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Q1. Ohm's law

Q2.

Unit of electrical resistance is ohm. Its symbol is  $\Omega$ .

Q3. Electric resistance.

Q4. Insulators.

Q6. Strength of electric current flowing in a given conductor depends on

(i) potential difference across the ends of the conductor

(ii) resistance of the conductor.

Q7. Thick wire.

Q8.

$$V = IR$$

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

Keeping  $V$  constant,  $I \propto \frac{1}{R}$

So, when  $R$  is halved,  $I$  also becomes double.

Q9. Potential difference,  $V = 20V$

Resistance,  $R = 5\text{ohms}$

Current,  $I = ?$

We know that

$$V = IR$$

$$20 = I \times 5$$

$$I = 20/5 = 4 \text{ A}$$

Q10.  $R = 20\text{ohms}$

$$I = 2\text{amp}$$

We know that

$$V = IR$$

Thus,

$$V = 2 \times 20$$

$$V = 40V$$

Q11.

$$I = 5\text{amp}$$

$$\text{p.d., } V = 3V$$

We know that

$$V = IR$$

Thus,

$$3 = 5 \times R$$

$$R = 3/5 = 0.6 \text{ ohm}$$

Q12. current.

Q13. Those substances which have very low electrical resistance are called as good conductors. E.g., copper and aluminium.

Those substances which have comparatively high resistance than conductors are known as resistors. E.g., nichrome and manganin.

Those substances which have infinitely high electrical resistance are called insulators. E.g., rubber and wood.

Q14. Conductor: mercury, aluminum, iron, metal coin

Resistor: manganin, nichrome

Insulator: rubber, polythene, wood, bakelite, paper, thermocol

Q15. Ohm's law gives a relationship between current (I) and potential difference (V). According to ohm's law: At constant temperature, the current flowing through a conductor is directly proportional to the potential difference across its ends.

If I is the current flowing through a conductor and V is the p.d. across its ends, then according to the ohm's law:

$$I \propto V$$

$$\text{or, } V \propto I$$

$$\text{or, } V = RI$$

$$\text{or } R = \frac{V}{I}$$

where, R is a constant called "resistance" of the conductor.

The unit of resistance is ohm.

$$\text{If } V = 1 \text{ volt and } I = 1 \text{ amp, then } R = \frac{1}{1} = 1 \text{ ohm.}$$

Thus, 1 ohm is the resistance of a conductor such that when a potential difference of 1 volt is applied to its ends, a current of 1 amp flows through it.

Q16. (a) The property of a conductor due to which it opposes the flow of current through it is called resistance of the conductor.

Work done = Potential difference x charge moved.

$$(b) V = 12 \text{ volt, } I = 2.5 \times 10^{-3} \text{ A}$$

We know that

$$V = IR$$

$$R = V/I$$

$$R = 12/(2.5 \times 10^{-3})$$

$$R = 4.8 \times 10^3 \text{ ohm} = 4800 \text{ ohm.}$$

Q17. (a) 1 ohm is the resistance of a conductor such that when a potential difference of 1 volt is applied to its ends, a current of 1 ampere flows through it.

(b) Its resistance will increase.

(c)

$$V = IR$$

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

$$\text{Keeping } V \text{ constant, } I \propto \frac{1}{R}$$

So, when R is doubled, I becomes half.

Q18. (a) Electricians wear rubber hand gloves while working with electricity because rubber is an insulator and protects them from electric shocks.

$$(b) I = 6 \text{ amp, } R = 40 \text{ ohm}$$

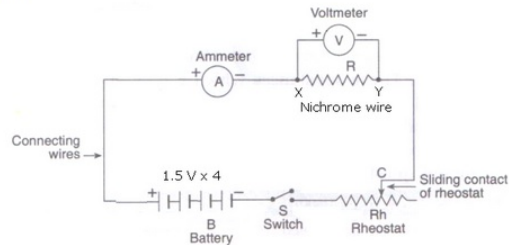
We know that

$$V = IR$$

$$V = 6 \times 40 = 240 \text{ V.}$$

Q19.

(i)



(ii) Since the graph is a straight line passing through the origin, so current is directly proportional to the potential difference. Hence, the ratio  $\frac{V}{I}$  remains constant.

From graph, when  $V = 1.5$  volt,  $I = 0.6$  amp

$$\text{So, } \frac{V}{I} = \frac{1.5}{0.6} = 2.5\Omega$$

For p.d. 0.8V, 1.2V and 1.6V, the value of  $\frac{V}{I}$  ratio remains the same i.e., 2.5 ohm.

(iii) The resistance of the wire is equal to the ratio of potential difference applied and the current passing through it.

$$R = \frac{V}{I} = 2.5\Omega$$

Q20. (a) The ratio of potential difference and current is known as resistance.

(c) Ohm's law

(d) Potential difference = Current x Resistance

(e)  $V = 240$  volt,  $I = 5$  amp

We know that

$$V = IR$$

$$240 = 5 \times R$$

$$R = 240/5 = 48 \text{ ohm.}$$

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Q30. In first case,

$I = 2.4$  amp,  $V = 120$  volt

$$V = IR$$

$$120 = 2.4 \times R$$

$$R = 120/2.4 = 50 \text{ ohm}$$

In second case,

$V = 240$  volt,  $R = 50$  ohm

$$V = IR$$

$$240 = I \times 50$$

$$I = 4.8 \text{ amp.}$$

Q31. Resistance.

Q32. (a) Ohm's law

(b) Temperature.

Q33. In first case,

$I = 0.02$  amp,  $V = 10$  volt

$$V = IR$$

$$10 = 0.02 \times R$$

$$R = 10/0.02 = 500 \text{ ohm}$$

In second case,

$I = 250 \times 10^{-3}$  amp,  $R = 500$  ohm

$$V = IR$$

$$V = 250 \times 10^{-3} \times 500$$

$$V = 125 \text{ volt.}$$

Q34.  $I = 200\text{mA} = 0.2 \text{ A}$

$$R = 4 \times 10^3 \text{ ohm} = 4000 \text{ ohm}$$

We know that

$$V = IR$$

$$V = 0.2 \times 4000$$

$$V = 800 \text{ volt.}$$

\*\*\*\*\* END \*\*\*\*\*