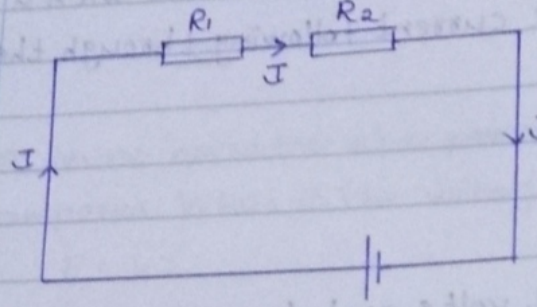
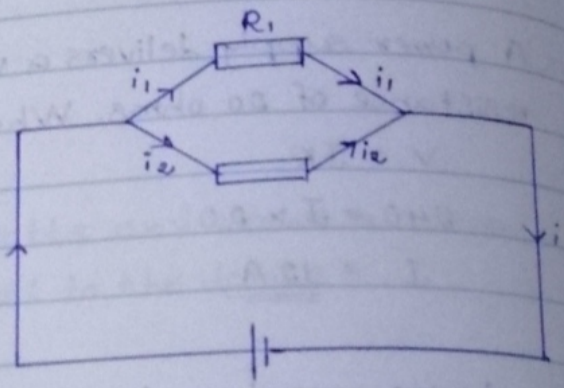
Tutorial 07

(1) (a)



(b)



If $R_1 = 6\Omega$, $R_2 = 12\Omega$, $I = 1A$, find equivalent resistance and V?

(a) Total Resistance = $R_1 + R_2 = 18\Omega$

$I = 1A$

$V = ?$

$V = IR$

$= 1 \times 18$

$= 18V$

(b) Total Resistance = $\frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{R_T}$

$$\frac{1}{R_T} = \frac{1}{6} + \frac{1}{12} = \frac{3}{12} = \frac{1}{4}$$

$R_T = 4\Omega$

$I = 1A$

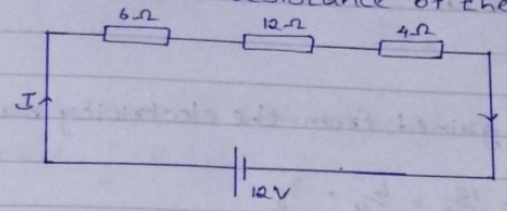
$V = IR$

$= 1 \times 4$

$= 4V$

(2) Three resistors 6Ω, 12Ω and 4Ω are connected in series to an electronic supply of 12 V.

(i) Calculate the total resistance of these three resistors.



$R_T = 6\Omega + 12\Omega + 4\Omega = \underline{22\Omega}$

(ii) What is the current gain from the electric supply?

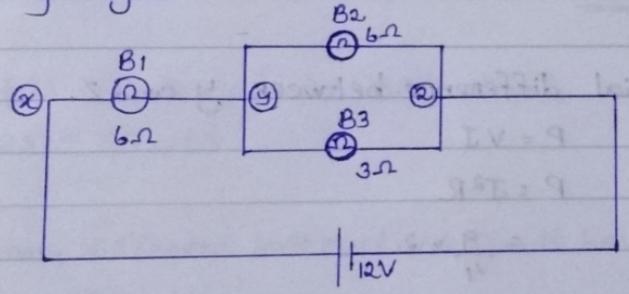
$V = IR$

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

$= \frac{12}{22}$

$= \underline{0.55A}$

(3) Three bulbs, B1, B2, B3 are connected to 12V supply as shown in the following diagram.



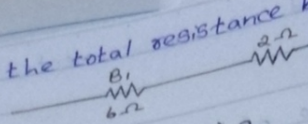
(i) Calculate the total resistance of the two bulbs B2 and B3 (between y and z).

B2 and B3 are parallely connected to each other.

$\therefore \frac{1}{R_T} = \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{6} + \frac{1}{3} = \frac{3}{6} = \frac{1}{2}$

$R_T = \underline{2\Omega}$

(i) What is the total resistance between the two points x and z



$R_T' = (6+2)\Omega$

$R_T' = \underline{8\Omega}$

(ii) What is the current gained from the electricity supply?

$V = IR$

$I = V/R = \frac{12}{8} = \frac{6}{4} = \frac{3}{2}$

$I = \underline{1.5A}$

(iv) Calculate the potential difference between x and y.

$P = VI$

$P = I^2R$

$P = (1.5)^2 \times 6$

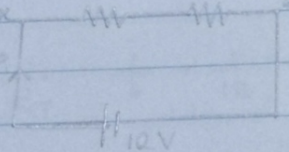
$P = \left(\frac{3}{2}\right)^2 \times 6$

$P = \frac{9}{4} \times 6^3$

$P = 27/2$

$P = \underline{13.5W}$

(v) Calculate the potential difference between y and z.



$P = VI$

$P = I^2R$

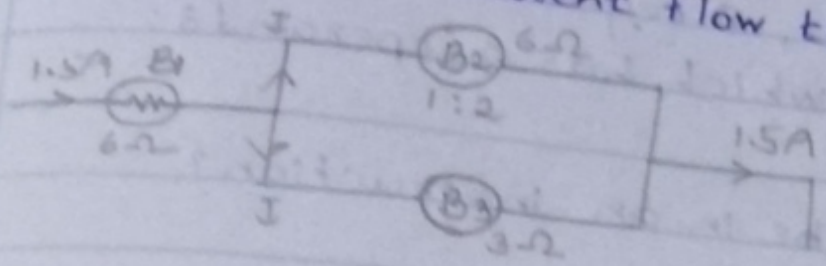
$= \frac{9}{4} \times 2$

$P = \underline{4.5W}$

SAD

WEB

(vi) Calculate the current flow through B_2.



$$I_{B_2} = \frac{1.5}{3} \times 1 = \frac{1}{2}$$

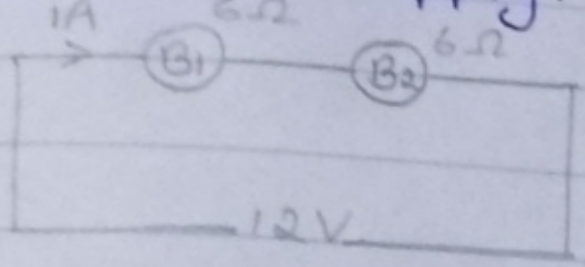
$$I_{B_2} = \underline{0.5A}$$

(vii) Calculate the current flow through B_3.

$$\frac{1.5}{3} \times 2 = \frac{1}{2} \times 2 = 1A$$

$$I_{B_3} = \underline{1A}$$

(viii) If B_3 is removed, then what would be the current gain from the electronic supply.



$$I = \frac{V}{R} = \frac{12}{12}$$

$$I = \underline{1A}$$