પુ•ના International School

Shree Swaminarayan Gurukul, Zundal

Class – X **Electricity** **Worksheet - 1**

1. A piece of wire of resistance R is cut into five equal parts. These parts are then connected in parallel. If the equivalent resistance of this combination is R', then the ratio R/R' is :

   A. 1/25 B. 1/5 C. 5 D. 25

2. Which of the following terms does not represent electrical power in a circuit:

   A. I^2R B. IR^2 C. VI D. V^2/R

3. An electric bulb is rated 220 V and 100 W. When it is operated on 110 V, the power consumed will be:

   A. 100 W B. 75 W C. 50 W D. 25 W

4. Two conducting wires of the same material and of equal lengths and equal diameters are first connected in series and then in parallel in an electric circuit The ratio of the heat produced in series and parallel combinations would be :

   A. 1:2 B. 2:1 C. 1:4 D. 4:1

5. Electric charge is expressed in :

   A. volt B. joule C. coulomb D. ohm.

6. If 10^{10} electrons are removed from a neutral body, the charge acquired by the body is :

   A. $+1.6 \times 10^{-29}$ C B. $+1.6 \times 10^{-9}$ C

   C. -1.6×10^{-9} C D. $+10^{10}$ C

7. When the distance between two charged particles is halved, the force between them becomes :

   A. one-half B. double

   C. one-fourth D. four times.

8. The minimum value of charge on an object cannot be less than :

   A. 1.6×10^{-19} C B. 3.2×10^{-19} C

   C. 1 C D. 3×10^{9} C

9. Which of the following charges is not possible ?

   A. 1.6×10^{-19} C B. 3.2×10^{-19} C

   C. 6.4×10^{-19} C D. 0.8×10^{-19} C

10. A flow of 10^7 electrons per second in a conductor constitutes a current of :

    A. 1.6×10^{-26} A B. 1.6×10^{12} A

    C. 1.6×10^{-12} A D. $\frac{1}{1.6} \times 10^{12}$ A

Answer Key

1. D

Explanation: Resistance of each one of the five parts = (R/5)

Resistance of five parts connected in parallel is given by

$$\frac{1}{R'}=\frac{1}{R/5}+\frac{1}{R/5}+\frac{1}{R/5}+\frac{1}{R/5}+\frac{1}{R/5}$$

or $$\frac{1}{R'}=\frac{5}{R}+\frac{5}{R}+\frac{5}{R}+\frac{5}{R}+\frac{5}{R}=\frac{25}{R}$$

or $$\frac{R}{R'}=25$$

2. B

Explanation: Electrical power, $P = VI = (IR)R = I^2R$

$$=V\left(\frac{V}{R}\right)=\frac{V^2}{R}$$

IR^2 does not represent electrical power in a circuit.

3. D

Explanation: Resistance of the electric bulbs, $R=\frac{V^2}{P}$

or $$R=\frac{(220)^2}{100}=484\ \Omega$$

Power consumed by the bulb when it is operated at 110 V

$$P'=\frac{V^2}{R}=\frac{(110)^2}{484}=\frac{110\times110}{484}=25\ W$$

4. C

Explanation: Since both the wires are made of the same material and have equal lengths and equal diameters, so they will have the same resistance.

Assume it to be R.

When connected in series, their equivalent resistance is given by

$$R_s = R + R = 2R$$

When connected in parallel, their equivalent resistance is given by

$$\frac{1}{R_p}=\frac{1}{R}+\frac{1}{R}=\frac{2}{R} \quad \text{or} \quad R_p=\frac{R}{2}$$

Further, electrical power is given by

$$P=\frac{V^2}{R}$$

Power (or heat produced) in series,

$$P_s=\frac{V^2}{R_s}$$

Power (or heat produced) in parallel,

$$P_p=\frac{V^2}{R_p}$$

$$\frac{P_s}{P_p}=\frac{V^2/R_s}{V^2/R_p}=\frac{R_p}{R_s}=\frac{R/2}{2R}=\frac{1}{4}$$

or $R_s : R_p :: 1 : 4$

5. C
6. B
7. D
8. A
9. D
10. C