \frac{R_2}{R_{tot}}(V_{tot})$ $= \frac{4}{(1,5+4)} \times 14,67$ ✓ $= 10,67\ V$✓

(2)
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