

## Electric Current and Its Effects

### In text Questions

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**1. If cells are placed side by side. Then, how are the terminals of the cells connected?**

**Ans.** If cells are placed side by side, then with the help of some connecting wires, the positive terminal of one cell is connected to the negative terminal of other to produce a combined power of all cells, which can be called a battery.

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**2. Batteries used in tractors, trucks and inverters are also made from cells. Then, why it is called a battery?**

**Ans.** As we know the cell is the unit of battery when more than one cell are combined together, it forms a battery. In trucks, tractors and inverters, cells are internally arranged and we need not to connect it externally, so we called it as batteries.

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**3. If the filament of the bulb is broken, would the circuit be complete? Would the bulb still glow?**

**Ans.** If the filament of the bulb is broken, the circuit will not be complete as the current from one side does not flow to other side. So, the bulb will not glow.

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**4. Name some electric appliances where the heating effect of the electric current is used.**

**Ans.** Some of the electric appliances where the heating effect of the electric current is used are electric heater, geyser, micro-oven, room heater, boiler, etc.

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**5. Does the electric current have other effect except heating? Name it.**

**Ans.** Yes, electric current have other effect except heating, i.e. magnetic effect of current. When electric current is passed through a coil, there is a magnetic field developed around the coil or wire, if magnetic compass is placed near by, it deflects the magnetic needle.

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**6. When the current flows through wire, does the wire behave like a magnet?**

**Ans.** When the current flows through any wire, a magnetic field is developed around that wire or coil and it behaves like a magnet. It can be analyzed by placing a magnetic compass around the wire, it will show deflection of the needle.

**7. When current is passed through a coil, does the pins cling to the coil?**

**Ans.** When an electric current is passed through a coil, it gets magnetized due to phenomena of magnetic effect of current.

When magnetic materials such as pins are placed near, to it. It, gets attracted by the coil or we can say that pins cling to the coil.

**8. When the current through the coil stops flowing. Will the coil remain an electromagnet?**

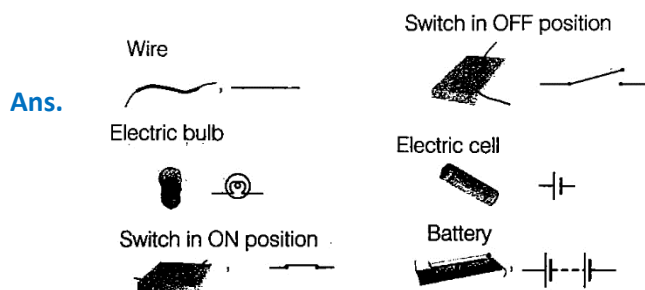
**Ans.** When the current through the coil stops flowing, the coil does not remain an electromagnet. As, from the concept of magnetic effect of current, magnetization of the coil only persists till the current flows through it. As soon as circuit breaks the magnetic property of the coil disappears and the coils do not remain an electromagnet.

# **NCERT** **Exercises** (Questions-Solutions)

## Exercises

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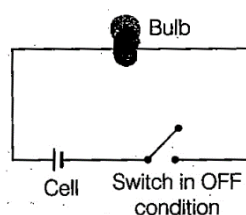
1. Draw the symbols in your notebook to represent the following components of electrical circuits: connecting wires, switch in the OFF position, bulb, cell, switch in the ON position and battery.



2. Draw the circuit diagram to represents the circuit shown in figure.



**Ans.** Complete circuit is shown as below:



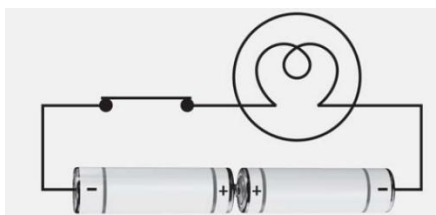
3. Figure shows four cells fixed on a board. Draw lines to indicate how will you connect their terminals with wires to make a battery of four cells?



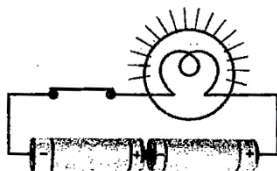
**Ans.** To connect all the cells, we should join negative terminal of one cell to positive terminal of other.



4. The bulb in the circuit shown in figure does not glow. Can you identify the problem? Make necessary changes in the circuit to make the bulb glow.



- Ans. Since the two cells are connected with the positive terminal in one side. This can be corrected by joining the negative terminal of one cell to the positive terminal of other cell as shown in figure.



5. Name any two effects of electric current.

- Ans. The two effects of electric current are  
(i) Heating effect (ii) Magnetic effect

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6. When the current is switched ON through a wire, a compass needle kept nearby gets deflected from its North-South position. Explain.

- Ans. When the current is switched ON through a wire or a coil, there is a magnetic field created around the coil or wire and we can say that the wire or coil gets magnetised. Thus, a compass needle kept nearby gets deflected from its North-South position due to other magnet formed by current carrying wire or coil.

7. Will the compass needle show deflection, when the switch in the circuit shown by figure is closed?



- Ans. Yes, the compass needle shows the deflection, when switch is closed or circuit is complete. On closing the circuit, current flows through the coil and it gets magnetised. Thus, due to this magnetic effect of current, compass needle shows deflection.

8. Fill in the blanks:

- (a) Longer line in the symbol for a cell represents its ..... terminal.  
(b) The combination of two or more cells is called a .....  
(c) When current is switched ON in a room heater, it  
(d) The safety device based on the heating effect of electric current is called a .....

- Ans.** (a) positive (b) battery  
(c) gets heated (d) fuse wire

**9.** Mark "T", if the statement is True and "F", if it is False:

(a) To make a battery of two cells, the negative terminal of one cell is connected to the negative terminal of the other cell.

(b) When the electric current through the fuse exceeds a certain limit, the fuse wire melts and breaks.

(c) An electromagnet does not attract a piece of iron.

(d) An electric bell has an electromagnet.

- Ans.** (a) False (F), to make a battery of two cells, the negative terminal of one cell is connected to the positive terminal of the other cell.  
(b) True (T)  
(c) False (F), as an electromagnet attracts magnetic material.  
(d) True (T)

**10.** Do you think an electromagnet can be used for separating plastic bags from a garbage heap? Explain.

- Ans.** No, an electromagnet cannot be used for separating plastic bags from a garbage heap because plastic bags are not magnetic materials.  
Only magnetic materials can be attracted by the magnet, so plastic bags do not get attracted by the magnet.

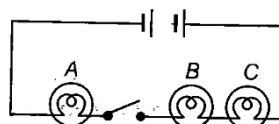
**11.** An electrician is carrying out some repairs in your house. He wants to replace a fuse by a piece of wire. Would you agree? Give reasons for your response.

- Ans.** No, we should not agree for replacing a fuse by a piece of wire. As we know that fuse wire is made up of special material which can be melt on passing high amount of current or during any short circuit. If it is replaced by some other wire, melting of fuse may not take place on short circuiting or excessive current flow and it may cause fire.

**12.** Zubeda made an electric circuit using a cell holder shown in figure, a switch and a bulb. When she put the switch in the ON position, the bulb did not glow. Help Zubeda in identifying the possible defects in the circuit.

- Ans.** These may be the reasons by which bulb will not glow:  
(i) Zubeda may have arranged the cells not in a particular manner, i.e. terminals of cell may not be in alternate form.  
(ii) May be the bulb used by Zubeda is fused one.  
(iii) May be the connecting wire in cell holder is not attached prop

**13.** In the circuit shown in figure:



(a) Would any of the bulb glow, when the switch is in the OFF position?

(b) What will be the order in which the bulbs A, B and C will glow, when the switch is moved to the ON position?

- Ans.** (a) Any of the bulb will not glow when the switch is in the OFF position because circuit is not complete.  
(b) All the bulbs glow simultaneously as the switch is moved to the ON position.



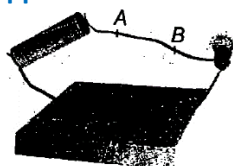
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## Exemplar

(Problems-Solutions)

### Multiple Choice Questions

1. When an electric current flows through a copper wire AB as shown in figure, the wire

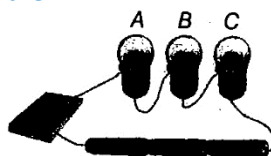


- (a) deflects a magnetic needle placed near
- (b) becomes red hot
- (c) gives electric shock
- (d) behaves like a fuse

**Ans.** (a) It deflects a magnetic needle placed near it because a magnetic field is created near the current carrying wire.

2. Three bulbs A, B and C are connected in a circuit as shown in figure. When the switch is ON

- (a) bulb C will glow first
- (b) bulbs B and C will glow simultaneously and bulb A will glow after sometime
- (c) all the bulbs A, B and C will glow at the same time
- (d) the bulbs will glow in the order A, B and C



**Ans.** (c) All the bulbs glow simultaneously because there is no time lag in the flow of current as soon as circuit is complete.

3. When a switch is in OFF position, circuit starting from the positive terminal of the cell stops at the switch

- (i) circuit is open
- (ii) circuit is open
- (iii) no current flows through it
- (iv) current flows after sometime

Choose the combination of correct answer from the following.

- (a) All-are correct
- (b) (ii) and (iii) are correct
- (c) Only (iv) is correct
- (d) (i) and (ii) are correct

**Ans.** (b) When switch is in OFF position, circuit is open and no current flows through it.

4. Which of the following precautions need not be taken while using electric gadgets/ appliances/circuit?

- (a) We should never touch a lighted electric bulb connected to the mains
- (b) We should never experiment with the electric supply from the mains or a generator or an inverter
- (c) We should never use just any wire or strip of metal in place of a fuse
- (d) We should never turn the switch in ON position

**Ans.** (d) We should never turn the switch in ON position

### Very Short Answer Type Questions

**5. Which property of a conducting wire is utilized in making electric fuse?**

**Ans.** Electric fuse wire is made up of special material which has low melting point. As .if high amount of current is passed, it melts to disconnect the electric circuit and prevent us from causing any damage.

**6. Name the device used these days in place of electric fuses in electrical circuits.**

**Ans.** The device used in these days in place of electric fuse is MCB (Miniature Circuit Breaker). It auto disconnects the circuit, when there is a short circuit or excess current flow.

**7. Fill in the blanks:**

(a) Our body is a ..... of electricity.

(b) An electric cell produces electricity from the ..... in it.

(c) In an electric circuit, a fuse is a ..... to prevent possible fire.

(d) A combination of two or more cells is called a ..... .

**Ans.** (a) good conductor (b) chemicals stored  
(c) safety device (d) battery

**8. Unscramble the following words:**

(a) TBTAYER

(b) SFEU

(c) HTRCO

(d) HICWTS

**Ans.** (a) BATTERY (b) FUSE  
(c) TORCH (d) SWITCH

**9. Paheli does not have a night lamp in her room. She covered the bulb of her room with a towel in the night to get dim light. Has she taken the right step? Give one reason to justify your answer.**

**Ans.** No, she has not taken the right step. Because due to excessive heat of bulb, the towel may burn and it also results in the wastage of electrical energy.

**10. Why are CFLs (Compact Fluorescent Lamps) preferred over electric bulbs?**

**Ans.** Compact fluorescent lamps are preferred over electric bulbs because electric bulbs use more power of electricity and it also losses electrical energy in the form of heat but it is not so in compact fluorescent lamps.

**11. Why is an electric fuse required in all electrical appliances?**

**Ans.** Electric fuse is required in all electrical appliances to prevent damage from excessive current flow and during short circuit.

### Short Answer Type Questions

**12. Can we use the same fuse in a geyser and a television set? Explain.**

**Ans.** No, we cannot use same fuse in a geyser and in a television set because the fuse used in every appliances has some limit to withstand the current flows through it. So, different appliances have different fuses.

**13. Name two electric devices for each where**

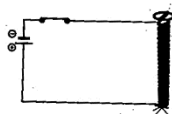
(a) heating effect of current is used and

(b) magnetic effect of current is used.

- Ans.** (a) Heating effect of current is used in electric heater and geyser.  
(b) Magnetic effect of current is used in electric bell and cranes to lift heavy magnetic materials from one place to other.
- 14. Why do we cover plug pinholes which are within the reach of children with cellotape or a plastic cover when not in use?**
- Ans.** We do cover plug pinholes which are within the reach of children with cellotape or plastic cover to avoid electric shocks. If unconsciously, a child puts his finger in the electric socket, the shock may be fatal.
- 15. Boojho made an electromagnet by winding 50 turns of wire over an iron screw. Paheli also made an electromagnet by winding 100 turns over a similar iron screw. Which electromagnet will attract more pins? Given reason.**
- Ans.** Since the magnetic effect directly depends on the number of turns of the coil. As, Paheli's coil has more number of turns than Boojho. So, her electromagnet is stronger than Boojho. So, electromagnet of Paheli attracts more pins as compared to Boojho.

### Long Answer Type Questions

- 16. Your teacher has shown you the following activity.**



- Ans. Activity** Teacher has wound a long insulated piece of wire around an iron nail in the form of a coil. Free ends of the wire are connected to a cell through a switch as shown in the figure. The current is switched on and some pins are placed near the end so of the nail.

- 17. Write down any three questions that come to your mind about this activity.**

**Ans.** Some of the questions which rise are as follows:

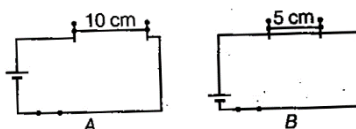
- (i) On disconnecting circuit, why pin gets detached from the nails.
- (ii) What will happen, if we use some other materials accept nails like wood?
- (iii) If more number of turns of wire is wounded over nails, what will happen?

- 18. Paheli took a wire of length 10 cm. Boojho took a wire of 5 cm of the same material and thickness. Both of them connected with wires as shown in the circuit given in figure.**

**The current flowing in both the circuits is the same.**

**(a) Will the heat produced in both the cases be equal? Explain.**

**(b) Will the heat produced be the same, if the wires taken by them are of equal lengths but of different thickness? Explain.**



- Ans.** (a) No, the amount of heat produced in both the wires will be different because amount of heat produced in a wire on passing electric current depends on the length of wire and here length is different for both the wires.  
(b) No, the amount of heat produced in the wire of same length but different thickness cannot be same because amount of heat produced in a wire also depends on the thickness of the wire.



**19. How does the magnetic effect of electric current help in the working of an electric bell? Explain with the help of a diagram.**

**Ans.** As, in the diagram when electric current is passed through the coil or solenoid. By the phenomenon of magnetic effect of current, the coil or solenoid gets magnetized which attracts nearby soft iron armature and the hammer strikes gong repeatedly. Thus, electric bell starts ringing and as soon as switch is OFF, no current flows through the coil and its magnetization stops. So, bell will not work.

ON/OFF switch

