

Board - CBSE

Class - 10<sup>th</sup>

Topic - Electricity

1. Explain the following:
  - (a) Why is the tungsten used almost exclusively for filament of electric lamps?
  - (b) Why are the conductors of electric heating devices, such as bread-toasters and electric irons, made of an alloy rather than a pure metal?
  - (c) Why is the series arrangement not used for domestic circuits?
  - (d) How does the resistance of a wire vary with its area of cross-section?
  - (e) Why are copper and aluminium wires usually employed for electric transmission?
2. The value of current  $I$  flowing in a given resistor for the corresponding values of potential difference  $V$  across the resistor are given below:

$I$ (amperes)	1.5	1.0	2.0	3.0	4.0
$V$ (volts)	1.6	3.4	6.7	10.2	13.2

Plot a graph between  $V$  and  $I$  and calculate the resistance of that resistor.

3. How can three resistors of resistance  $2\Omega$ ,  $3\Omega$  and  $6\Omega$  be connected to give a total resistance of (a)  $4\Omega$  (b)  $9\Omega$ ?
4. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?
5. (a) Define electrical energy with S.I. unit?  
(b) A household uses the following electric appliance;
  - (i) The refrigerator of rated  $400\text{w}$  for ten-hour each day.
  - (ii) Two electric fans of rating  $80\text{w}$  each for twelve hours each day.
  - (iii) Six electric tubes of rating  $18\text{w}$  each for 6hours each day.

Calculate the household's electricity bill for June if the cost per unit of electric energy is Rs. 3.00.

6. Two wires, A and B, are equal in length, have different cross-sectional areas and are made of the same metal.
  - (a) (i) Name the property which is the same for both the wires,  
(ii) Name the property which is different for both the wires.
  - (b) If the resistance of wire A is four times the resistance of wire B, calculate
    - (i) the ratio of the cross-sectional areas of the wires and
    - (ii) The ratio of the radii of the wire.

7. A household uses the following electric appliances
  - (i) The refrigerator of rated 4 for ten hours each thy.
  - (ii) Two electric fans of rating 8 each for twelve hours each day.
  - (iii) Six electric tubes of rating 18 W each for 6 hours each day.Calculate the household's electricity bill for June if the cost per unit of electric energy is Rs. 3.00.
8. A wire of length  $L$  and resistance  $R$  is stretched so that its length is doubled. How will its (a) Resistance change (b) Resistively change?
9. Compare the power used in the  $2\ \Omega$  resistor in each of the following circuits:
  - (i) A 6-volt battery in series with  $1\ \Omega$  and  $2\ \Omega$  resistors and,
  - (ii) A 4 V battery in parallel with  $12\ \Omega$  and  $\Omega$  resistors.
10. Show how you would connect three resistors, each of resistance  $6\ \Omega$  so that the combination has a resistance of (i)  $9\ \Omega$  (ii)  $4\ \Omega$ .
11. A copper wire has a diameter of 0.5 mm and resistivity of  $1.6 \times 10^{-8}\ \text{m}$ . what will be the length of this wire to make its resistance 10? How much does the resistance change if the diameter is doubled?
12. An electric lamp of  $100\ \Omega$ , a toaster of  $50\ \Omega$  and a water filter of resistance  $500\ \Omega$  are connected parallel to a 220 V source. What is the resistance of an electric iron connected to the same source that takes as much current as all three appliances? What is the current through it?
13. When connected to the same source, will current flow more easily through a thick wire or a thin wire of the same material? Why?
14. On what factor does the resistance of a conductor depend?
15. Define 1 volt. Express it in terms of S.I. unit of work and charge calculate the amount of energy consumed in carrying a charge of 1 coulomb through a battery of 3 V.