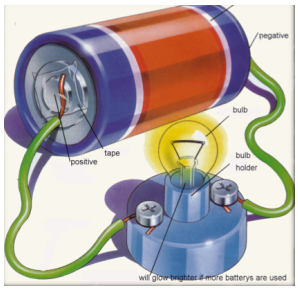
Do Now:

(1) What is electric circuit?

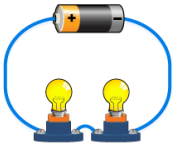
_____

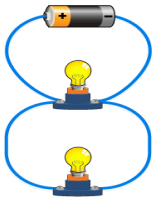
(2) Convert the following picture into schematic diagram.



Electric Circuits

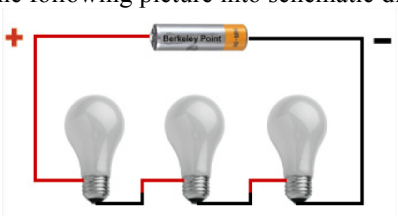
1. Electric components are commonly connected in one of the two ways:



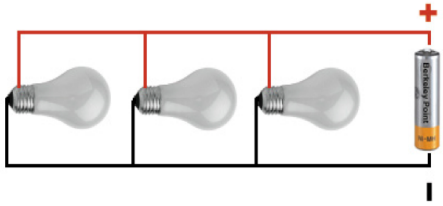


_____ _____

2. Convert the following picture into schematic diagram.

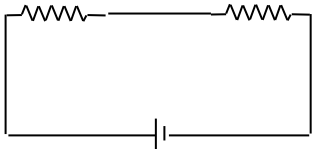


3. Convert the following picture into schematic diagram.



Series Circuits

4. Label every component of the circuit; identify each of the voltage and current.



5. Relation among all the currents:

_____

6. Relation among all the voltages:

_____.

7. Find the equivalent resistance (R_{eq}):

_____.

8. Write the Ohm's law using (a) individual resistance (R_1 & R_2), and (b) equivalent resistance (R/R_{eq}):

(a) _____.

(b) _____.

9. What will happen to the resistance if the number of series devices increases?

_____.

10. Why is the overall resistance of the circuit increased as the number of devices increases?

_____.

11. Total resistance _____ any individual resistance.

12. Find the total amount of power (P) in terms of individual power (P_1 & P_2) consumed by each resistor:

_____.

13. Summary of series circuits:

I: _____.

V: _____.

R: _____.

P: _____.

Series Circuits Exercise

14. Three 3-Ω resistors placed in series would provide a resistance which is equivalent to one _____Ω- resistor.

15. Three resistors with resistance values of 2-Ω, 4-Ω, and 6-Ω are placed in series. These would provide a resistance, which is equivalent to one _____Ω- resistor.

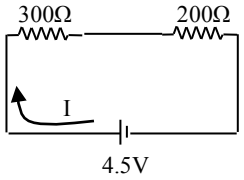
16. As the number of resistors in a series circuit increases, the overall resistance _____ and the current in the circuit _____.

17. Three identical light bulbs are connected in series and connected to a battery. Compare the brightness of them.

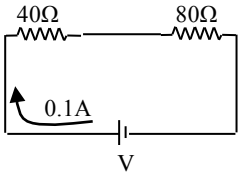
18. A circuit has one resistor and the current is 4 A. If we add another identical resistor into the circuit in series, the current will become _____ A.

19. A circuit has one resistor and the current is 4 A. If we add another 3 identical resistors into the circuit in series, the current will become _____ A.

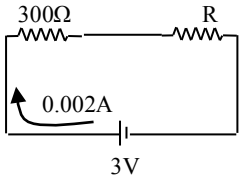
20. Calculate the total resistance R and total current I.



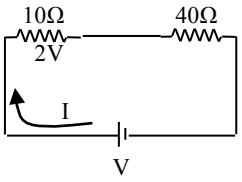
21. Calculate the equivalent resistance and voltage V of the cell.



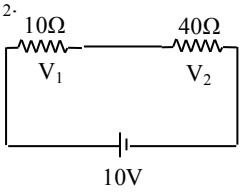
22. Calculate the resistance R.



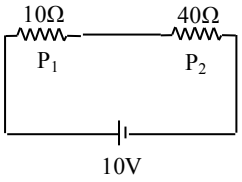
23. If the voltage drop for the 10 Ω resistor is 2 V, calculate the total current I and the voltage V of the cell.



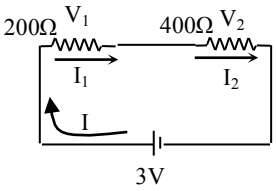
24. Calculate and compare V_1 and V_2.



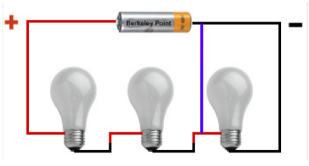
25. Calculate the Power P_1, P_2, and total power P of the circuit.



26. Calculate all the unknown quantities in the diagram.



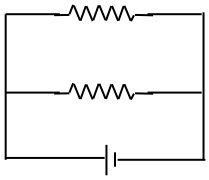
27. What will happen to the circuit if we add a wire to the circuit?



28. What is the disadvantage of the series circuits?

Parallel Circuits

29. Label every component of the circuit; identify each of the voltage and current.



30. Relation among all the voltages:

_____

31. Relation among all the currents:

_____.

32. Find the equivalent resistance (R_{eq}):

_____.

33. Write the Ohm's law using (a) individual resistance (R_1 & R_2), and (b) equivalent resistance (R/R_{eq}):

(a) _____.

(b) _____.

34. What will happen to the resistance if the number of parallel devices increases?

_____.

35. Why is the overall resistance of the circuit decreased as the number of parallel branches increases?

_____.

36. Total resistance _____ any individual resistance.

37. Find the total amount of power (P) in terms of individual power (P_1 & P_2) consumed by each resistor:

_____.

38. Summary of parallel circuits:

I: _____.

V: _____.

R: _____.

P: _____.

Parallel Circuits Exercise

39. Three 3-Ω resistors placed in parallel would provide a resistance which is equivalent to one _____Ω- resistor.

40. Two resistors with resistance values of 20-Ω and 40-Ω are placed in parallel. These would provide a resistance, which is equivalent to one _____Ω- resistor.

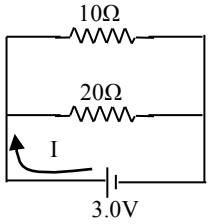
41. As more and more resistors are added in parallel to a circuit, the equivalent resistance of the circuit _____ and the total current of the circuit _____.

42. Three identical light bulbs are connected in parallel and connected to a battery. Compare the brightness of them.

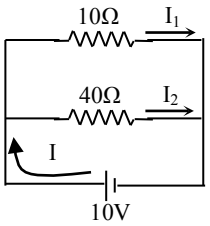
43. A circuit has one resistor and the current is 2 A. If we add another identical resistor into the circuit in parallel, the total current will become _____ A.

44. A circuit has one resistor and the current is 2 A. If we add another 3 identical resistors into the circuit in parallel, the current will become _____ A.

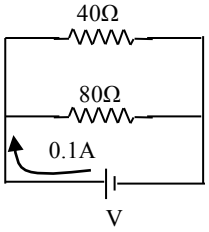
45. Calculate the total resistance R and total current I.



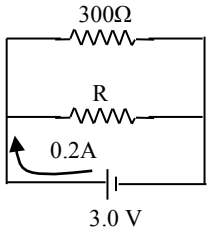
46. Calculate and compare I_1 and I_2.



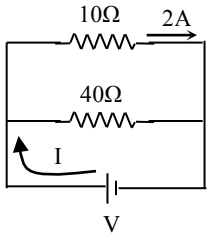
47. Calculate the equivalent resistance and voltage V of the cell.



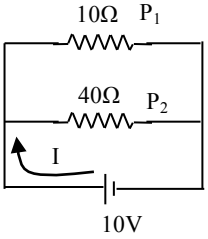
48. Calculate the resistance R.



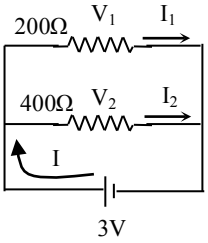
49. If the current for the 10 Ω resistor is 2 A, calculate the voltage V of the cell and the total current I.



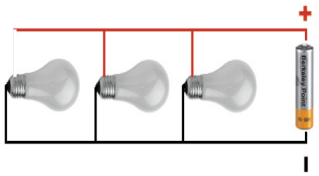
50. Calculate the Power P_1, P_2, and total power P of the circuit.



51. Calculate all the unknown quantities in the diagram.



52. What will happen to the circuit if we cut a wire of the circuit?



53. What is the disadvantage of the parallel circuits?

Compound Circuits

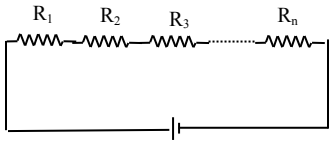
54. What is the equivalent resistance:

_____.

_____.

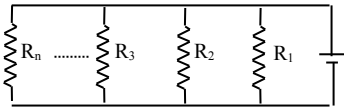
_____.

55. Formulas for total/equivalent resistance:



Series: _____-

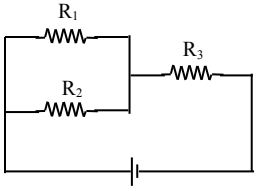
_____.



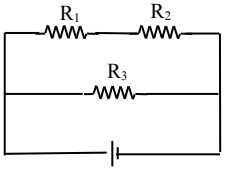
Parallel:

_____.

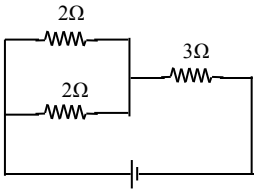
56. Strategy to find the equivalent resistor of a compound circuit.



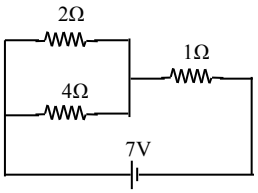
57. Strategy to find the equivalent resistor of a compound circuit.



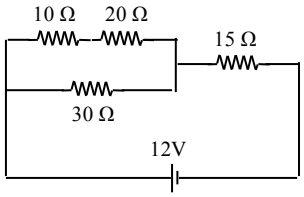
58. Calculate the equivalent resistance of the following compound circuit



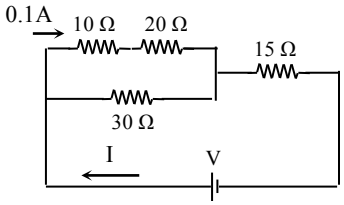
59. Calculate the equivalent resistance R and the total current I



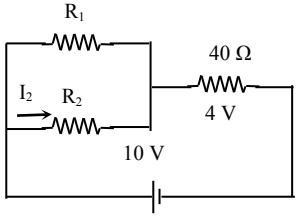
60. Calculate the equivalent resistance R and the total current I



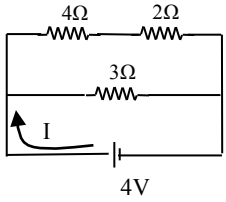
61. Calculate the the total current I and total voltage V.



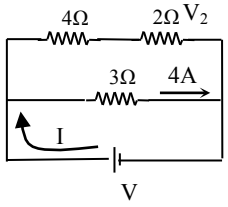
62. If $R_1 = R_2$, calculate the R_1, I_2 , and the total current I.



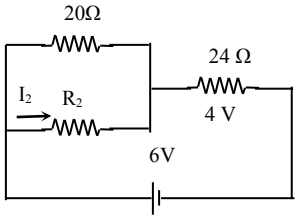
63. Calculate the equivalent resistance R and the total current I.



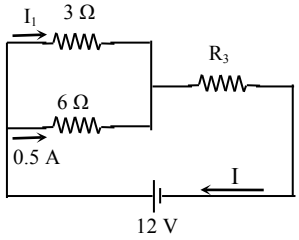
64. Calculate the the total current I, total voltage V and V_2.



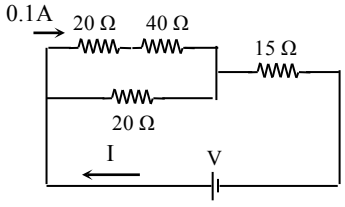
65. Calculate the R_2, and I_2 .



66. Calculate the I_2 , R_3, the total current I.



67. Calculate the the total current I and total voltage V.



68. Use the diagram to calculate a) the total resistance in the circuit, b) the total current through the circuit, c) the total power the circuit consume, and d) the current through R_2. (where $R_1 = 10\Omega$, $R_2 = 30\Omega$, $R_3 = 30\Omega$, $R_4 = 15\Omega$, V = 12V)