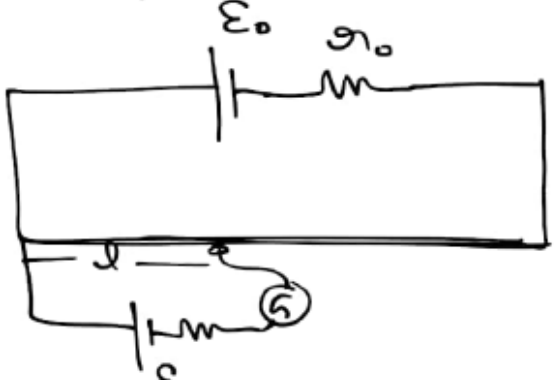
⇒ ⇒

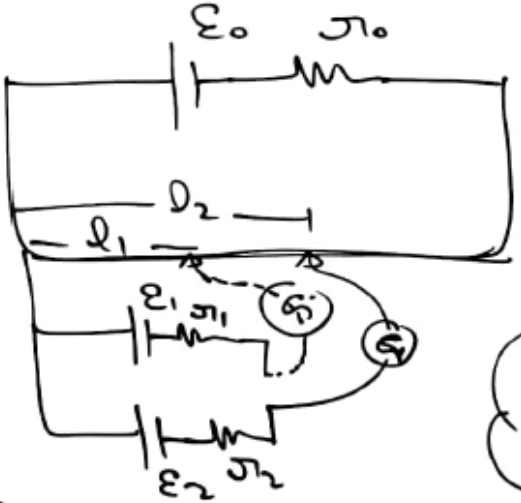
⇒ **Potentiometer**

(1) Emf of the cell.



$\varepsilon = x l$

(1) 2021 NEET



$\frac{\varepsilon_1}{\varepsilon_2} = \frac{l_1}{l_2}$

$\varepsilon_1 = x l_1$

$\varepsilon_2 = x l_2$

$\frac{\varepsilon_1}{\varepsilon_2} = \frac{l_1}{l_2}$

X – Potential gradient

2021 NEET

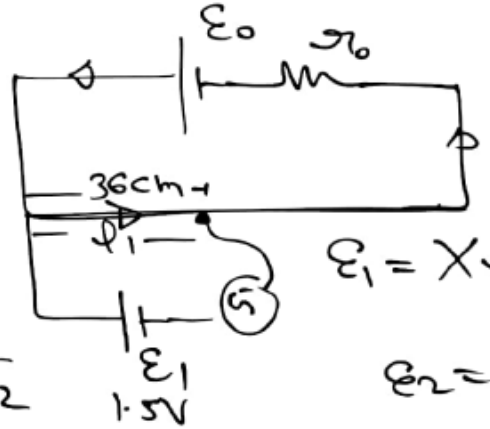
(89) In a potentiometer ckt a cell of Emf 1.5V gives balance point at 36cm length of wire. If another cell of Emf 2.5 Volt replace the first cell, then at what length of the wire, the balance point occurs?

(a) 62cm

(b) 60cm

(c) 21.6 cm

(d) 64cm.



$\varepsilon_1 = X l_1$

$\varepsilon_2 = X l_2$

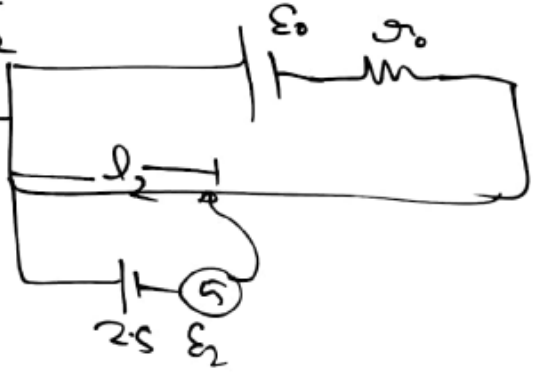
$\frac{\varepsilon_1}{\varepsilon_2} = \frac{l_1}{l_2}$

$\frac{1.5}{2.5} = \frac{36}{l_2}$

$l_2 = \frac{36 \times 2.5}{1.5}$

$l_2 = \frac{36 \times 2.5}{1.5}$

$l_2 = 60cm$



AIEEE 2017

Q2) A Potentiometer is an accurate & versatile device to make Electrical measurements of Emf because the method involve.

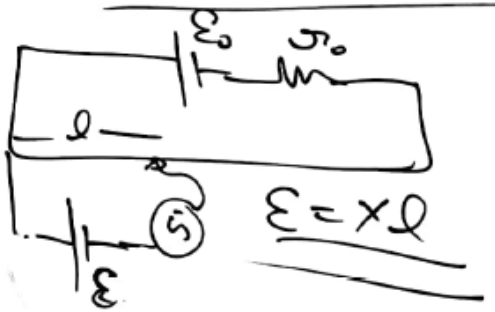
(a) potential gradients.

(b) A condition of no current flow through the galvanometer. — null deflection

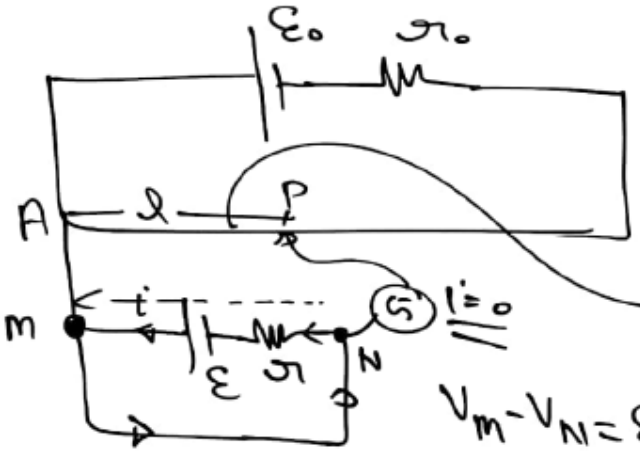
(c) a combination of cells, galvanometer & resistance.

(d) cells.

(b) based on null deflection



(iii) To find internal resistance of cell -

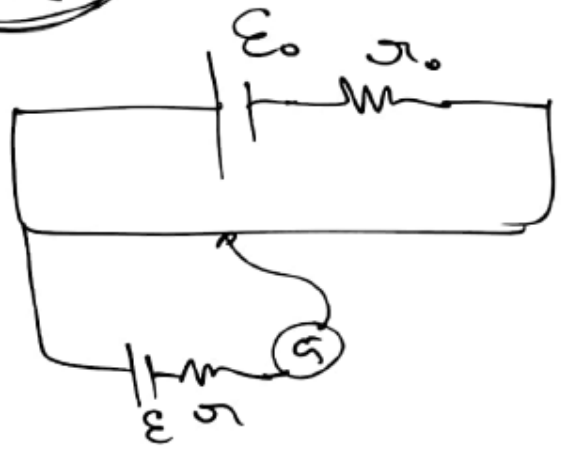


P.D b/w A P = xl

$V_m - V_N = \varepsilon - ir$

$V_N - ir + \varepsilon = V_m$

$V_m - V_N = \varepsilon - ir$



$\varepsilon - ir = xl$

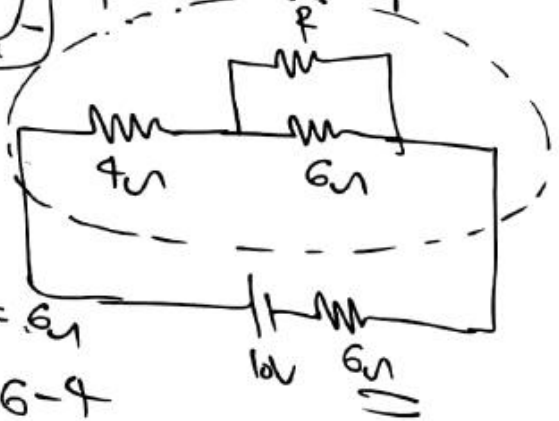
Power, Energy Consume by resistance:-

Condition

↳ for maximum Power dissipation/ Consume / radiate by external Resistance, $r = R$

Internal resistance
||
External resistance

Q) find Value of R such that maximum Power Consumption.



$4 + \frac{6R}{6+R} = 6$

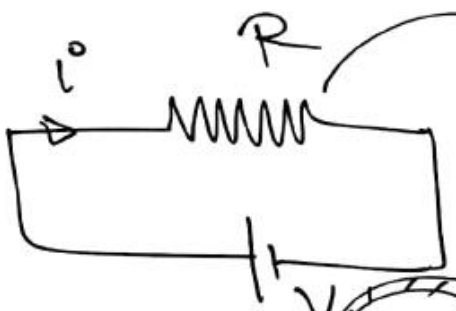
$\frac{6R}{6+R} = 6-4$

$\frac{6R}{6+R} = 2 \Rightarrow 6R = 12 + 2R$

$4R = 12$

$R = 3\Omega$

Power, Energy Consume by resistance :-



$P = Vi = (iR)i = i^2R = \left(\frac{V}{R}\right)^2 R = \frac{V^2}{R}$

$$P = Vi = i^2R = \frac{V^2}{R}$$

Power = $\frac{\text{Energy}}{\text{time}}$

$P = \frac{E}{t}$ $\quad E = P \cdot t$

Energy Consume/radiate in t ~

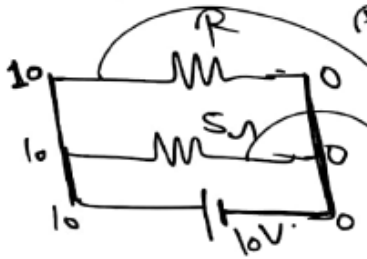
$$E = Vit = i^2Rt = \frac{V^2}{R}t$$

Power, Energy Consume by resistance:-

$$P = Vi = i^2R = \frac{V^2}{R} \qquad V = iR$$

Mains 2012

(a) 20 Ω.
(b) 15 Ω.
(c) 10 Ω.
(d) 30 Ω.



Power dissipiate in ckt is 30 watt. The value of R.

$P_1 + P_2 = 30$ watt

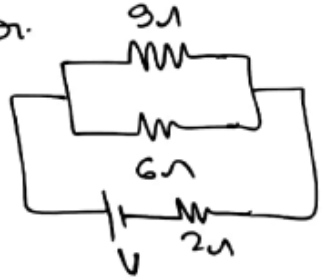
$$\frac{10^2}{R} + \frac{10^2}{5} = 30$$

$$\frac{100}{R} + \frac{100}{5} = 30$$

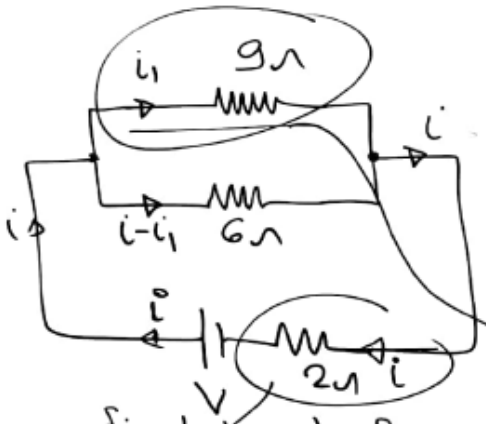
$$\frac{100}{R} = 30 - 20$$

$$\frac{100}{R} = 10 \qquad R = 10\,\Omega$$

AIPMT 2011 If the Power dissipated in the 9 Ω resistor in the Circuit shown is 36 W, The potential difference across the 2 Ω resistor.

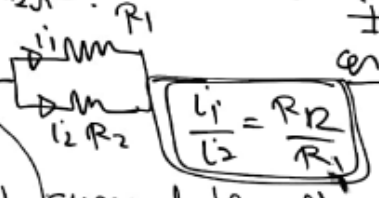


(a) 4V
(b) 8V
(c) 10V
(d) 2Volt.



$P_{9\Omega} = 36W$

$V_{2\Omega} = ?$

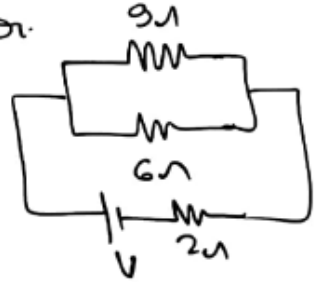


$\frac{i_1}{i_2} = \frac{R_2}{R_1}$

(i) Read Question
(ii) Write what is given
(iii) Find → ?
(iv) Think about formula

or write –

AIPMT 2011 | If the Power dissipated in the 9 Ω resistor in the circuit shown is 36 W, The potential difference across the 2Ω resistor.



(a) 9V
(b) 8V
(c) 10V
(d) 2Volt.

(L) first How to find, net current through cell,

$i_1 \times 9 = (i - i_1)\, 6$

$\frac{i_1}{i - i_1} = \frac{6}{9} = \frac{2}{3}$

$3i_1 = 2i - 2i_1$

$5i_1 = 2i$

$i_1 = \frac{2}{5} i$

$P = i_1^2 R = 36$

$= \left(\frac{2i}{5}\right)^2 \times 9 = 36$

$\left(\frac{2i}{5}\right)^2 = (2)^2$

$\frac{2i}{5} = 2$

$i = 5$ Amp

$V = iR$

$= 5 \times 2 = 10$ Volt