

Class 7 Solutions Science Chapter 3 Electricity: Circuits and their Components

Let Us Enhance Our Learning

Q1. Choose the incorrect statement.

(i) A switch is the source of electric current in a circuit.

Ans: Incorrect.

A switch does not generate electric current; it only controls the flow of current by opening or closing the circuit.

(ii) A switch helps to complete or break the circuit.

Ans: Correct.

A switch controls the flow of electricity by either closing or opening a circuit, depending on whether it is in the "ON" or "OFF" position.

(iii) A switch helps us to use electricity as per our requirement.

Ans: Correct.

A switch allows us to control the use of electricity by turning devices "ON" or "OFF".

(iv) When the switch is in 'OFF' position, there is an air gap between its terminals.

Ans: Correct.

In the 'OFF' position, the switch opens the circuit, creating a gap that stops the current from flowing.

Q2. Observe Fig. 3.16. With which material connected between the ends A and B, the lamp will not glow?

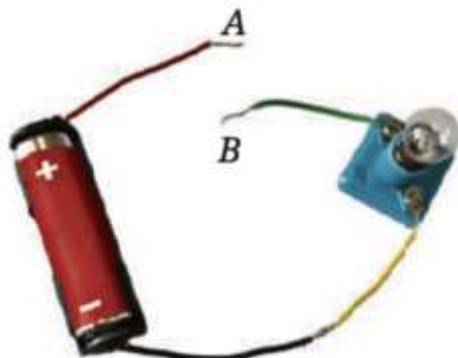


Fig. 3.16

Ans: The lamp will not glow if the material between the ends A and B is an **insulator** (like rubber, plastic, or wood). These materials do not allow electricity to flow through them.



Q3. In Fig. 3.17, if the filament of one of the lamps is broken, will the other glow? Justify your answer.

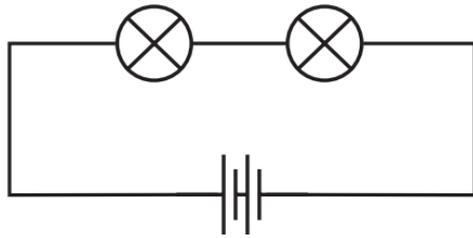


Fig. 3.17

Ans: No, the other lamp will not glow if the filament of one lamp is broken.

- If the filament of **one lamp breaks**, it creates a **gap in the circuit**.
- This gap means that the path for the **electric current** is interrupted. When there's a break in the circuit, the **current cannot flow** through it anymore.
- Even though the other lamp might be perfectly fine, it **won't glow** because no electricity is reaching it due to the broken connection.

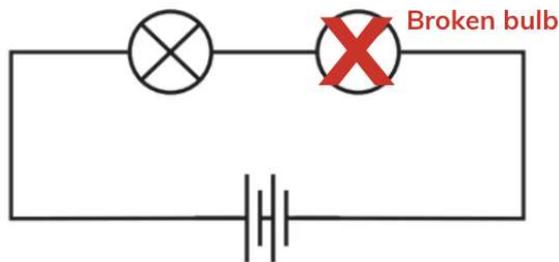


Fig. 3.17

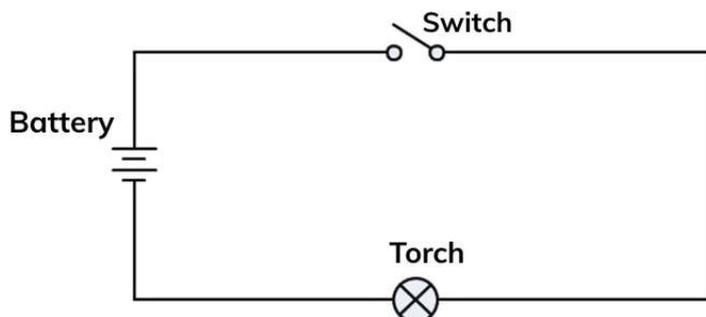
Q4. A student forgot to remove the insulator covering from the connecting wires while making a circuit. If the lamp and the cell are working properly, will the lamp glow?

Ans: No, the lamp will not glow because the **insulator** prevents the electric current from passing through the wire, which is necessary for the lamp to glow.

To make the circuit work and the lamp glow, you need to **remove the insulation** from the parts of the wire that connect to the cell and the lamp. This will allow the electricity to flow and make the lamp light up!

Q5. Draw a circuit diagram for a simple torch using symbols for electric components.

Ans: A simple torch circuit can be represented as:



This is a simple series circuit where the battery provides power, the switch controls the current, and the lamp glows when the current flows.

Q6. In Fig. 3.18:

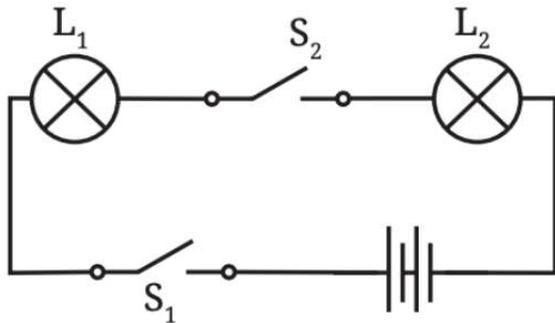


Fig. 3.18

(i) If S2 is in 'ON' position, S1 is in 'OFF' position, which lamp(s) will glow?

Ans: Neither lamp will glow because both switch 1 is open.

(ii) If S2 is in 'OFF' position, S1 is in 'ON' position, which lamp(s) will glow?

Ans: Neither lamp will glow because both switch 2 is open.

(iii) If S1 and S2 both are in 'ON' position, which lamp(s) will glow?

Ans: Both Lamp 1 and Lamp 2 will glow, as both switches are closed, allowing current to flow to both lamps.

(iv) If both S1 and S2 are in 'OFF' position, which lamp(s) will glow?

Ans: Neither lamp will glow because both switches are open, preventing current flow.

Q7. Vidyut has made the circuit as shown in Fig. 3.19. Even after closing the circuit, the lamp does not glow. What can be the possible reasons? List as many possible reasons as you can for this faulty operation. What will you do to find out why the lamp did not glow?



Fig. 3.19

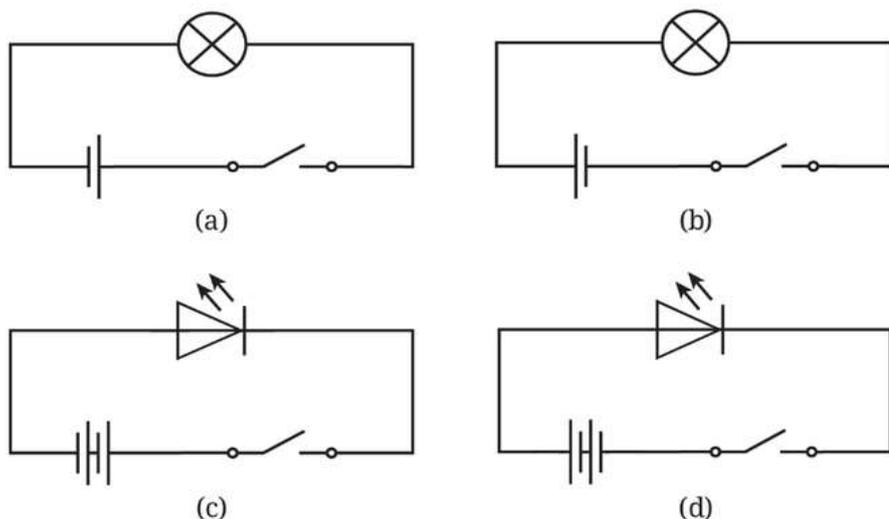
Ans: Possible reasons:

- **Broken filament** in the lamp (if it's an incandescent lamp).
- **Loose connections** or poor contact in the circuit.
- **Dead battery** or improper placement of battery terminals.
- **Wires not properly connected** to the lamp or battery.
- **Open circuit** due to a faulty switch or a disconnected part of the circuit.

To find out why the lamp did not glow, one should:

- Check the lamp for a broken filament.
- Ensure all connections are secure.
- Test the battery using a simple tester to ensure it is working.
- Verify that the switch is in the 'ON' position.
- Check the wiring to ensure proper electrical contact.

Q8. In Fig. 3.20, in which case(s) the lamp will not glow when the switch is closed?



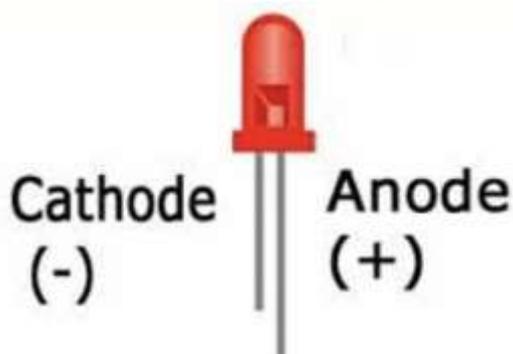
Ans: Case (a), (b), and (d) will glow when switch will be closed but Case (c) will not glow because the **negative terminal** of the battery is connected to the **positive terminal** of the LED, meaning the LED is reverse-connected. In this case, **no current will flow** through the LED, and it will remain **off**.

Q9. Suppose the '+' and '-' symbols cannot be read on a battery. Suggest a method to identify the two terminals of this battery.

Ans: To check which end of battery is positive and which is negative:

LED Identification: An LED has two leads:

- **Longer lead:** This is the **positive** terminal (anode).
- **Shorter lead:** This is the **negative** terminal (cathode).



Connect the Battery: Connect the battery's terminals to the LED's leads:

- Connect the **longer lead** of the LED to the **one end** of the battery and shorter end of LED to the other end.

Observation:

- The LED will **glow** only when the **longer lead** is connected to the **positive terminal** of the battery and the **shorter lead** to the **negative terminal**.



- If the LED **doesn't glow**, it means the leads are connected in reverse. You can swap the connections to test.

Q10. You are given six cells marked A, B, C, D, E, and F. Some of these are working and some are not. Design an activity to identify which of them are working.

(i) Items required:

- Electric lamp.
- Wires.
- Cell holders.
- Cells A, B, C, D, E, F.

(ii) Procedure:

- Connect each cell one by one in the circuit with the lamp.
- Observe if the lamp glows.
- Record which cells cause the lamp to glow.

(iii) Activity to identify the working cells:

- Test each cell individually in the circuit.
- Mark the cells that cause the lamp to glow as working, and those that don't glow the lamp as non-working.

Q11. An LED requires two cells in series to glow. Tanya made the circuit as shown in Fig. 3.21. Will the lamp glow? If not, draw the wires for correct connections.

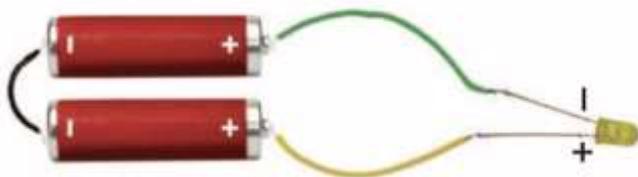


Fig. 3.21

Ans: No, the LED will not glow if the cells are not connected in the correct polarity. To make the LED glow, the **positive terminal of the battery** should be connected to the **positive terminal of the LED** (longer wire), and the **negative terminal of the battery** should be connected to the **negative terminal of the LED** (shorter wire).

Corrected connections

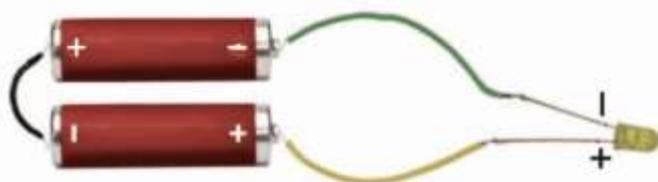


Fig. 3.21