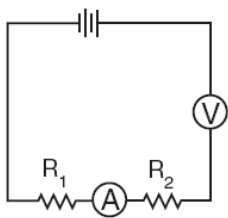
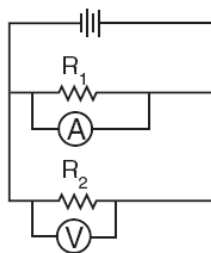


IB Physics SL Y2 – Electric Circuits Homework Problems

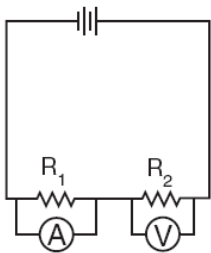
Instructions: Complete these problems on separate paper. Show all of your work.



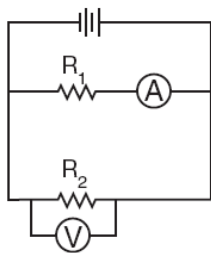
(1)



(3)

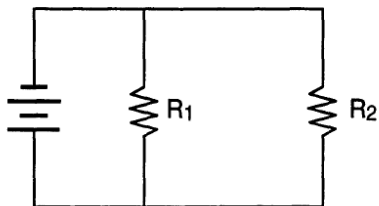


(2)



(4)

1. In which circuit above are meters properly connected to measure current through R1 and potential difference across R2? Explain.



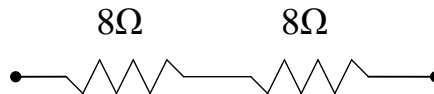
2. Resistors R1 and R2 have an equivalent resistance of 6 ohms when connected in the circuit shown below. The resistance of R1 could be

- (A) 1 Ω
- (B) 5 Ω
- (C) 8 Ω
- (D) 4 Ω

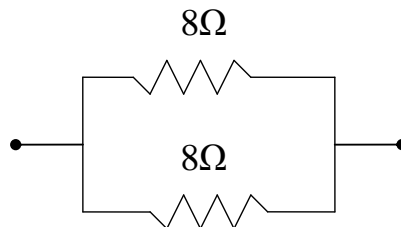
Explain your answer choice.

3. Rank the equivalent resistance of the five circuits below from greatest to least. Show each calculation clearly.

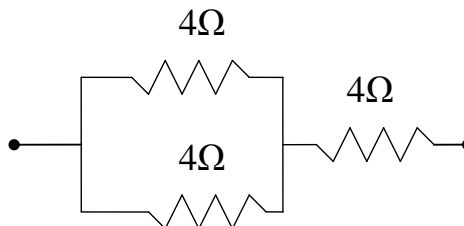
- i. circuit 1



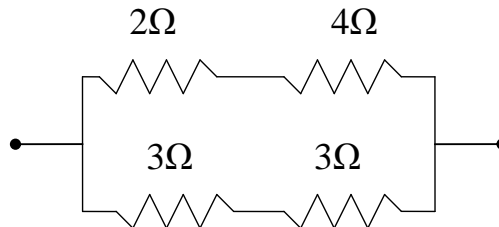
- ii. circuit 2



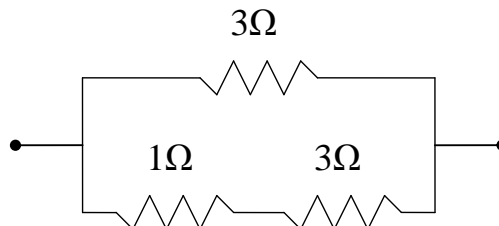
- iii. circuit 3



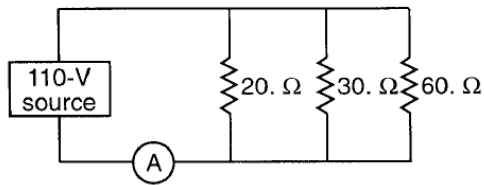
- iv. circuit 4



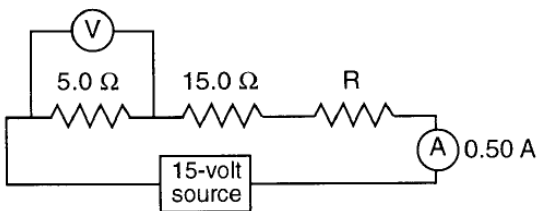
- v. circuit 5



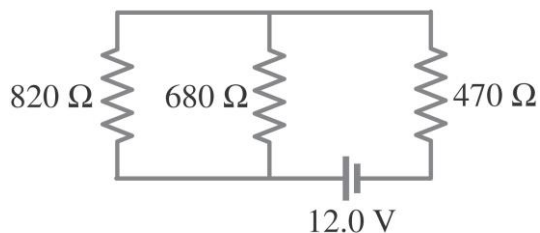
4. Three identical resistors have an equivalent resistance of 12 ohms when connected in series. What is the equivalent resistance if they are connected in parallel?



5. The diagram above shows a parallel circuit.
- What is the equivalent resistance?
 - What is the current measured by the ammeter?
 - What is the voltage drop across each resistor?
 - What is the current through each resistor?



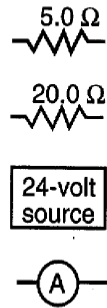
6. Consider the series circuit shown above. A voltmeter and ammeter are connected as shown.
- What reading would the voltmeter show?
 - What is the value of the resistor R?



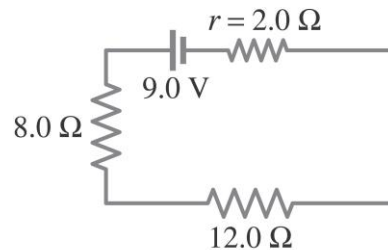
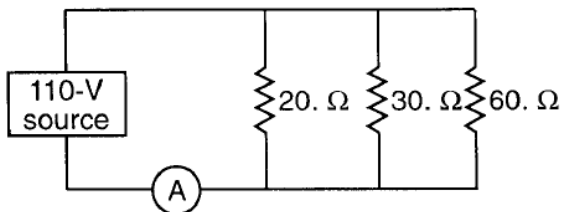
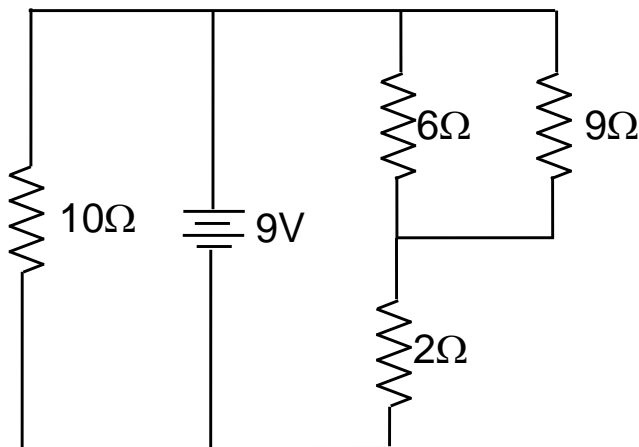
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7. Determine (a) the equivalent resistance of the circuit shown above, (b) the voltage across each resistor, and (c) the current through each resistor.
8. Calculate the terminal voltage for a battery with an internal resistance of 0.90Ω and an emf of 8.50 V when the battery is connected in series with (a) an $81.0\text{-}\Omega$ resistor, and (b) a $810.0\text{-}\Omega$ resistor.
9. What is the internal resistance of a 12.0-V car battery whose terminal voltage drops to 8.4 V when the starter draws 75 A ? What is the resistance of the starter?

10. A 5.0-ohm resistor, a 20.0-ohm resistor, and a 24-volt source of potential difference are connected in parallel. A single ammeter is placed in the circuit to read the total current.
- On the diagram below, draw in wires connecting the components shown to make a complete circuit that will function as described above.



- Determine the total resistance.
 - Determine the total current measured by the ammeter.
11. Three 240-Ω resistors can be connected together in four different ways, making combinations of series and/or parallel circuits. What are these four ways, and what is the net resistance in each case?
12. Complete a V-I-R chart for the circuit shown below.



13. Three resistors are connected in parallel as shown above. What is the total power dissipated?
14. Three resistors are connected in series as shown above. What is the total power dissipated?