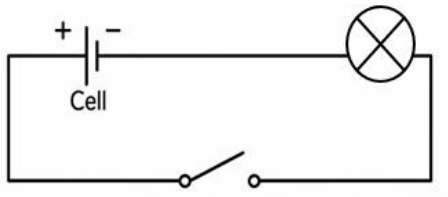
INDIAN SCHOOL AL WADI AL KABIR		
Class: VII	**DEPARTMENT: SCIENCE 2026-27**	**DATE: 14-11-2026**
WORKSHEET NO: 9 WITH ANSWERS	**TOPIC: ELECTRICITY: CIRCUITS AND THEIR COMPONENTS**	**NOTE: A4 FILE FORMAT**
CLASS & SEC:	**NAME OF THE STUDENT:**	**ROLL NO.**

I. OBJECTIVE-TYPE QUESTIONS (1M):

1. A student examines a standard cylindrical electric cell used in a torchlight to determine its polarity before inserting it into a circuit. Which of the following correctly identifies the terminals of the cell?

(a) The metal cap is negative (–ve), and the flat metal disc is positive (+ve)
(b) The metal cap is positive (+ve), and the flat metal disc is negative (–ve)
(c) Both ends can act as either positive or negative interchangeably
(d) The cylindrical curved surface is the positive terminal

2. A picture shows an electric bulb with a broken filament. Even after connecting the bulb to a complete circuit, the bulb does not glow. Why?
(a) The switch is connected in parallel.
(b) The bulb filament is broken.
(c) The connecting wires are short.
(d) The cell is placed inside the bulb.



3. Under a magnifying lens, a student inspects an unlit torch bulb and identifies a very thin, coiled wire supported by two thicker wires. What is this thin wire called, and what happens to it when the circuit is switched ON?

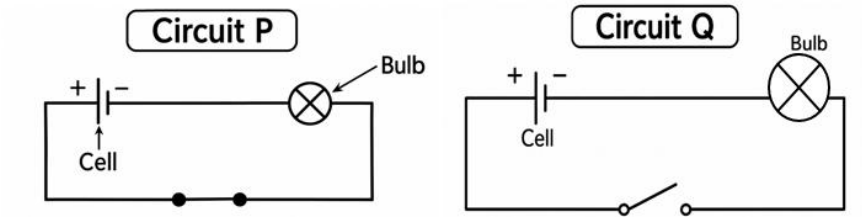
(a) Metal tip; it conducts current without changing temperature.
(b) Insulator; it prevents current from leaking to the glass bulb.
(c) Filament; it gets hot and glows to emit light.
(d) Terminal; it rotates to connect the thicker wires.

4. A DIY switch is constructed using a small cardboard piece, two brass drawing pins, and a metal safety pin pinned through one end. What occurs when the safety pin is rotated so that its free end touches the second drawing pin?

(a) The circuit becomes "open," and current stops flowing.
(b) The circuit is in the "OFF" position because a short circuit forms.

(c) The drawing pins act as insulators and block the current.
(d) The circuit becomes "closed" (ON position), completing the path for current to flow.

5. Two circuits, P and Q, are shown below. In circuit P, the bulb glows, but in circuit Q it does not. What could be the most probable reason?



(a) Circuit Q has a switch.
(b) Circuit Q is an open circuit.
(c) Circuit Q uses copper wires.
(d) Circuit Q has a longer wire.

6. Which of the following is the safest practice while handling electrical appliances?

(a) Touching switches with wet hands
(b) Inserting metal objects into sockets
(c) Using damaged electrical wires
(d) Keeping hands dry while operating switches

7. Which of the following correctly explains why rubber is used to cover electric wires?

(a) Rubber is an insulator and prevents electric shock.
(b) Rubber increases electric current.
(c) Rubber is shiny and attractive.
(d) Rubber is a good conductor.

For the following questions, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (A), (B), (C), and (D) as given below

(A) Both A and R are true, and R is the correct explanation of the assertion.
(B) Both A and R are true, but R is not the correct explanation of the assertion.
(C) A is true, but R is false.
(D) A is false, but R is true.

8**. Assertion (A):** An incandescent torch bulb fails to light up when its filament is broken.
Reason (R): A broken filament creates a break in the circuit, which prevents electric current from flowing in a complete path.

9. **Assertion (A):** An LED lights up only when connected in one specific direction to a battery.

Reason (R): An LED emits light when current passes through its thin filament wire.

10**. Assertion (A):** Connecting wires are made of copper metal and covered with an outer layer of plastic or rubber.

Reason (R): Copper is an electrical conductor that carries current, while plastic and rubber are insulators that protect people from dangerous electric shocks.

II. VERY SHORT ANSWER TYPE QUESTIONS (2M):

1. What is a battery, and why are multiple cells connected in devices?

[Hint: A combination of two or more cells is called a battery. Connecting more than one cell (multiple cells) provides energy to the circuit for a longer time, delivers more energy, or both.]

2. How is the filament supported and connected to the terminals inside an incandescent lamp?

[Hint: The filament is supported by two thicker wires inside the bulb. One thick wire connects to the metal case at the lamp's base, while the other connects to the metal tip at the centre of the base.]

3. What is the function of a switch in a circuit?

[Hint: A switch is used to complete (ON) or break (OFF) the circuit, thereby controlling the flow of electric current.]

4. What is the purpose of using a cell holder in a circuit?

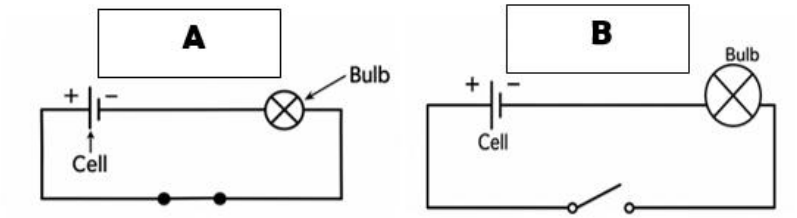
[Hint: The purpose of using a cell holder in a circuit is to securely hold the cell in place and provide proper electrical contact.]

5. Why are standard symbols used to draw in a circuit diagram?

[Hint: Using standard symbols makes circuits easier to draw and understand, enabling people across different countries and industries to interpret them uniformly.]

III. SHORT ANSWER TYPE QUESTIONS: (3M)

1. Identify the types of circuits shown below and write the difference between them.



[Hint: A: Closed circuit: When the switch is in the 'ON position, the circuit from the positive terminal of the battery to the negative terminal is complete. This circuit is said to be closed.

B: Open circuit: When the switch is in the 'OFF' position, the circuit is incomplete. It is said to be open.]

2. Why are electrical connecting wires made of copper on the inside and covered with plastic or rubber on the outside?

[Hint: Inner core: Copper is an excellent conductor with an abundant supply and lower cost, allowing electric current to flow easily.

Outer cover: Plastic and rubber are electrical insulators that cover the metal to protect people from dangerous electric shocks.]

3. Draw neat and well-labelled circuit diagrams using appropriate electrical symbols to show:
   (i) an electrical circuit with an incandescent lamp in the OFF position, and
   (ii) an electrical circuit with an LED lamp glowing.

Hint:

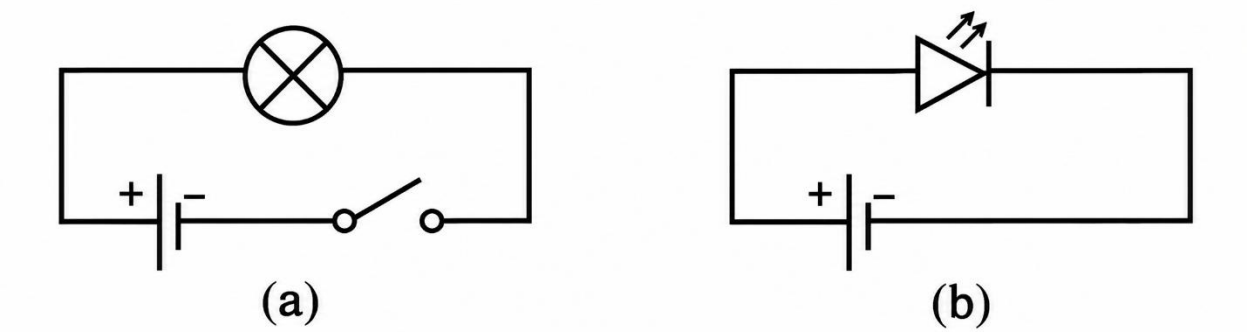


Fig. 3.14: A circuit diagram *(a)* with an incandescent lamp *(b)* with an LED lamp

4. State a few precautions that should be taken when working with electric circuits. (WB SAQ)

[Hint:

- **Ensure wires are properly connected and insulation is removed.**
- **Do not touch bare wires when the circuit is on.**
- **Use proper switches to control current.**
- **Use dry hands (with gloves) to prevent electric shock.]**

5. Explain the difference between an LED and an incandescent lamp. (WBQ LAQ)

[Hint: An LED has two terminals; one is positive (the longer wire), and the other is negative (the shorter wire). Electric current can pass through an LED in one direction only. In an incandescent electric lamp, there is a thin wire called the filament, which gets hot and glows to produce light when electric current passes through it.]

IV. LONG ANSWER TYPE QUESTIONS. (5M)

1. Describe how to make a simple switch. (WB LAQ)

[Hint: To make a simple switch, the following materials are needed: Two drawing pins, a safety pin (or a paper clip), two lengths of connecting wire and a small piece of cardboard.

Procedure: a) Insert one drawing pin through the small ring at the base of the safety pin and fix it into the cardboard piece, making sure the safety pin can rotate freely.

b) Press the second drawing pin into the cardboard at a distance where the free, swinging end of the safety pin can easily touch it.

c) Connect one connecting wire to each of the two drawing pins. The simple switch is now ready to be connected into a circuit.

When the safety pin is rotated so that its free end touches the second drawing pin, it bridges the gap between the pins and completes the path and forms a closed circuit.

When the safety pin is rotated away so that it no longer touches the second drawing pin, a gap is created between the contacts. This gap prevents electric current from flowing and thus forms an open circuit.]

V. SOURCE-BASED/ CASE STUDY-BASED QUESTIONS

An electric cell is a portable source of electrical energy. Every cell has two terminals: the small protruding metal cap serves as the positive (+ve) terminal, while the flat metal disc at the base serves as the negative (–ve) terminal. To power devices that require more energy or longer operating time, two or more cells can be joined together to form a battery by connecting the positive terminal of one cell to the negative terminal of the next. When these terminals are connected using metal wires to an incandescent lamp, they form an electrical circuit that provides a continuous path for electric current. In a closed circuit, electric current flows from the positive

terminal to the negative terminal of the cell, passing through a very thin wire inside the glass bulb called the filament. As current passes through, the filament gets hot and glows to produce light. However, if the filament snaps, the lamp is said to be "fused," creating a gap in the circuit that halts the flow of current and prevents the bulb from lighting up.

i. What are the two terminals of an electric cell?
[Hint: An electric cell has two terminals: a metal cap, the positive (+ve) terminal and a metal disc, the negative (–ve) terminal.]

ii. What is an electrical circuit?
[Hint: An electrical circuit is a continuous path through which electric current flows.]

iii. What happens to the filament when electric current passes through it?
[Hint: The filament becomes hot and glows, producing light.]

ANSWERS FOR OBJECTIVE TYPE QUESTIONS [1 to 10]:

1. (b) The metal cap is positive (+ve), and the flat metal disc is negative (–ve).
2. (b) The bulb filament is broken.
3. (c) Filament; it gets hot and glows to emit light.
4. (d) The circuit becomes "closed" (ON position), completing the path for current to flow
5. (b) Circuit Q is an open circuit.
6. (d) Keeping hands dry while operating switches.
7. (a) Rubber is an insulator and prevents electric shock.
8. (A) Both A and R are true, and R is the correct explanation of the assertion.
9. (C) A is true, but R is false.
10. (A) Both A and R are true, and R is the correct explanation of the assertion.

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