*** Choose the correct alternative from those given below question** [20]

1. An electric current flows through a nichrome wire for a short time.
   (i) The wire becomes warm.
   (ii) A magnetic compass placed below the wire is deflected.
   (A) Only (i) is correct (B) Only (ii) is correct
   (C) Both (i) and (ii) are correct (D) Both (i) and (ii) are not correct

   Ans. : (C) Both (i) and (ii) are correct

2. Nichrome wire is commonly used in electrical heating devices because it
   (A) is a good conductor of electricity.
   (B) generates more heat for a given current.
   (C) is cheaper than copper.
   (D) is an insulator of electricity.

   Ans. : (B) generates more heat for a given current.

3. Heat produced in a heating element on passing current through it depends on:
   (i) Nature of the material of the heating element
   (ii) Thickness of the wires of the element
   (iii) Colour of the element
   (iv) Length of the wire of the element
   Choose the combination of correct answers from the four options above.
   (A) (i) and (ii) only (B) (i), (ii), and (iv) only
   (C) All four are correct (D) (ii) and (iii) only

   Ans. : (B) (i), (ii), and (iv) only

4. The magnetic effect of an electric current generates a magnetic field around the current-carrying coil of a metallic wire
   (A) When the electric current stops flowing through the coil
   (B) When the coil becomes hot due to the heating effect of the electric current
   (C) When the electric current is flowing through the coil
   (D) When the coil is brought near another magnet

   Ans. : (C) When the electric current is flowing through the coil

5. Wires made of which of the following materials is more suitable for showing the heating effects of electric current?
   (A) Copper wire (B) Nichrome (C) Aluminium (D) Silver

   Ans. : (B) Nichrome

6. Which of the following is NOT a drawback of the heating effects of electric current?

(A) Loss of electric energy during transmission

(B) Melting of plastic sockets and plugs due to overheating

(C) Heating of water with an immersion rod

(D) Fires due to electric short circuits

Ans. : (C) Heating of water with an immersion rod

7. Which of the following appliances is based on the magnetic effect of electric current

(A) Electric bell (B) Electric iron (C) Water heater (D) Electric stove

Ans.: (A) Electric bell

8. Voltaic cell uses _____ electrolyte that is why it is not considered as convenient as a dry cell

(A) coloured (B) solid (C) liquid (D) paste

Ans. : (C) liquid

9. In a dry cell, the positive terminal is the metallic tip on top of the carbon rod. Which then is the negative terminal of the cell?

(A) Bottom of the carbon rod

(B) Bottom of the zinc container

(C) The paste of chemicals inside the cell

(D) Carbon rod just below the metallic tip

Ans. : (B) Bottom of the zinc container

10. The strength of the electromagnet depends on:

(A) The nature of the metal used in the coil

(B) Number of turns in the coil

(C) The strength of the current flowing through the coil

(D) All of these

Ans. : (D) All of these

11. The heating effect of the electric current does NOT change with the change in

(A) The nature, length, and thickness of the conductor

(B) Time duration for which the current is passed

(C) Strength of the electric current

(D) Direction of the flow of electric current

Ans. : (D) Direction of the flow of electric current

12. Assertion (A): When electric current flows through a conductor (like a wire), it produces a magnetic field around it. This phenomenon is known as the magnetic effect of electric current.
Reason (R): The magnetic field around a current-carrying conductor can be shown by the deflection of a compass brought near the conductor.

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

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

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

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

13. Assertion (A): Electromagnets do not have poles like the North pole and South pole of a bar magnet.
Reason (R): When we interchange the terminals of the battery in a circuit, the poles of the electromagnet also change positions.

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

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

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

Ans. : (D) (A) is false, but (R) is true.

14. Which of the following appliances is NOT based on the heating effect of electric current?

(A) Electric bell (B) Electric iron (C) Water heater (D) Electric stove

Ans. : self

15. Dry cell uses _____ electrolyte that is why it is considered as a convenient portable source of electricity.

(A) coloured (B) solid (C) liquid (D) Thick,moist paste

Ans. : self

16. In a dry cell, the negative terminal is the bottom of the zinc container. Which is the positive terminal of the cell?

(A) Bottom of the carbon rod

(B) Bottom of the zinc container

(C) The paste of chemicals inside the cell

(D) Metallic tip over the carbon rod.

Ans. : self

17. The strength of the heating effect of electric current depends on:

(A) The nature of the metal used in the coil

(B) Number of turns in the coil

(C) The strength of the current flowing through the coil

(D) All of these

Ans. : self

18. The strength of the electromagnet does NOT change with a change in

(A) The nature and thickness of the conductor

(B) Time duration for which the current is passed

(C) Strength of the electric current

(D) The number of turns in the coil

Ans. : self

19. Assertion (A): When an electric current passes through a conductor, it gets heated. This warming is called the heating effect of electric current.
Reason (R): When electric current flows through any conductor, it faces some opposition or resistance to its flow. This resistance converts some electric energy to heat energy.

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

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

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

Ans. : self

20. Assertion (A): While making elements of heating appliances from wires of materials like nichrome, the length of the wires is increased by making coils of the wire.
Reason (R): The increase in the length of the conducting wire does not change the heating effect of the electric current.

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

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

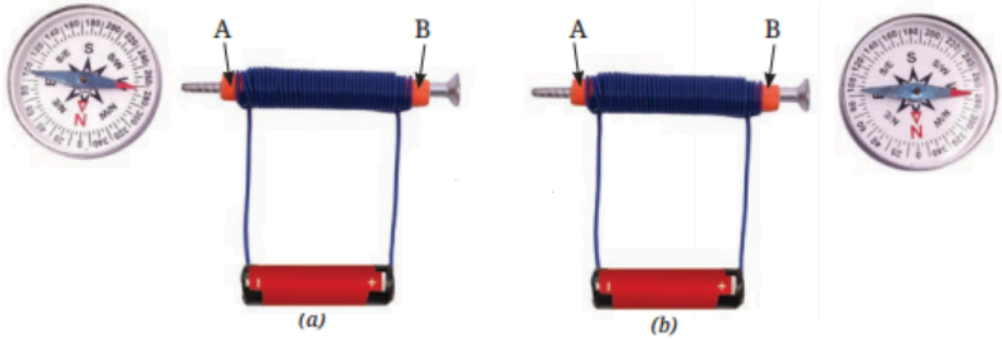
(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

Ans. : self

*** Answer the following as requested in detail.** **[15]**

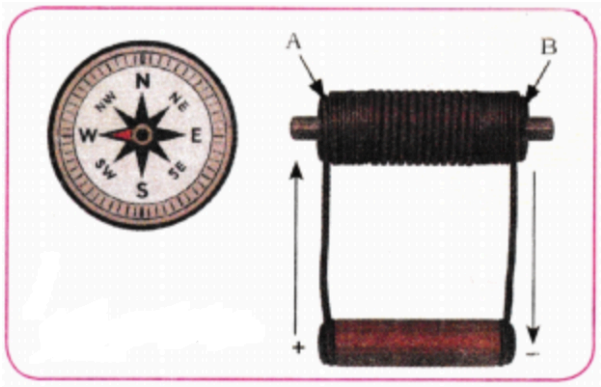
21. Look at the Figure. If the compass is placed near the coil deflects:



Compass needle near (a) End A; (b) End B of an electromagnet

1. Draw an arrow on the diagram to show the path of the electric current.
2. Explain why the compass needle moves when current flows.
3. Predict what would happen to the deflection if you reverse the battery terminals.

Ans. : 1. The current flows from the positive terminal of the cell to end marked A of the coil, then through the coil to end marked B, and then to the negative terminal of the cell as shown by the red arrows in the Figure.

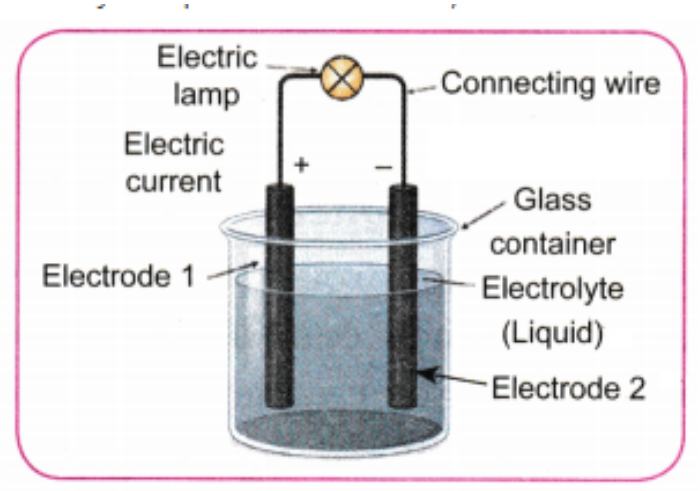


2. The compass needle moves as the coil becomes a magnet on passing the current through it, and the compass needle in its magnetic field moves.

3. When we reverse the battery terminals, the poles of the coil electromagnet change. Therefore, the deflection in the compass needle also changes accordingly. The pole of the compass needle that was earlier attracted to the coil will move away from it, and the other pole of the compass needle will get attracted towards the coil.

22. Explain the Structure of a Voltaic cell.

Ans. : A Voltaic cell is a plastic/glass container that contains two metal plates of two different materials and a liquid called an electrolyte. The metal plates are called electrodes. One of the plates acts as a positive terminal and the other as a negative terminal, and zinc is the negative terminal in a combination of copper and zinc plates, and zinc is the negative terminal in a combination of copper and zinc plates.



The liquid is put in a glass or plastic container, and the metal plates are partly dipped in the electrolyte. The electrolyte is usually a weak acid or a salt solution. A chemical reaction between the plates and the electrolyte produces electricity. When the circuit is connected, the electric current starts flowing from the positive terminal through the circuit to the negative terminal. Over time, the chemicals get used up, and the cell stops working. It is called a "Dead" cell that cannot supply any more electricity.

23. What is the heating effect of electric current? Explain with examples.

Ans. : When an electric current passes through a conductor, it gets heated. This warming is called the heating effect of electric current. When electric current flows through any conductor, it faces some opposition or resistance to its flow. This resistance converts some electric energy to heat energy. Different conductors have different resistances. Nichrome offers more resistance to the flow of current compared to copper. Thus, current flowing through a nichrome wire has a greater heating effect than copper wire. Nichrome is a material suitable for making heating elements. When electric current passes through wires of nichrome and other such materials, the wires become hot. The amount of heat produced in a wire depends on

- The nature of the material
- Thickness of wire (thin wires offer more resistance and thus more heat) and
- The length of the wire (Resistance offered and heat generated are directly proportional to the length of the wire).

While making elements of heating appliances from wires of these materials, the length of the wires is increased by making coils of the wires. Also, the wires are kept thin to produce more heat. The amount of heat produced by the electric current flowing through the conductors also depends on the magnitude of the electric current and the duration of time for which the current is passed.

A battery of two or more cells produces more heat when current is passed through a nichrome wire compared with a single cell. Also, the wire will be heated more if an electric current is passed for 1 minute compared to the passage of current for 30 seconds. Examples of daily use of heating effect in our houses are: room heaters,

water heaters, electric stoves, electric kettles, electric irons, hair dryers, etc. In industry high high-temperature induction coils and furnaces are based on the heating effect of electric current.

*** Fill in the blanks:** **[15]**

24. The solution used in a Voltaic cell is called _____

Ans. : Electrolyte

25. A current carrying coil behaves like a _____

Ans. : Magnet

26. The region around a magnet where its magnetic effect can be felt is said to have a _____

Ans. : Magnetic Field

27. Heavy iron scrap is fed into _____ at very high temperatures to melt it and make iron ingots and iron rods.

Ans. : Furnaces

28. If the direction of the flow of _____ is reversed, the poles of electromagnet interchange their positions.

Ans. : Current

29. Nichrome offers more _____ to the flow of current compared to copper.

Ans. : Resistance

30. When we increase the current flowing through the coil (use battery of two or more cells in place of one cell), the magnet becomes _____

Ans. : Stronger

31. Some of the electricity is used up in heating the filament of the bulb. This reduces the _____ of these bulbs.

Ans. : Efficiency

32. Energy loss during _____ of electric current is also a problem related to the heating effect of electric current.

Ans. : Transmission

33. The amount of heat produced by the electric current flowing through the conductors also depends on the _____ of the electric current.

Ans. : Magnitude

34. When we increase the current flowing through the coil by using battery of two or more cells in place of one cell, the magnet becomes _____

Ans. : self

35. When we increase the current flowing through the coil by using battery of two or more cells in place of one cell, the heating effect of electric current _____

Ans. : self

36. Example of the use of heating effect of electric current in industry are high _____ furnaces.

Ans. : self

37. While making elements of heating appliances from wires of these materials, length of the wires is _____ by making coils of the wire.

Ans. : self

38. Batteries used in laptops, backup devices like inverters and in motor vehicles are bigger batteries that are _____

Ans. : self

*** Answer the following questions in short.** **[36]**

39. When we use a zinc and a copper plate in a Voltaic cell, which plate is the positive electrode?

Ans. : self

40. When we use 3 cells in place of a single cell to show the heating effect of electric current, what results we expect?

Ans. : self

41. What device would you use to know if the electromagnet has two poles or not?

Ans. : self

42. A Voltaic battery is made using iron nails, copper wires, and lemon cut pieces. When the LED glows, it shows that the battery is generating electricity. Will the LED glow if we interchange the terminals of the battery?

Ans. : self

43. What liquids can be used in a voltaic battery?

Ans. : self

44. What is the positive terminal of a dry cell?

Ans. : self

45. What is the negative terminal of a dry cell?

Ans. : self

46. Explain how the number of turns in the coil is related to the strength of the electromagnet.

Ans. : self

47. What is the impact of using a battery of 2 or 3 cells in place of a single cell in an activity to explain electromagnets?

Ans. : self

48. Are some metals more suitable for electromagnets than others?

Ans. : self

49. The heating effect of electric current increases with the increase in the length of the conducting wire in an electric circuit. Explain.

Ans. : self

50. Why is Nichrome more suited for making heating elements in electric appliances?

Ans. : self

51. Name four combinations of two metals each that can be used in a Voltaic cell.

Ans. : self

52. Explain the structure and functioning of a dry cell. What precautions should be taken so that the cell does not weaken quickly or suddenly be used up?

Ans. : self

53. Why are Voltaic cells not convenient as a portable source of electricity? What improvements have made rechargeable cells more widely used compared to dry cells?

Ans. : self

54. Explain the magnetic effect of electric current. On what factors does the strength of an electromagnet depend? What way the lifting electromagnets used in industry?

Ans. : self

55. Write an activity to show that the electromagnets have two poles like a bar magnet.

Ans. : self

56. A Voltaic cell, also known as a Galvanic cell, contains two metal plates made of different materials and a liquid called an electrolyte, placed in a glass or plastic container. The plates, called electrodes, are partly dipped in the electrolyte, which is usually a weak acid or a salt solution. A chemical reaction between the plates and the electrolyte produces electricity.
(a) In what way is the Voltaic cell different from the dry cell?
(b) Who discovered the Voltaic or the Galvanic cell? What was the difference of opinion between the two scientists about the electricity generation by the cell, and how was it resolved?

Ans. : self

* State whether the following sentences are true or false. Correct the false sentences and rewrite them. [17]

57. Dry cells are less portable compared to Voltaic cells.

    Ans. : false (Voltaic cells are less portable due to the liquid electrolyte.)

58. A coil becomes an electromagnet only when an electric current flows through it.

    Ans. : true

59. An electromagnet, using a single cell, attracts more iron paper clips than the same electromagnet with a battery of 2 cells.

    Ans. : false (A stronger current of battery current of 2 cells makes the coil a stronger magnet.)

60. The heating effect of electric current depends on the direction of the flow of electric current.

    Ans. : false

61. When we interchange the terminals of the battery in a circuit, the poles of the electromagnet also change positions.

    Ans. : true

62. Electromagnets do not have poles like the North pole and South pole of a bar magnet.

    Ans. : false

63. Pure water can be used as an electrolyte in a Voltaic cell.

    Ans. : false

64. An electric heater is an example of the heating effect of electric current.

    Ans. : true

65. A hair dryer is an example of the magnetic effects of electric current.

    Ans. : false

66. The strength of an electromagnet depends on the resistance offered to the electric current by the coil material.

    Ans. : false

67. Dry cells use solid electrolytes; therefore are convenient to carry anywhere.

    Ans. : false

68. Any of the two plates in a Voltaic cell can be a positive terminal, irrespective of the metal used.

    Ans. : self

69. The magnetic effect produced by a coil when the current through it remains

unchanged when we add more batteries to the circuit.

Ans. : self

70. The heating effect of electric current is caused due to resistance in the conductor to the flow of electric current.

Ans. : self

71. Dry cells use thick, moist paste electrolytes.

Ans. : self

72. The dry cells are single-use cells. Once these become weak, they have to be disposed of.

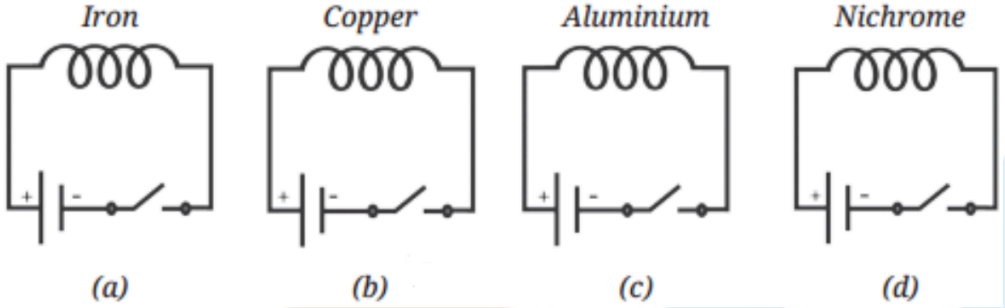
Ans. : self

73. A doorbell is an example of the heating effect of electric current.

Ans. : self

*** Answer the following questions in short.** **[45]**

74. We have four coils, of similar shape and size, made up from iron, copper, aluminium, and nichrome as shown in the Figure:



When current is passed through the coils, compass needles placed near the coils will show deflection.
(i) Only in circuit (a)
(ii) Only in circuits (a) and (b)
(iii) Only in circuits (a), (b), and (c)
(iv) In all four circuits

(A) Only in circuit (a)

(B) Only in circuits (a) and (b)

(C) Only in circuits (a), (b), and ©

(D) In all four circuits

Ans. : The compass needles placed near the coils will show deflection in all the four cases. The deflection however will not be equal in all the four cases. The magnetic strength of the electromagnet depends on the nature of the material used. Some magnetic substances like iron, nickel and cobalt make strong electromagnets, while aluminium and nichrome may be of the same shape and size may not make equally

strong magnets. Therefore, the deflection of the compass needles will vary depending on the strength of the electromagnet.

75. Can we use electric current to make a magnet?

Ans. : Yes, the magnetic effect of the electric current is used to make a magnet. If an electric current is passed through a long conducting wire coiled around a metal nail or rod, the nail or rod becomes a magnet during the flow of the current. When the electric current flow stops, the nail or the rod does not have a magnetic force.

76. While doing the activity for the electromagnet, did you also notice that the wire ends got warm? Why would that happen?

Ans. : The wire ends get warm when current flows through the wires for some time. This happens due to the heating effect of electric current. Depending on the nature of the metals used as conductors, the conductors offer some resistance to the flow of the current. In the process, a part of the electric energy is converted into heat energy that warms the ends of the wires.

77. Electric heating devices (like an electric heater or a stove) are often considered more convenient than traditional heating methods (like burning firewood or charcoal). Give reasons to support this statement, considering societal impact.

Ans. : Traditional methods like burning firewood or charcoal are NOT convenient because:

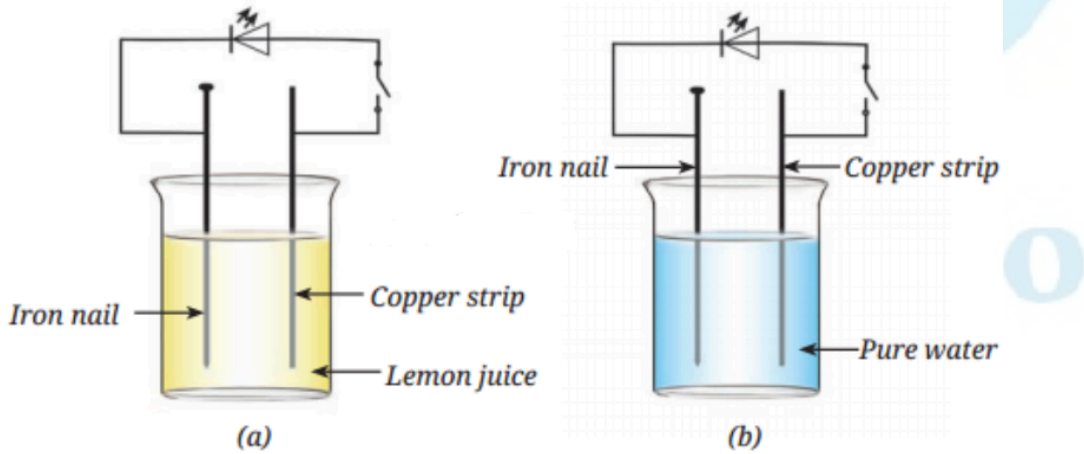
(i) More space in the household is required to store dry firewood or charcoal.

(ii) The smoke arising from the burning of firewood or charcoal is a health hazard. It gives a burning sensation to the eyes and makes breathing difficult.

(iii) The burning of firewood or charcoal releases harmful gases like carbon dioxide and carbon monoxide. These gases pollute the air we breathe and, therefore, are not good for our environment.

Electric heating devices, like an electric heater or stove, are more convenient as they need less space and do not cause pollution.

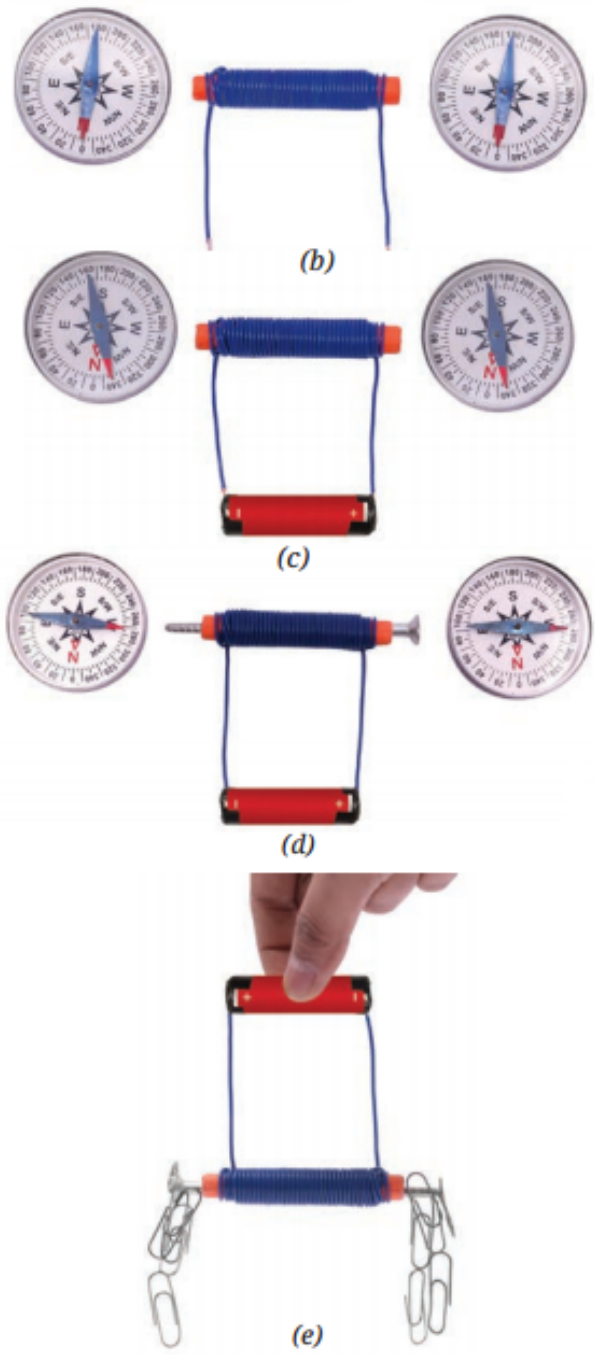
78. In Figure (below), in which case, the LED will glow when the switch is closed?



Ans. : The LED will glow when the switch is closed in case of (a). Here, the electrolyte is the lemon juice. Copper and iron plates properly placed in a weak acid or salt

solution and connected in a circuit, produce electricity. In case of (b), the liquid used is pure water that does not become an electrolyte.

79. Neha keeps the coil the same way as in Activity but slides the iron nail out, leaving only the coiled wire. Will the coil still deflect the compass? If yes, will the deflection be more or less than before?



(b) Coil and magnetic compasses; (c) Coil connected to a cell; (d) Coil with iron nail inserted; (e) Coil with iron nail and clips

Ans. : Yes, the coil will deflect the compass even after the iron nail has been slid out. The coil gets a magnetic force when current flows through it. If iron nail is inserted inside the coil, the strength of the magnet increases. Deflection in the compass will

be less when Neha slides the iron nail out, due to less strong electromagnet formed by the coil alone.

80. Name three variables on which the heating effect of electric current depends.

Ans. : The length of the conducting wire.
The nature of the metal used in conducting wire.
The strength of the electric current.

81. Name three variables on which the magnetic effect of electric current depends.

Ans. : The number of turns in the coil of conducting wire.
The strength of the electric current.
Presence of an iron nail/rod inside the coil of the conducting wire.
The nature of the metal used in the conducting wire of which the coil is made.

82. What variables increase or decrease the magnetic effect of electric current?

Ans. : When we increase the current flowing through the coil (use a battery of two or more cells in place of one cell), the magnetic effect becomes stronger. When the number of turns in the coil is increased (the length of the conducting wire increases), the magnetic effect becomes stronger. When a conducting wire is coiled around a rolled sheet of paper and current is passed through the coil, it creates a magnetic field that becomes stronger when we insert an iron nail inside the sheet of paper roll.

83. What variables increase or decrease the heating effect of electric current?

Ans. : The heating effect of electric current depends on the nature of the metal used as a conductor. Nichrome produces more heat than copper. When the length of the wire in the circuit is increased, the heating effect increases. Also, the wires are kept thin to produce more heat. The amount of heat produced by the electric current flowing through the conductors also depends on the magnitude of the electric current and the duration of time for which the current is passed. A battery of two or more cells produces more heat when current is passed through a nichrome wire compared with a single cell. Also, the wire will be heated more if an electric current is passed for 1 minute compared to the passage of current for 30 seconds.

84. Explain how the discovery of the Voltaic cell was made?

Ans. : Two Italian scientists, Alessandro Volta and Luigi Galvani, are known to have discovered the Voltaic cell, also called the Galvanic cell. Galvani noticed a dead frog's leg kicking when touched with two different metals, copper and iron. He believed the electricity that came from the frog itself stimulated muscular motion. But Volta thought that the electricity came from the metals. He tested this using saltwater-soaked paper in place of a frog's leg and got the electric current. The two scientists thus agreed that the combination of metals and liquid generated an electric current. Thus, the first battery was invented.

85. In what way the rechargeable cells better than dry cells?

Ans. : The dry cells are considered single-use cells. Once the electric current given out by the dry cell weakens, it has to be discarded and disposed of. The rechargeable cells or batteries are used multiple times after recharging. The rechargeable cells thus run for longer periods and are preferred over dry cells. However, the rechargeable cells cannot last forever. These also become weak after being used many times, and need to be discarded. Mobile phone batteries need to be changed over time.

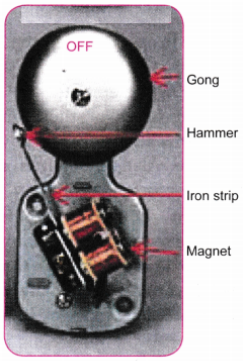
86. How is the dry cell considered convenient over the Voltaic cell?

Ans. : A voltaic cell, also known as a Galvanic cell, uses a liquid electrolyte (a weak acid or a salt solution). This makes the battery inconvenient as a portable source of electricity. A dry cell uses the electrolyte in the form of a thick, moist paste. This makes the dry cell more convenient as a portable source of electricity.

87. Voltaic cells were an important discovery, but they are not convenient for everyday use. Instead, dry cells are one of the most widely used electric cells today. They are called dry because the electrolyte is not a liquid but a thick, moist paste.
1. Who and when discovered the Voltaic cell?
2. What is the difference between the electrolyte used in a dry cell and the one used in a Voltaic cell?

Ans. : 1. Voltaic cell (named after the scientist Alessandro Volta), also known as a Galvanic cell (named after the scientist Luigi Galvani) is one of the earliest electric cells. In the late 18th century, Galvani noticed that a dead frog's leg kicked when touched with two different metals. This could happen due to stimulation from electricity. Galvani believed that electricity came from the frog itself. But Volta experimented with saltwater-soaked paper and two different metals and still got an electric current. Thus, the Voltaic cell was discovered by finding the combination of metals and a liquid chemical that generated an electric current.
2. In a dry cell, the outer shell made of zinc contains the chemicals in the form of a thick, moist paste, which serves as the electrolyte. The electrolyte in a Voltaic cell is a liquid.

88. An electric bell has an electromagnet fitted in its circuit. One or two electromagnets made of wires coiled on iron pieces are fixed on the bell case. When the bell switch is pressed, the current flows through these coils, and these become magnets. These magnets attract a metal strip, which has a hammer attached to its end near the gong of the bell. The metal strip moves fast towards the electromagnet, and the hammer strikes the gong. At the same time, with the movement of the metal strip from its position, the electric circuit breaks, the magnet stops working, and the strip moves back to its original position.



An electric bell

Q.1. When does the electromagnet work?

Q.2. When the flow of current stops in the coil, what happens to the magnetic field around the electromagnet?

Q.3. What is the industrial use of an electromagnet?

Ans. : 1. When electric current flows through a coiled thin conducting wire, it works as an electromagnet. The electromagnet works when the circuit is in the switch ON position.

2. When the current stops flowing (the circuit is in the switch OFF position), the magnetic field around the electromagnet disappears, and then the electromagnet does not attract any magnetic substances.

3. Applications of electromagnets are common in industrial activities that use magnetic substances. For example, heavy iron scrap is fed into furnaces at very high temperatures to melt it and make iron ingots and iron rods. Cranes fitted with very strong electromagnets are used to lift the iron scrap and to feed the same into the furnaces.

*** Answer the following questions in details [4 marks]** **[24]**

89. Does an electromagnet also have two poles like a bar magnet?

Ans. : Electromagnets also have two poles like a bar magnet. When an electric current is passed through a conducting wire coiled around an iron nail, one end of the nail becomes the North pole of the magnet, and the other end of the nail becomes the South pole of the magnet. This can be shown by bringing the North pole of a compass needle near two ends (one by one) of the nail, while current is flowing, and observing its deflection in each case. The property of magnets that 'like poles repel each other' shows that the electromagnets also have two poles like a bar magnet.

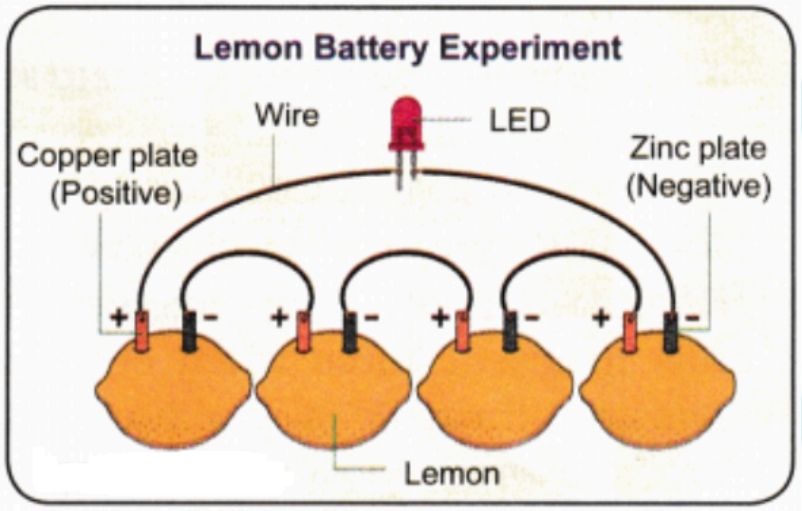
90. Are electromagnets also used in real life, for lifting objects?

Ans. : Electromagnets are widely used in factories and scrap yards to move, lift, and sort heavy metal items. These electromagnets are hung to the cranes. The crane operator moves the hanging magnet with the crane to heavy metal items and switches ON the current. The magnet lifts all magnetic items from the pile of heavy metal items. The crane operator controls and moves the magnet to the other

position where these items are to be released. He then switches OFF the current, and the magnetic field disappears; the items are released.

91. Can we also make our Voltaic cell using easily available materials?

Ans. : We can make our Voltaic cell using fresh lemon pieces, iron nails, copper wires or thin strips and an LED lamp to check the current of the cell. Five iron nails and five copper strips have to be inserted, one in each lemon piece. The copper strip of the first lemon piece should be connected to the iron nail of the second lemon. The copper strip of the second lemon should be connected to the iron nail of the third lemon, and so on.



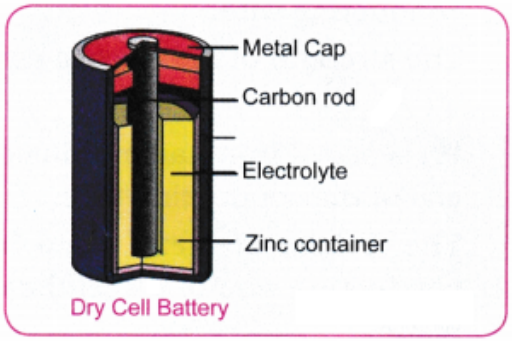
The first iron nail is to be connected to the negative terminal of the LED, and the last copper strip to the positive terminal of the LED. The LED will glow to show that the Voltaic cell is ready.

92. Suppose Sumana forgets to move the switch of her lifting electromagnet model to the OFF position (in the introduction story). After some time, the iron nail no longer picks up the iron paper clips, but the wire wrapped around the iron nail is still warm. Why did the lifting electromagnet stop lifting the clips? Give possible reasons.

Ans. : A conducting coil becomes a magnet ONLY when the electric current is flowing through it (magnetic effect of electric current). When the flow of electric current is stopped, the coil loses its magnetic effect. The magnetic effect of electric current remains in the conducting wire (coil) during the current flow only. The heating effect of electric current converts a part of the electric energy to heat energy. This heat energy makes the current-carrying wire warm. When the current stops flowing the heating effect of the electric current stops, but the wire that has become warm takes some time before cooling to the normal temperature.

93. Explain the structure of a dry cell.

Ans. : A dry cell consists of a zinc container, which acts as a negative terminal, and a carbon rod at the centre with a metal cap at the top end. The metal cap over the carbon rod acts as a positive terminal.



The zinc container is filled with a thick, moist paste electrolyte that surrounds the carbon rod. The chemical reaction between the electrolyte and the carbon rod produces electricity, and the current flows from the positive terminal of the cell through a circuit to the negative terminal. The dry cell is a single-use cell. It has to be disposed of once it is used up.

94. What is the magnetic effect of an electric current? Explain with examples.

Ans. : When electric current flows through a conductor (like a wire), it produces a magnetic field around it. This phenomenon is known as the magnetic effect of electric current. The magnetic field disappears when the current stops flowing. The magnets formed by passing an electric current through conducting wires are called electromagnets. Examples of electromagnets used in our daily life are electric doorbells, magnets used in loudspeakers, electric motors, fans, and many toys. Electromagnets of very high strength are used in industry to lift heavy loads of iron scrap to feed these into furnaces or for sorting heavy scrap items.

*** Answer the following questions in on sentence** **[4]**

95. What is an electrolyte?

Ans. : The liquid or paste form of chemicals inside an electric cell, which are used to give out electricity due to their reaction with the electrodes, is called an electrolyte.

96. What is an electrode?

Ans. : Metallic plates or carbon rods that are part of the electric cell and act as positive and negative terminals of the cell are called electrodes.

97. Define magnetic field.

Ans. : The region around a magnet where its magnetic effect can be felt is called the magnetic field of the magnet.

98. Name three types of portable sources of electricity.

Ans. : Voltaic cell, dry cell, and portable cell.

*** Match the Following.** **[12]**

99.

Column A	Column B
Q.1. Voltaic Cell	(a) Best suited for an electric heater
Q.2. Electric iron	(b) Works on magnetic effect of electric current
Q.3. Nichrome wire	(c) Works on the heating effect of electric current
Q.4. Electromagnet	(d) Generates electricity by chemical reactions

Ans. :

Column A	Column B
(i) Voltaic Cell	(d) Generates electricity by chemical reactions
(ii) Electric iron	(c) Works on the heating effect of electric current
(iii) Nichrome wire	(a) Best suited for an electric heater
(iv) Electromagnet	(b) Works on magnetic effect of electric current

100.

Column A	Column B
Q.1. Examples of the heating effect of electric current	(a) North Pole and South Pole
Q.2. Increases the magnetic strength of an electromagnet	(b) Iron/copper, zinc/copper, zinc/silver, lead/copper
Q.3. Pairs of electrode materials used in Voltaic cells	(c) Number of turns in the coil
Q.4. Electromagnets also have	(d) Electric iron, electric kettle

Ans. :

Column A	Column B
1. Examples of the heating effect of electric current	(d) Electric iron, electric kettle
2. Increases the magnetic strength of an electromagnet	(c) Number of turns in the coil
3. Pairs of electrode materials used in Voltaic cells	(b) Iron/copper, zinc/copper, zinc/silver, lead/copper

4. Electromagnets also have	(a) North Pole and South Pole

101.

Clounm A	Column B
Q.1. Example of the heating effect of electric current	(a) Dry cell electrolyte
Q.2. Example of the magnetic effect of electric current	(b) Metallic trip over the carbon rod
Q.3. A weak acid or salt solution in liquid form	(c) Room heater,electric stove,hair dryer,electric icon
Q.4. An electrolyte in the form of a thick,moist paste	(d) Magnets in door bells,loudspeaker,electric motors,and fans
	(e) Electrolyte in a Voltaic cell

Ans. : self

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