KEY

PHYSICS 11

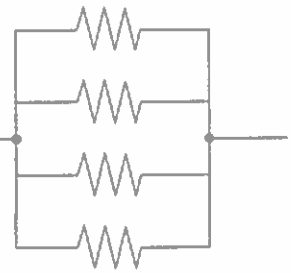
ELECTRIC CIRCUITS 2

1.

Which arrangement of four identical resistors has the highest equivalent resistance?

let R = 2 Ω

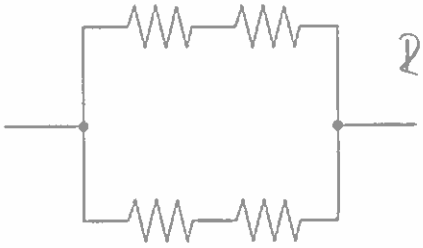
A.



$R_{eq} = \frac{1}{\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}}$

$= \frac{1}{2}\ \Omega$

B.

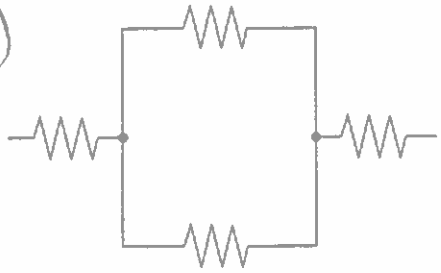


$R_{eq} = \frac{1}{\frac{1}{4}+\frac{1}{4}}$

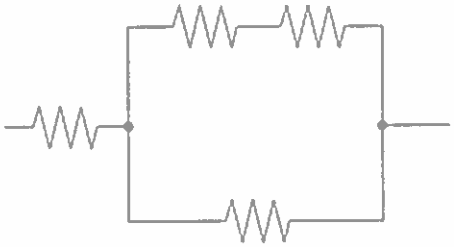
$= \frac{1}{\frac{1}{2}}$

$= 2\ \Omega$

C.



D.



$2 + \frac{1}{\frac{1}{4}+\frac{1}{2}}$

$2 + \frac{1}{\frac{3}{4}}$

$2 + \frac{4}{3} = 3.\overline{3}\ \Omega$

2. $2 + \frac{1}{\frac{1}{2}+\frac{1}{2}} + 2$

$= 4 + 1 = 5\ \Omega$

A student is instructed to determine the amount of charge flowing past a point in a circuit of unknown resistance during an experiment. What equipment will permit the student to do this?

A. voltmeter
B. ammeter, voltmeter
C. ammeter, stopwatch
D. voltmeter, stopwatch

$I = \frac{q}{\Delta t}$ ↖ stopwatch

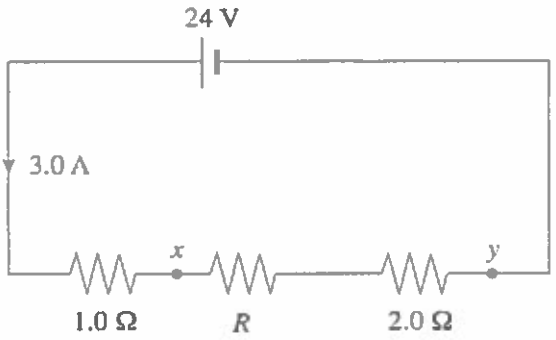
↑

ammeter

$\rightarrow q = I \cdot \Delta t$

3.

A series circuit consists of a battery and three resistors arranged as shown in the diagram below.



$R_{eq} = \frac{24}{3.0} = 8.0\,\Omega$

$R = 8.0 - 1.0 - 2.0$
$= 5.0\,\Omega$

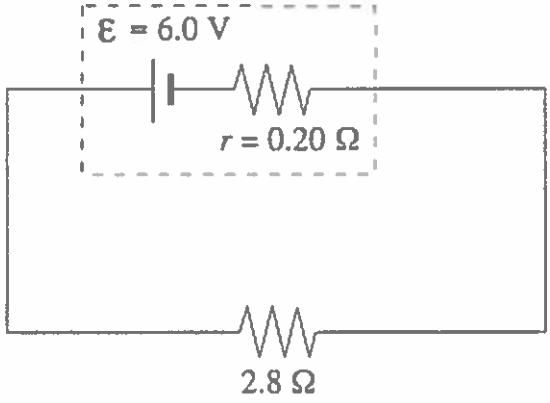
What is the potential difference V_{xy}?

$V_{xy} = (R_{x+y})(I_{TOT})$
$= (7.0)(3.0)$
$= 21\ V$

A. 3.0 V
B. 6.0 V
C. 9.0 V
(D.) 21 V

4.

What is the battery's terminal voltage in the circuit below?



$I_{TOT} = \frac{\mathcal{E}}{R_{eq}}$
$= \frac{6.0}{(2.8 + 0.20)}$
$= \frac{6.0}{3.0}$
$= 2.0\ A$

A. 0.40 V
(B.) 5.6 V
C. 6.0 V
D. 6.4 V

$V_{term} = \mathcal{E} - Ir$
$= 6.0 - (2.0)(0.20)$
$= 6.0 - 0.4$
$= \boxed{5.6\ V}$