Memo
Electrical Circuits

QUESTION 1:

1.1) A.
1.2) B.
1.3) B.
1.4) C.
1.5) B. (5x2=10)

QUESTION 2:

2.1) Electrical current strength is the tempo of the flow of charge. (2)
2.2)
2.2.1)
Parallel connection:
$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{50} + \frac{1}{50}$

i.e. $R_p = \frac{50}{2} = 25\Omega.$ $\longrightarrow$ $R_{total} = R_{series} + R_{parallel}$
$= 100 + 25$
$= 125\Omega.$

2.2.2)

$R_{total} = \frac{V_{EMK}}{I_{HFST}}$

$125 = \frac{(Vemk + Voor\ 100\Omega)}{I}$

$125 = \frac{(x + 100I)}{I}$

$125I = x + 100I$

i.e. $x = 25I.$ (5)

QUESTION 3:

3.1) $R_{total} = 2 + 3$
$= 5\Omega.$

$R_{total} = \frac{V_{EMK}}{I_{HFST}}$

$5 = \frac{10}{I}$

i.e. $I = 2A.$ (3)

3.2)

V_1 : $R = \frac{V}{I}$

$2 = \frac{V}{2}$

i.e. $V_1 = 4V$.

$V_1 + V_2 = 10$ V (Yes it's correct. The total potential difference provided to the circuit per coulomb charge is 10 V.)

V_2 : $R = \frac{V}{I}$

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

$V_2 = 6V$. (4)

3.3) Decrease.
More resistances in the total circuit will cause the total current to decease because the EMK remains constant and the resistance will be inversely even to the current. ($R=\frac{V}{I}$). (3)

QUESTION 4:

4.1) The two resistors are identical, thus the total potential difference is divided by two. $V_1 = V_2 = 1.5$ V. (1)

4.2)

R_1: $R = \frac{V}{I}$

$3 = \frac{1,5}{I}$

i.e. I = 0,5 A.

Charge: $\mathrm{I} = \frac{\mathrm{Q}}{\Delta \mathrm{t}}$

$0,5 = \frac{Q}{2}$ i.e. Q = 1C. (5)

4.3)

V_1 :

$\mathrm{V} = \frac{\mathrm{W}}{\mathrm{Q}}$

$1.5 = \frac{W}{1}$

W = 1,5 J. i.e. W ver V_2 is also 1,5 J.
Total Labour = 3 J (3)

QUESTION 5:

Connection 1: $R_{total} = 2 + 4$
$= 6\ \Omega.$

Connection 2:

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$= \frac{1}{3} + \frac{1}{4} + \frac{1}{12}$$

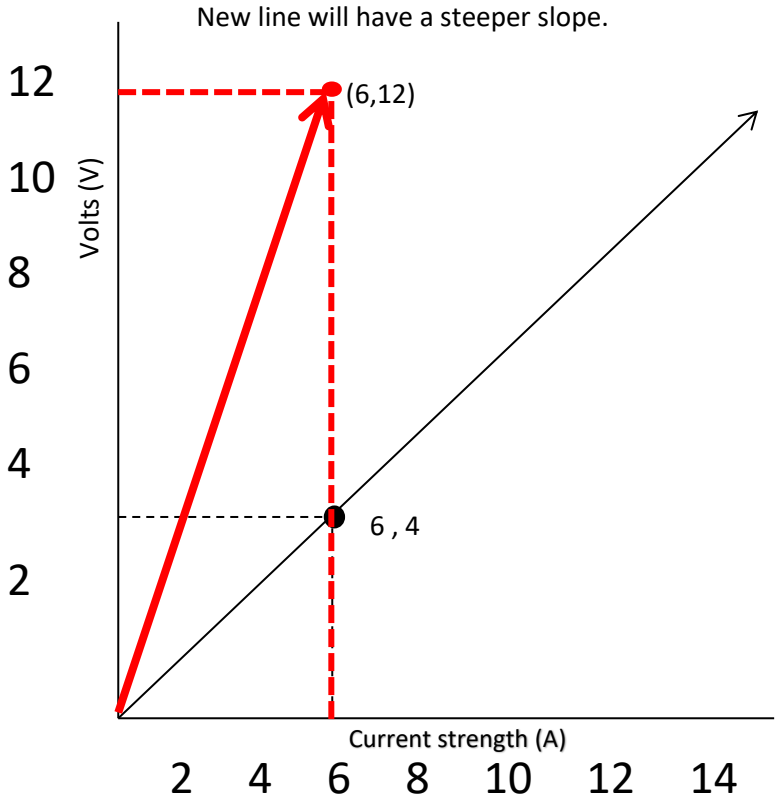
$$= \frac{4+3+1}{12}$$

i.e. $R_p = \frac{12}{8} = 1{,}5\Omega$
Connection 1 has the highest value. (4)

QUESTION 6 ON NEXT PAGE

QUESTION 6:

6.1)



(3)

6.2)

Line 1: Area = $\frac{1}{2}\ b.h = \frac{1}{2}\ (12)(8) = 48cm^2$.

Line 2: Area = $\frac{1}{2}\ b.h = \frac{1}{2}(6)(12) = 36cm^2$. (3)

6.3)

- Length of the conductor.
- Width of conductor.
- Material. (3)