NCERT Class 10 Mathematics Numerical Questions for Electricity CBSE Board Sample Problems (For CBSE, ICSE, IAS, NET, NRA 2022)

Get top class preparation for CBSE right from your home: fully solved questions with step-by-step explanation- practice your way to success.

Numerical Questions for Electricity

1) A wire of length 3 m and area of cross-section $1.7 \times 10^6\ m^2$ has a resistance 3×10^{-2} ohm.

a) What is the formula for resistivity of the wire and what is the unit of it

b) Calculate the resistivity of the wire

Ans)

a) Resistivity of the wire is given by

$$\rho = \frac{RA}{L}$$

And It unit is Ohm-m

b) In this case

L = 3 m

$$A = 1.7 \times 10^{-6}\ m^2$$

$$R = 3 \times 10^{-2}\ \text{ohm}$$

So

$$p = 1.7 \times 10^{-8} \text{hm} - m$$

2) The table given below shows the resistivity of three Material X, Y, and Z?

Samples	X	Y	Z
Resistivity	3×10^{-9}	11.1×10^{-6}	18×10^{-17}

The Table Given below Shows the Resistivity of Three Material X, Y, and Z?

a) Arrange the samples in increasing order of conductivity

b) Which of these is best conductor?

c) Which are these is best insulator?

Ans)

a) Conductivity is inversely proportional to resistivity

So

$$Y < X < Z$$

b) Z is the best conductor as it has least resistivity

c) Y is the best insulator as it has highest resistivity

3) There are m resistor each of resistance R. First, they all are connected in series and equivalent resistance is X. Now they are connected in parallel and equivalent resistance is Y. What is the ratio of X and Y?

Ans)

Series combination

$$\mathrm{XR} + R + R + \ldots = \mathrm{mR}$$

Parallel combination

$$\frac{1}{Y} = \frac{1}{R} + \frac{1}{R} + \ldots = \frac{m}{R}$$

Or $Y = \frac{R}{m}$

So $X : Y = m^2 : 1$

4) We have four resistors A , B , C and D of resistance 4ohm, 8ohm 42 ohm and 24 ohm respectively?

1	Lowest resistance which can be obtained by combining these four resistors	
2	highest resistance which can be obtained by combining these four resistors	

We Have Four Resistors a , B , C and D of Resistance 4ohm, 8ohm 42 Ohm and 24 Ohm Respectively?

Ans)

Lowest resistance is obtained in parallel combination

$$\frac{1}{R} = \frac{1}{4} + \frac{1}{8} + \frac{1}{12} + \frac{1}{24}$$

Or $R = 2\Omega$

Highest resistance is obtained in series combination

$$R = 4 + 8 + 12 + 24 = 64\Omega$$

5) Three resistors 5 Ω , 10 Ω and 30 Ω are connected in parallel with the battery of Voltage 6V?

S. no	Questions	
1	The value of current across each resistor	
2	The value of Potential difference across each resistor	
3	Total current in the circuit	
4	Effective resistance of the circuit	

Three Resistors 5 Ω, 10 Ω and 30 Ω Are Connected in Parallel with the Battery of Voltage 6V?

Ans)

Potential difference remains same across parallel combination

So current in each resistor is calculated as

$$I_1 = \frac{V}{R_1} = \frac{6}{5} = 1.2A$$

$$I_2 = \frac{V}{R_2} = \frac{6}{10} = .6A$$

$$I_3 = \frac{V}{R_3} = \frac{6}{30} = .2A$$

Total current in the circuit

$$I = I_1 + I_2 + I_3 = 1.2 + 6 + 2 = 2A$$

Effective resistance

$$\frac{1}{R} = \frac{1}{5} + \frac{1}{10} + \frac{1}{30}$$

$$R = 3\Omega$$

6) An electric bulb draws a current of . 8 A and works on 250 V on the average 8 hours a day.

a) Find the power consumed by the bulb

b) If the electric distribution company changes ₹ 5 for 6 KWH, what is the monthly bill for 60 days

Ans) Power of the electrical bulb is given by

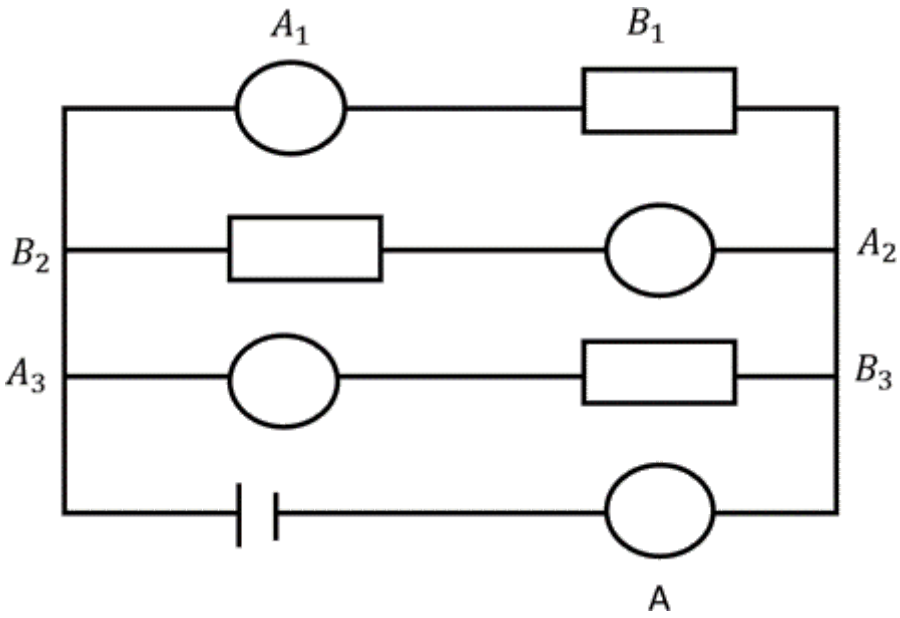
$$P = V \times I = .8A \times 250V = 200W = .2 \text{ KW}$$

Total energy consumption by the bulb in 60 days

$$E = P \times t = .2 \times 8 \times 60 = 96 \text{ KWH}$$

So cost will be $= 5 \times \frac{96}{6} = 80$ ₹

7)



A_1, A_2, A_3, and A are ammeters connected in the circuit

B_1 , B_2 , and B_3 are three identical bulbs

They all are connected to Voltage source as shown in Figure

When the three bulb are working good and glowing, the current recorded in Ammeter A is 6 A

Answer Following questions

a) Same amount of current will go through each Bulb. And the value is 2 A . True or False

b) If the Bulb B_3 is blown away, the bulb B_1 and B_2 will start glowing more. True or False

c) What will happen to all the ammeter reading if Bulb B_1 is blown away

d) The current shown in Ammeter A remains even any bulb goes down. True or False

Ans)

a) Since Bulb are identical and connected in parallel with Voltage. Same current will flow through each bulb. Since the total current is 6 A. individual current will be 2 A

b) If the Bulb B_3 is blown away, the potential difference across other bulb still remains same, So same current will flow and they will glow as it is. No change

c) When Bulb B_1 goes down, the current in that part become zero.

So reading of Ammeter A_1 becomes zero

Reading of Ammeter A_2 will remain same i.e.. 2 A

Reading of Ammeter A_3 will remain same i.e.. 2 A

Reading of Ammeter A will be $= 2 + 2 = 4A$

d) As shown above, the reading of Ammeter A will change

8) Gave the formula for each

1	Ohm's Law	
2	Resistance in terms of Length, Area, resistivity	
3	Current in terms of Resistance and Voltage	
4	Equivalent Resistance for Resistors in Series	
5	Equivalent Resistance for Resistors in Parallel	
6	Power produced in the resistance	

Gave the Formula for Each

Answer:

1	Ohm's Law	$V = \text{IR}$
2	Resistance in terms of Length, Area, resistivity	$R = \rho\frac{L}{A}$
3	Current in terms of Resistance and Voltage	$I = \frac{V}{R}$

4	Equivalent Resistance for Resistors in Series	$R = R_1 + R_2 + R_3$
5	Equivalent Resistance for Resistors in Parallel	$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$
6	Power produced in the resistance	$P = I^2 R$
Gave the Formula for Each		

Developed by: Mindsprite Solutions