BRAIN INTERNATIONAL SCHOOL

SUBJECT: PHYSICS **CLASS X** **NOV, 2024**

CH-11: ELECTRICITY

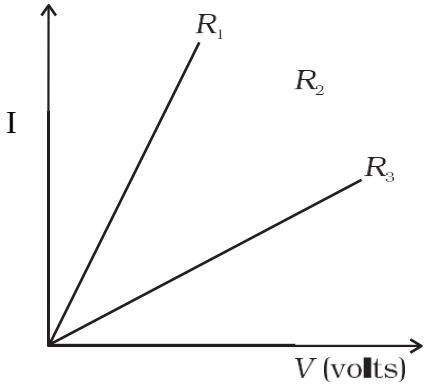
1. What is electric energy and electric power? Derive their expressions and define their units.
2. What is Ohm's law? How is it represented graphically? Derive an expression for the resultant resistance of series combinations of resistors.
3. State Ohm's law? Derive an expression for the equivalent resistance of parallel combinations of resistors.
4. What is Joule's heating effect? How can it be demonstrated experimentally? List its four applications in daily life.
5. What is electrical resistivity of a material? What is its unit? Describe an experimentally to study the factors on which the resistance of conducting wire depends?
6. A wire of given material having length l and area of cross-section A has a resistance of 4Ω.what would be the resistance of another wire of the same material having length $l/2$ and area of cross-section $2A$?
7. A student carries out an experiment and plots the V-I graph of three samples of nichrome wire with resistances R1, R2 and R3 respectively. Which of the following is true?

   (a) R1 = R2= R3

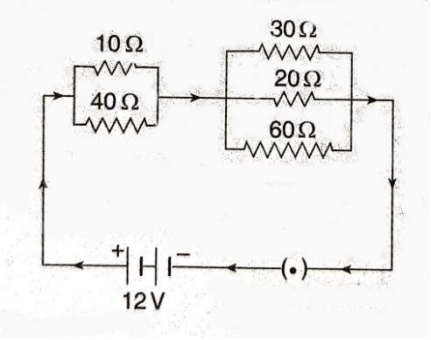
   (b) R1 > R2> R3

   (c) R3 > R2> R1

   (d) R2 > R3 > R1



8. A 6 Ω resistance wire is doubled up by folding. Calculate the new resistance of the wire.
9. Two wires of the same metal have the same area of cross section but their lengths in the ratio of 3: 1. What should be the ratio of current flowing through them respectively, when the same potential difference is applied across each of their length?
10. In the circuit diagram given below five resistances of 10Ω, 40 Ω, 30 Ω, 20 Ω and 60 Ω are connected as shown to a 12 V battery.



11. A copper wire has diameter 0.5 mm and resistivity of 1.6×10^{-8} Ω m. What will be the length of this wire to make its resistance 10 Ω? How much does the resistance change if the diameter is doubled?

12. A battery of 9 V is connected in series with resistors of 0.2 Ω, 0.3 Ω, 0.4 Ω, 0.5 Ω and 12 Ω, respectively. How much current would flow through the 12 Ω resistor?

13. Show how you would connect three resistors, each of resistance 6 Ω, so that the combination has a resistance of (i) 9 Ω, (ii) 4 Ω.

14. Several electric bulbs designed to be used on a 220 V electric supply line, are rated 10 W. How many lamps can be connected in parallel with each other across the two wires of 220 V line if the maximum allowable current is 5 A?

15. A hot plate of an electric oven connected to a 220 V line has two resistance coils A and B, each of 24 Ω resistance, which may be used separately, in series, or in parallel. What are the currents in the three cases?

CH-12: MAGNETIC EFFECTS OF ELECTRIC CURRENT

1. Why does a magnetic compass needle pointing North and South in the absence of a nearby magnet get deflected when a bar magnet or a current carrying loop is brought near it. Describe some salient features of magnetic lines of field concept.

2. With the help of a labelled circuit diagram illustrate the pattern of field lines of the magnetic field around a current carrying straight long conducting wire. How is the right hand thumb rule useful to find direction of magnetic field associated with a current carrying conductor?

3. Explain with the help of a labelled diagram the distribution of magnetic field due to a current through a circular loop. Why is it that if a current carrying coil has n turns the field produced at any point is n times as large as that produced by a single turn?

4. Describe the activity that shows that a current-carrying conductor experiences a force perpendicular to its length and the external magnetic field. How does Fleming's left-hand rule help us to find the direction of the force acting on the current carrying conductor?

5. Draw a labelled circuit diagram of a simple electric motor and explain its working. In what way these simple electric motors are different from commercial motors?

6. Explain the phenomenon of electromagnetic induction. Describe an experiment to show that a current is set up in a closed loop when an external magnetic field passing through the loop increases or decreases.

7. A magnetic compass shows a deflection when placed near a current carrying wire. How will the deflection of the compass get affected if the current in the wire is increased? Support your answer with a reason.

8. It is established that an electric current through a metallic conductor produces a magnetic field around it. Is there a similar magnetic field produced around a thin beam of moving (i) alpha particles, (ii) neutrons? Justify your answer.

9. What does the direction of thumb indicate in the right-hand thumb rule? In what way this rule is different from Fleming's left-hand rule?

10. Meena draws magnetic field lines of field close to the axis of a current carrying circular loop. As she moves away from the centre of the circular loop she observes that the lines keep on diverging. How will you explain her observation?

11. What does the divergence of magnetic field lines near the ends of a current carrying straight solenoid indicate?

12. Name four appliances wherein an electric motor, a rotating device that converts electrical energy to mechanical energy, is used as an important component. In what respect motors are different from generators?

13. What is electromagnetic induction? Explain how the movement of a magnet towards or away from a coil carrying a galvanometer produce current? Write the rule to find the direction of current in this above coil.

14. Explain why, two magnetic lines of force do not intersect.

15. How will you find out the direction of the magnetic field produced by current-carrying conductor?