



INDIAN SCHOOL AL WADI AL KABIR



Class: VII	Department: SCIENCE 2022-2023	Date of submission:29.5.22
Worksheet No:3 with answers	Topic: ELECTRIC CURRENT AND IT'S EFFECTS	Note: A 4 FILE FORMAT
NAME OF THE STUDENT:	CLASS & SEC:	ROLL NO.

I. VERY SHORT ANSWER (1M):

1. Name the factors upon which the heat produced in a wire depends. (Hint-Type of material, Length, and thickness of wire)
2. What is a battery? (Hint: A battery is defined as a combination of two or more cells. In a battery, the negative terminal of one cell is connected to the positive terminal of the next cell.)
3. Why copper wire is not used to make the filament of bulbs? (Hint- Its melting point is lower than tungsten and at high temperatures, the copper will melt. Copper wire has very low resistance and the bulb will not glow if electricity is passed through it.)
- 4.. Name the device used these days in place of electric fuses in electrical circuits. (Hint: The device used these days in place of an electric fuse is MCB (Miniature Circuit Breaker). This is a switch that automatically turns off when the current in a circuit exceeds the safe limit.)
5. Why is an electric fuse required in all electrical appliances? (Hint: Electric fuse is required in all electrical appliances to prevent damage from excessive current flow and during short circuits.)
6. What are the filaments of a bulb made up of? (Hint-In a bulb there is a thin wire called the filament made up of tungsten.)
7. Why are fuse wires not provided in an electric circuit containing an electric cell? (Hint- Fuse wire is used to prevent the sudden excess flow of current. The cell provides a current of fixed magnitude. So, fuse wires are not used in circuits containing electric cells.)

8. What are electromagnets? (Hint: An electromagnet is a magnet consisting of a soft iron core with a coil of insulated wire wound around it.)

9. Mention the name of the two devices that work based on of magnetic effects of current. (Hint: The devices that work based on magnetic effects of current are loudspeaker and electric bell.)

10. CFLs (Compact Fluorescent Lamps) are preferred over electric bulbs. Why? {Hint: Electric bulbs use more power of electricity and they also lose electrical energy in the form of heat, but it is not so in compact fluorescent lamps. CFLs thus reduce wastage of electricity and can be fixed in the ordinary bulb holders)

For question numbers 11 to 13, two statements are given- one labelled Assertion (A) and the other labelled Reason (R).

Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below

i) Both A and R are true, and R is the correct explanation of the assertion.

ii) Both A and R are true, but R is not the correct explanation of the assertion.

iii) A is true but R is false.

iv) A is false but R is true

11. **Assertion (A):** Fuse is a safety device that prevents damage to electrical circuits and possible fires.

Reason (R): The fuse wire blows off and breaks the circuit and preventing the fire and damage.

Ans (i) Both A and R are true, and R is the correct explanation of the assertion.

12. **Assertion (A):** Battery is a combination of two cells only.

Reason (R): The positive and negative terminals are generally marked on the cells.

Ans (iv) A is false but R is true.

13. **Assertion (A):** The heating up of a thin conducting wire on passing an electric current through it, is known as the heating effect of current.

Reason(R): Various electrical appliances that are based on the heating effect of current contain a coil of wire called an element.

Ans (ii) Both A and R are true but R is not the correct explanation of the assertion.

II - PASSAGE BASED QUESTIONS:

An electric bell consists of a coil of wire wound on an iron piece. The coil acts as an electromagnet. An iron strip with a hammer at one end is kept close to the electromagnet. There is a contact screw near the iron strip. When the iron strip is in contact with the screw, the current flows through the coil which becomes an electromagnet. It, then pulls the iron strip. In the process, the hammer at the end of the strip strikes the gong of the bell to produce a sound. However, when the electromagnet pulls the iron strip, it also breaks the circuit. The current stops flowing through the coil.

i) Which of the following appliances have an iron strip, a hammer, a contact screw and a gong?

- a) **Electric bell** b) Electric kettle c) Electric bulb d) Electric iron

ii) In an electric bell, which of these gets attracted to the electromagnet?

- a) Hammer **b) Soft iron strip** c) Screw d) none of these.

iii) When electric current passes through a wire, it behaves like a magnet. This is the

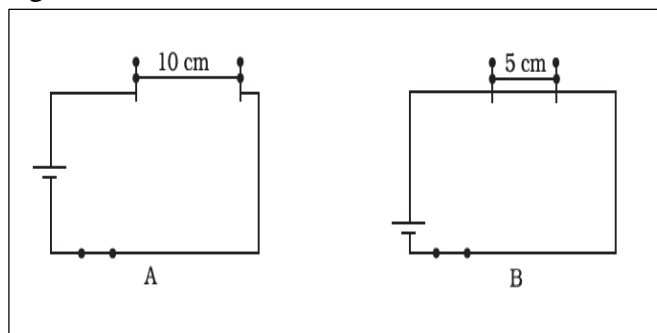
- a) **Magnetic effect of current** b) Electrical effect of current
c) Heating effect of current d) Optical effect of current

iv) Electric Bell works on the principle.

- a) Electrical energy is converted into mechanical energy
b) Electrical energy is converted into sound energy
c) Mechanical energy is converted into sound energy
d) Sound energy is converted into electrical energy

III.CASE STUDY-BASED QUESTIONS:

1. Paheli took a wire of length of 10 cm. Boojho took a wire of 5 cm of the same material and thickness. Both of them connected the wires as shown in the circuit given in the figure given below. The current flowing in both circuits is the same.



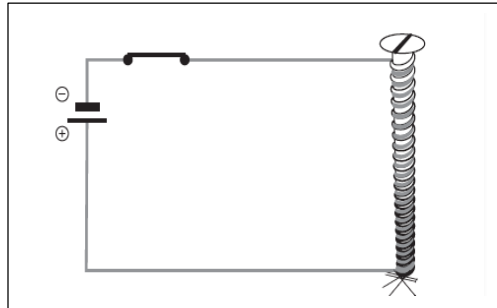
(i) Will the heat produced in both cases be equal? Explain.

(Hint-No, the amount of heat produced in both the wires will be different because the amount of heat produced in a wire on passing electric current depends upon the length of the wire and here length is different for both the wires.)

(ii) Will, the heat produced be the same if the wires taken by them are of equal lengths but of different thicknesses Explain.

(Hint-No, because the amount of heat produced in a wire depends upon the thickness of the wire.)

2. Rohan has wound a long-insulated piece of wire around an iron nail in the form of a coil. The free ends of the wire are connected to a cell through a switch. The current is switched on and some pins are placed near the ends of the nail.



(i) Why does the nail attract the pins?

[Hint: Because iron nail turns to an electromagnet when current flow through it.]

(ii) What will happen if we connect more cells in the circuit?

[Hint: It will attract more pins as the strength of the electromagnet increases.]

(iii) What will happen if we use some other material like a plastic straw in place of the nail?

[Hint: Plastic straw is an insulator so it will not turn into an electromagnet].

IV .a) SHORT ANSWER TYPE QUESTIONS (2 M):

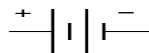
1. Why does the fuse wire have a low melting point? (Hint: A fuse wire has a low melting point. Whenever the current flowing through an electric circuit exceeds the safety limit, the fuse wire heats up and melts down, resulting in a break in the path of current flow. This stops the flow of current in the circuit.)

2. Draw the circuit symbols for:

a) A cell



b) A battery of two cells



c) An open switch



d) a bulb



3. Name two electric devices for each where-

(a) heating effect of current is used and

(b) magnetic effect of current is used

(Hint: (a) Heating effect of current is used in electric iron and geyser. (b) Magnetic effect of current is used in electric bell and cranes to lift heavy magnetic materials from one place to other.)

4. How can the strength of a magnetic field be increased? (Hint: The strength of the magnetic field can be increased: (i) by increasing the number of turns of the coil in the solenoid (ii) by increasing the strength of the electric current passing through the solenoid (iii) by winding the solenoid around a magnetic material)

5. Batteries used in tractors, trucks and inverters are also made from cells. Then why it is called a battery? (Hint: These are called batteries because they are a collection of cells. The cells are not dry. These are the several sets of plates and each set of plates acts like a cell. In trucks, tractors and inverters, cells are internally arranged and we need not connect them externally, so we called them batteries.)

6.(a) Can we use the same fuse in a geyser and a television set? Explain.

[Hint: No, we cannot use the same fuse in a geyser and television because a geyser and a television set require a different amount of current. Therefore, the fuse used in these will be of different ratings.]

(b) Why do we cover plug pinholes which are within the reach of children with cellotape or a plastic cover when not in use?

[Hint: Because the child may put his/her fingers into the socket which results in electric shock which may be fatal.]

IV. b) SHORT ANSWER TYPE QUESTIONS (3 M):

1. Explain how to make a simple electromagnet

(Hint: Take a long piece of Insulated, flexible wire and an iron nail. Wind the wire tightly around the nail in the form of a coil. Connect the free ends of the wire to the terminals of a cell through a switch. When the current is switched on, the iron nail acts like an electromagnet.)

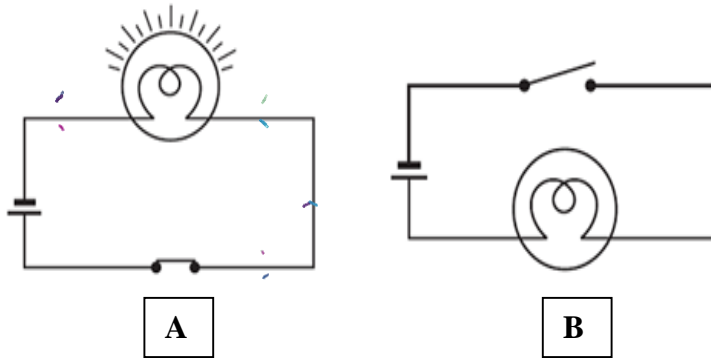
2. What causes short-circuit? (Hint: If the insulation on the wires has come off due to wear and tear, direct touching of wires occurs. This causes a short circuit.)

b. What causes overloading? (Hint: Connecting of many devices to a single socket may cause overload in the circuit.)

3. 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? Give reason.

(Hint: The magnetic effect directly depends on the number of turns of wire on an electromagnet. The electromagnet of Paheli is stronger as it has a greater number of turns of wire on it and will attract more pins.)

4. 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. The 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.)

5. Differentiate between cells in series and cells in parallel

[Hint: The positive terminal of one cell is connected to the negative terminal of the other cell in a row, one after the other is called cells in series connection.

The cells arranged parallel to one other are called cells in parallel connection.]

V.LONG ANSWER TYPE QUESTIONS (5 M):

1. What are MCBs? Write the full form of it.

(Hint: MCBs are safety switches used for the protection of appliances and human beings.

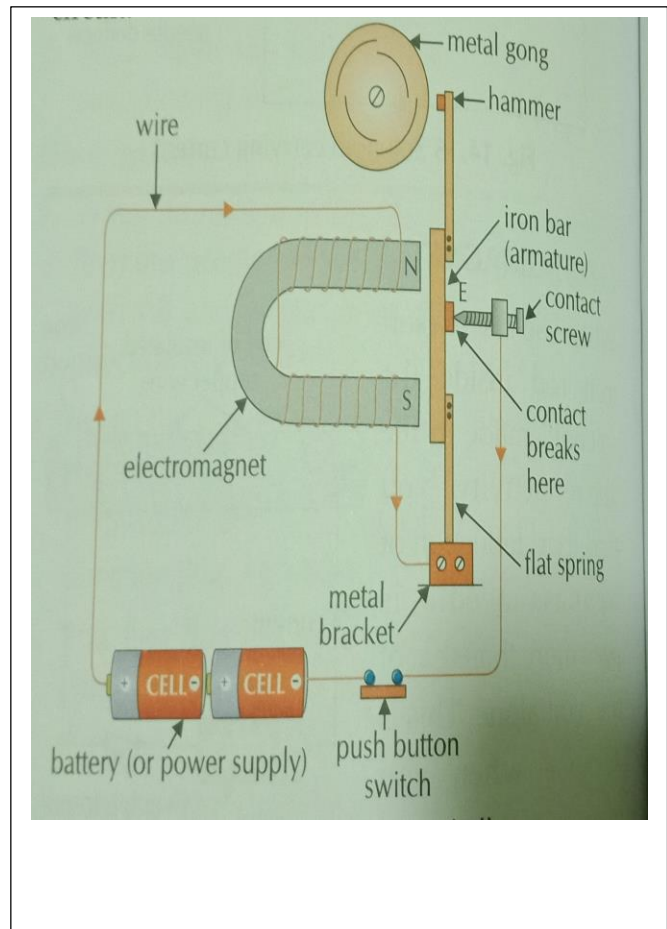
If the current through a circuit exceeds the safety limit, it automatically turns off and

protects the devices connected to the circuit. This automatic turn-off is accomplished by

over-current sensors and temperature sensors along with a relay mechanism. MCBs are a replacement for safety fuses, which were used earlier. MCB stands for Miniature Circuit Breaker.)

2. Briefly explain the construction and working of an electric bell with the help of a labelled diagram.

(Hint: An electric bell works with the help of an electromagnet. It is made up of a coil of wire wound around an iron piece, resembling an electromagnet. When current passes through it, a magnetic field is produced. When the circuit is complete, the hammer of the bell is attracted towards the electromagnet. As the hammer moves towards the electromagnet, the circuit breaks. This stops the electromagnet from attracting the hammer anymore. The hammer comes back to its original position due to the spring effect. While doing so, it touches the metal connector and the circuit is complete again. This cycle continues till the key is kept ON)



3. List five uses of electromagnets (Hint: The uses of electromagnets can be listed as follows:

- (i) Electric motors mainly use electromagnets.
- (ii) They are used in electric bells.
- (iii) Electromagnets are used to lift the loads of iron and steel.
- (iv) They are used in telephones, telegraphs, generators, etc.
- (v) Electromagnets are also used in cranes.)

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