SUBJECT:- PHYSICS   CLASS:- XTH   DATE:- 13/05/XXI

SUBJECT TEACHER:- MR. NEEL NIRANJAN

CHAPTER 1. (ELECTRICITY) (BASED ON NCERT PATTERN) (IMPORTANT QUESTIONS)

Q1. How many 176 Ω resistors (in parallel) are required to carry 5 A on a 220 V line?

Ans. I = 5 A , V = 220 V

Let the number of 176 Ω resistors be n.

$$\frac{1}{R_p} = \frac{1}{176} + \frac{1}{173} \ldots + n$$

$$\frac{1}{R_p} = \frac{n}{176} \text{ or } R_p = \frac{176}{n}$$

As $R = \frac{V}{I}$

$$\frac{176}{n} = \frac{220}{5}$$

$$n = \frac{176 \times 5}{220} = 4$$

Hence, four resistors of 176 W are required to carry 5 A on a 220 V line.

Q2. show how you would connect three resistors each of resistance 6 Ω , so that the combination has a resistance of (i) 9 Ω , (U) 4 Ω.

Ans .(i)To get 9 Ω connect 2 resistors of 6 Ω in parallel and 3rd resistor in series.

$$\frac{1}{R_p} = \frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3}$$

$$R_p = 3\,\Omega$$

$$R_{total} = R_p + R$$

$$= 3 + 6 = 9\,\Omega$$

(ii) To get 4 Ω —Connect 2 resistors in series and the third in parallel to both of them

$$R_s = 6 + 6 = 12\,\Omega$$

$$\frac{1}{R_{total}} = \frac{1}{R_s} + \frac{1}{R}$$

$$= \frac{1}{12} + \frac{1}{6} = \frac{1+2}{12} = \frac{1}{4}$$

$$R_{total} = 4\,\Omega$$

Q3. Several electric bulbs designed to be used on a 220 V electric supply line, are rata 10 W. How many lamps can be connected in parallel to each other across (he two win. of a 220 V line if the maximum allowable current is 5 A?

Ans. P = 10 W

V = 220 V

I = ?

Using, $I = \dfrac{P}{V}$

$$= \frac{10}{220} = \frac{1}{22}$$

If number of bulbs connected to current of 5 A is n. Then,

$$\frac{1}{22}n = 5$$

n = 5 ◆ 22 = 110

110 bulbs can be attached