

CHAPTER 3

Electricity Circuits and their Components

VEDA
ACADEMY

CLASS 7TH

NCERT SOLUTIONS - SCIENCE



P1



P2

1. Choose the incorrect statement.

- (i) A switch is the source of electric current in a circuit.
- (ii) A switch helps to complete or break the circuit.
- (iii) A switch helps us to use electricity as per our requirement.
- (iv) When the switch is in 'OFF' position, there is an air gap between its terminals.

ANSWER

(i) Incorrect.

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

(ii) 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) Correct.

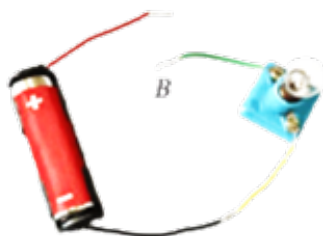
A switch allows us to control the use of electricity by turning devices "ON" or "OFF".

(iv) Correct.

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

2. Observe the Figure. With which material connected between the ends A and B, the lamp will not glow?

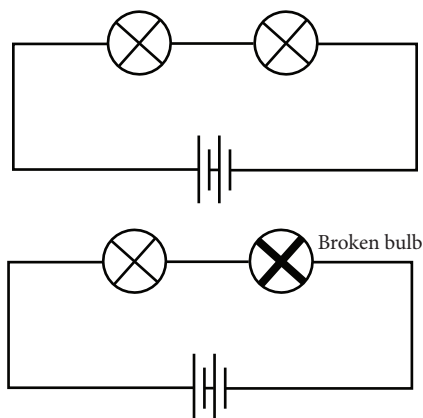
ANSWER



- 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.



3. In Figure, if the filament of one of the lamps is broken, will the other glow? Justify your answer.



ANSWER

- 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.

4. 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?

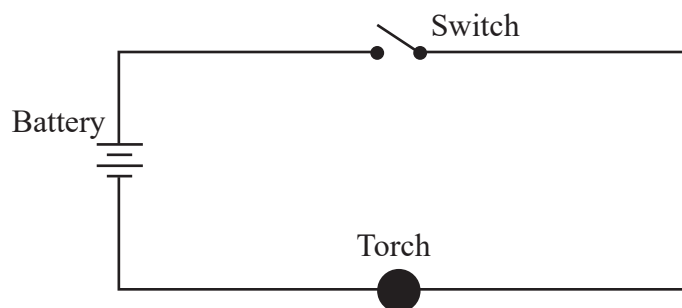
ANSWER

- 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.

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

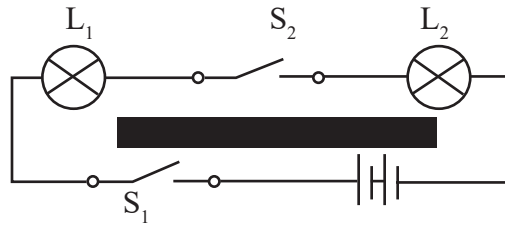
ANSWER

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.

6. In Fig. 3.18:



- If S_2 is in 'ON' position, S_1 is in 'OFF' position, which lamp(s) will glow?
- If S_2 is in 'OFF' position, S_1 is in 'ON' position, which lamp(s) will glow?
- If S_1 and S_2 both are in 'ON' position, which lamp(s) will glow?
- If both S_1 and S_2 are in 'OFF' position, which lamp(s) will glow?

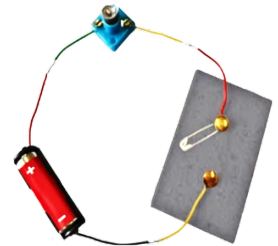
ANSWER

- Neither lamp will glow because both switch 1 is open.
- Neither lamp will glow because both switch 2 is open.
- Both Lamp 1 and Lamp 2 will glow, as both switches are closed, allowing current to flow to both lamps.
- Neither lamp will glow because both switches are open, preventing current flow.

7. Vidyut has made the circuit as shown in Figure. 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?

ANSWER

- 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.

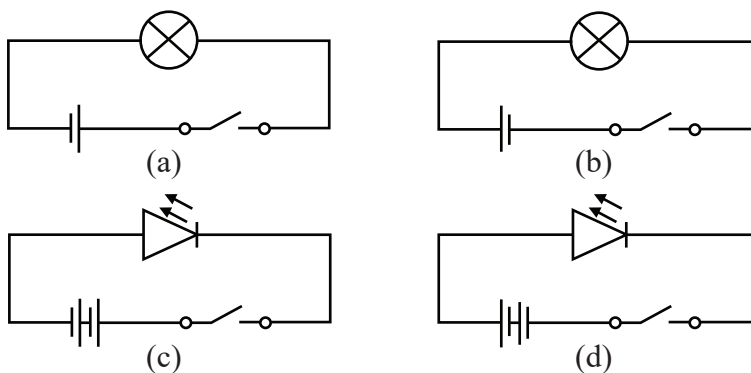


To find out why the lamp did not glow, one should:

- 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.



8. In Figure, in which case(s) the lamp will not glow when the switch is closed?



ANSWER

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.

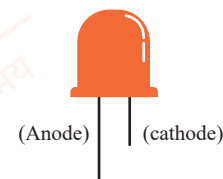
9. Suppose the '+' and '-' symbols cannot be read on a battery. Suggest a method to identify the two terminals of this battery.

ANSWER

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.

10. 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) List the items that you require.
- (ii) Write the procedure that you will follow.
- (iii) With the items, carry out the activity to identify the cells that are working.



ANSWER

(i) Items Required:

1. Light bulb
2. Wires
3. Cells (A, B, C, D, E, F)

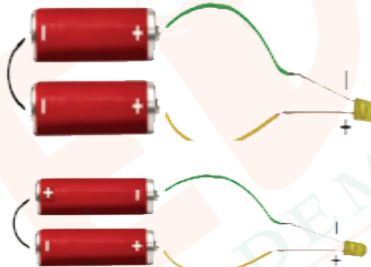
(ii) Procedure:

1. Connect the light bulb to one cell.
2. Check if the bulb glows. If it does, the cell is working.
3. Repeat the process for each cell (A, B, C, D, E, F).

(iii) Carrying Out the Activity:

1. Connect each cell one by one to the bulb.
2. The cells that make the bulb glow are working, and the ones that do not working

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

**ANSWER**

- The LED bulb will glow when the longer wire i.e., the positive terminal of LED is connected with positive terminal of battery and shorter wire i.e., the negative terminal of LED is connected with negative terminal of battery.
- According to the given connection the LED will not glow, as negative terminal of LED is connected with positive terminal of battery.

