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ELECTRICITY
CELL ARRANGEMENT

PREPARED BY
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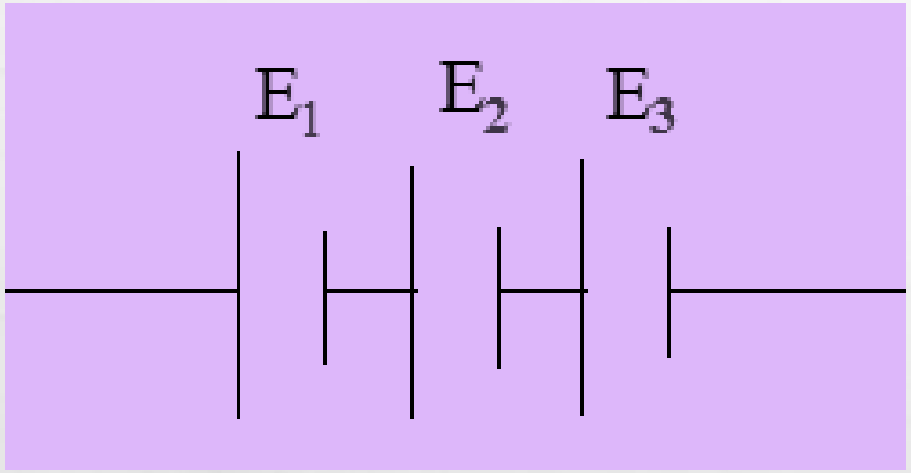
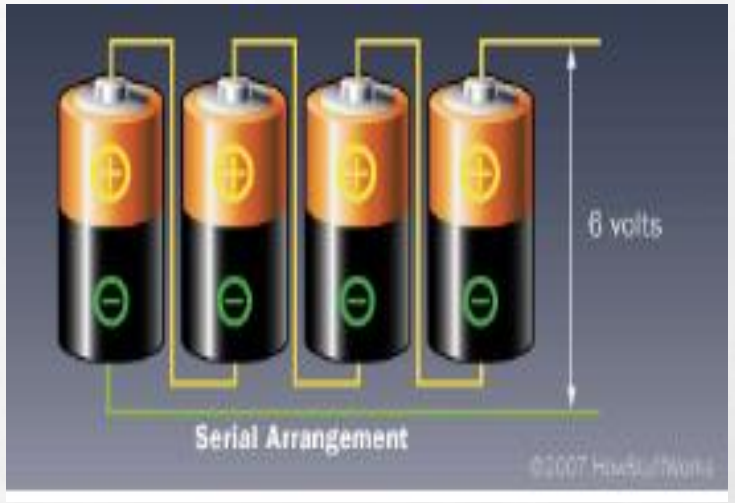
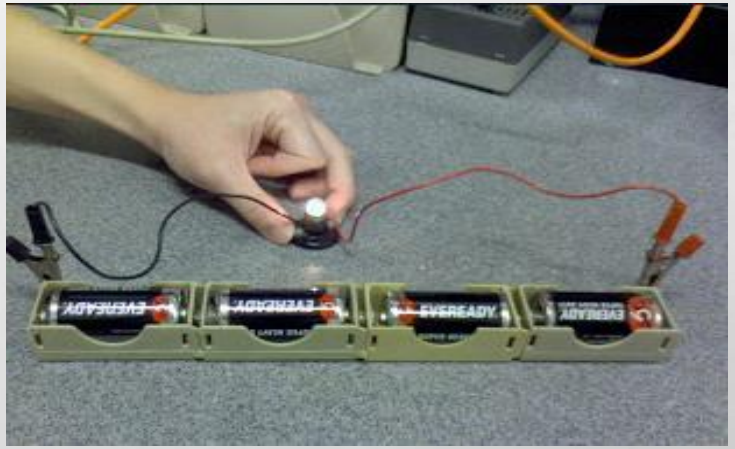
CELL ARRANGEMENTS

1. Series arrangement

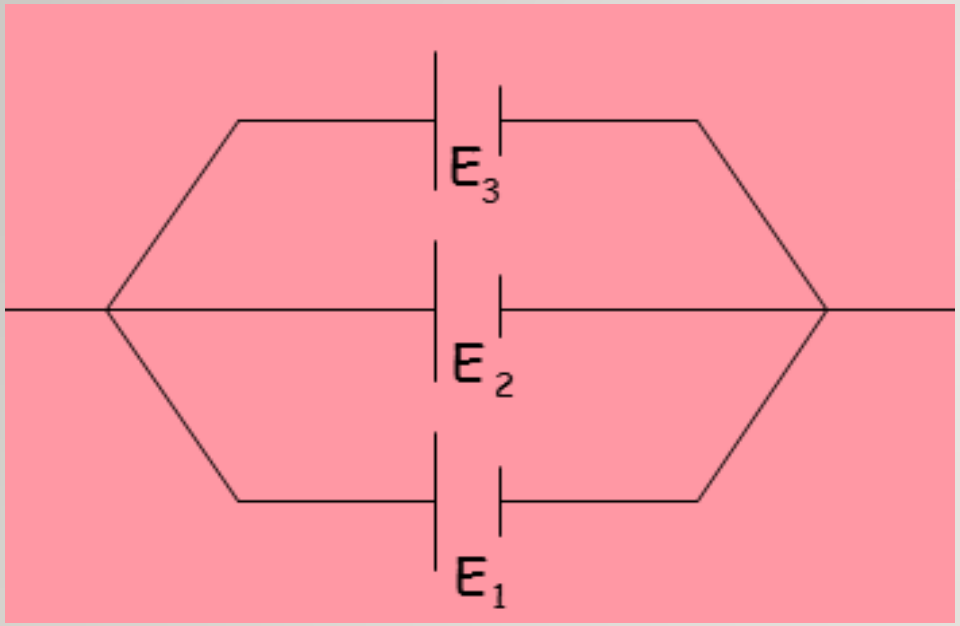


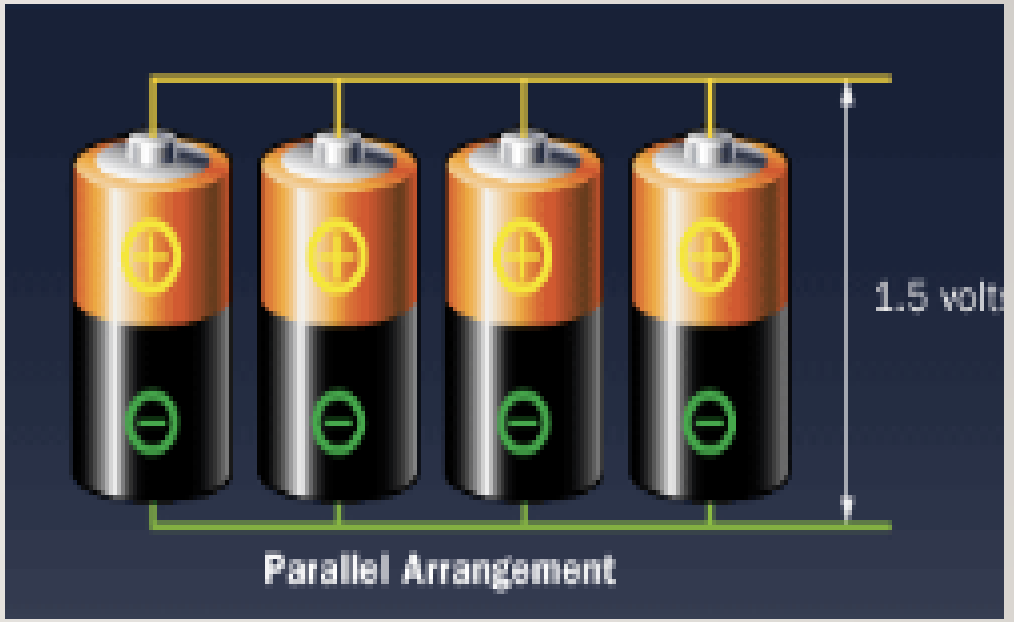




Total emf $E = E_1 + E_2 + E_3$

2. Parallel arrangement





When cells of equal *emf* are connected in parallel

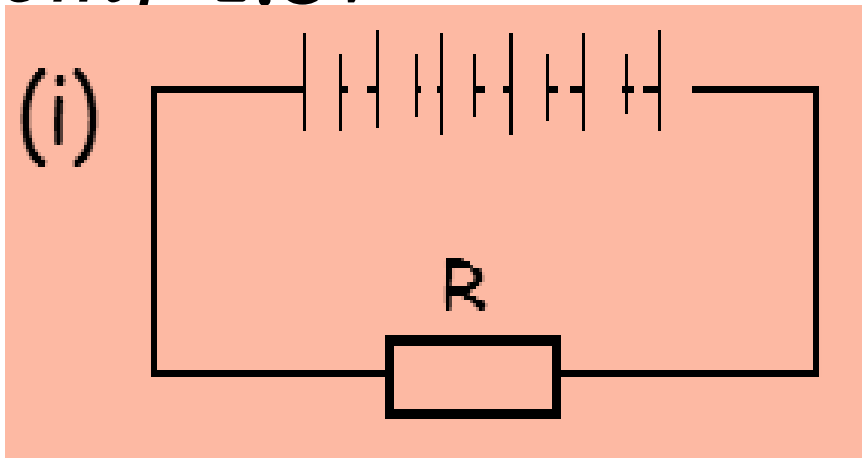
Total emf $E = E_1 = E_2 = E_3$

Advantages of series arrangement of cells over the parallel arrangement.

In series arrangement the effective e.m.f is greater than the individual e.m.f of the cells and hence a greater current is drawn from the series combination than in the parallel combination. However the series arrangement has a disadvantage of all the cells being drained at once thus the cells have a shorter life span.

Example.

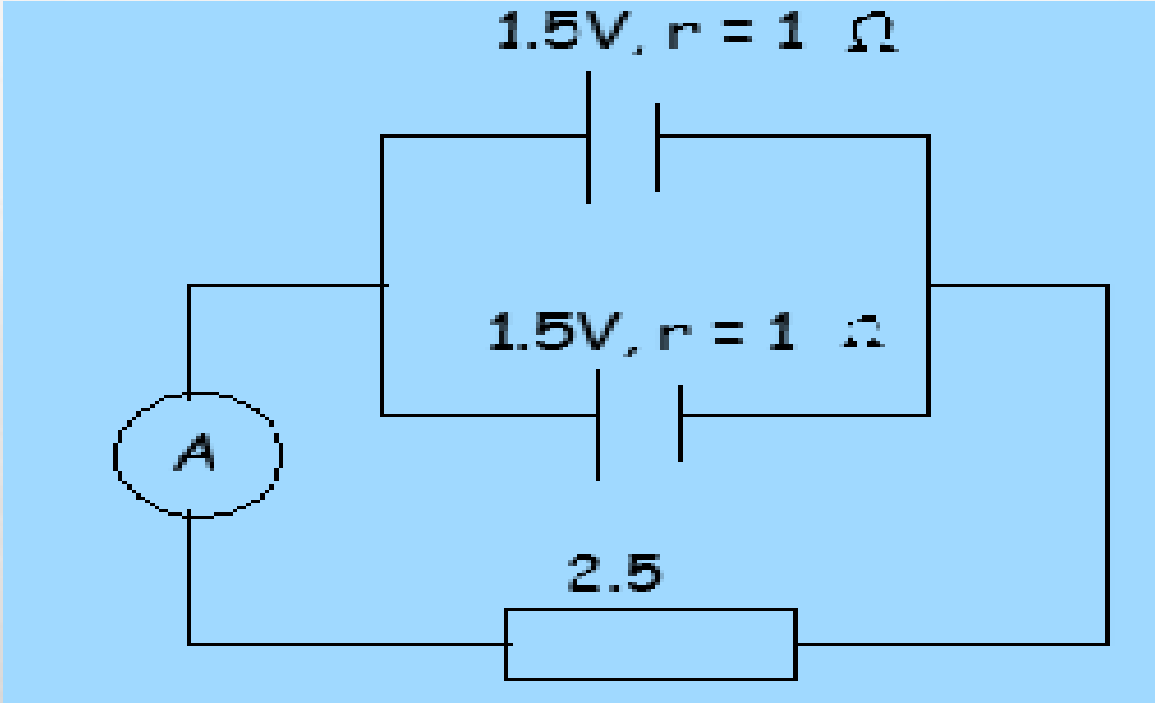
1. Find the total emf in each of the following circuits if each cell is of emf $1.5V$



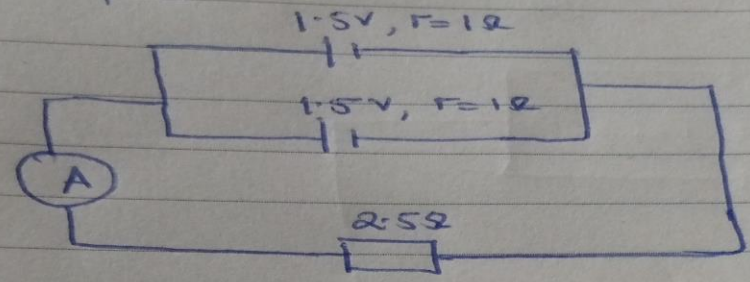
Note: If the cells are connected in parallel and have internal resistance, their resistance is calculated as resistors in parallel.

EXAMPLES

1. Find the ammeter reading



Example.



Find the ammeter reading.

$E = 1.5V$, $r = \frac{1 \times 1}{1+1} = 0.5\Omega$

$E = I(R + r)$

$1.5 = I(2.5 + 0.5)$

$1.5 = I(3)$

$I = \frac{1.5}{3} =$ _____ A.

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

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

$= 0.5\,A$

2. A battery containing 8 cells each of emf 1.5V and internal resistance 0.5Ω is connected to two other resistors of 4Ω and 16Ω . Calculate the minimum and maximum current that can flow through the battery.

You can the link below

https://youtu.be/dgkaE7eiY5w

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e-light platform