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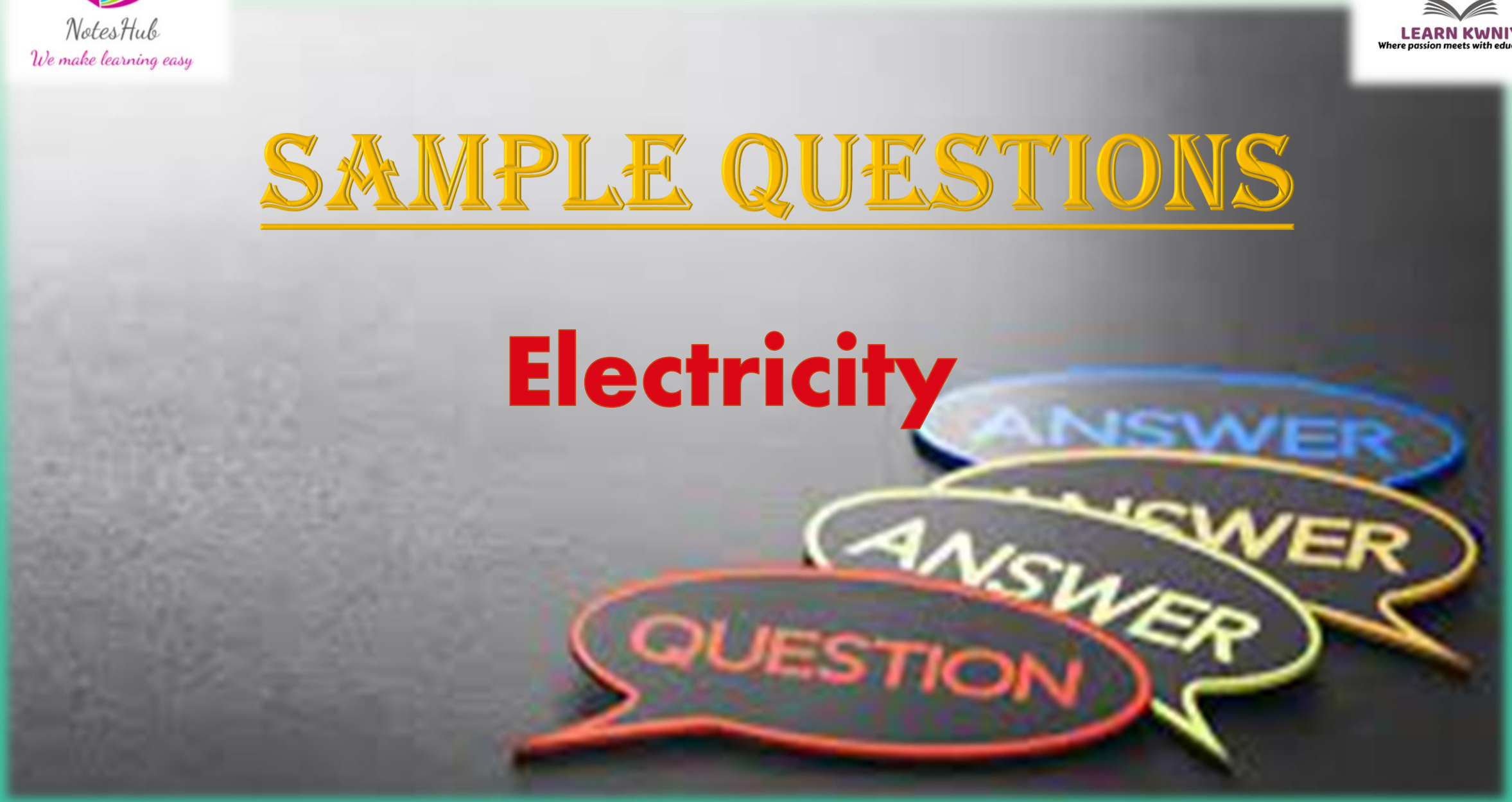
# SAMPLE QUESTIONS

## Electricity



**1.**

**An electric bulb draws a current of 0.25 A for 20 minutes. Calculate the amount of electric charge that flows through the circuit.**

**Solution**

**Current, I = 0.25 A**

**Charge, Q = ?**

**And Time, t = 20 minutes**

**= 20 × 60 seconds**

**= 1200 s**

$$\mathbf{I} = \frac{Q}{t}$$

$$\mathbf{0.25} = \frac{Q}{1200}$$

**Q = 0.25 × 1200 C**

**Q = 300 C**

**2.**

**How much work is done in moving a charge of 2 coulombs from a point at 118 volts to a point at 128 volts ?**

**Solution**

**Here, Potential difference, V = 128 – 118 = 10 volts**

**Work done, W = ?**

**Charge moved, Q = 2 coulombs**

**Putting these values in formula, we get : V = W / Q**

$$10 = \frac{W}{Q}$$

**W = 10 × 2 Thus, Work done, W = 20 joules**

**3.**

**By what other name is the unit joule/coulomb called ?**

**4.**

**What is meant by saying that the electric potential at a point is 1 volt ?**

**5.**

**How much work is done when one coulomb charge moves against a potential difference of 1 volt ?**

6.
What do you understand by the term “potential difference” ?
7.
What is meant by saying that the potential difference between two points is 1 volt ?
8.
What is the potential difference between the terminals of a battery if 250 joules of work is required to transfer 20 coulombs of charge from one terminal of battery to the other ?
9.
What is a voltmeter ?
10.
Define electric current. What is the SI unit of electric current.
11.
One coulomb of charge flows through any cross-section of a conductor in 1 second. What is the current flowing through the conductor ?
12.
Which instrument is used to measure electric current ? How should it be connected in a circuit ?

**13**

**Potential difference between two points of a wire carrying 2 ampere current is 0.1 volt. Calculate the resistance between these points.**

**Solution**

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

**Potential difference, V = 0.1 volt**

**Current, I = 2 amperes**

**Resistance, R = ?**

**Putting these values in the above formula, we get :**

$$\frac{0.1}{2} = R$$

$$0.05 = R$$

$$R = 0.05\Omega$$

**14.**

**An electric iron draws a current of 3.4 A from the 220 V supply line. What current will this electric iron draw when connected to 110 V supply line ?**

**Solution**

**we will calculate the resistance of electric iron. Now, in the first case, the electric iron draws a current of 3.4 A from 220 V supply line.**

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

**Potential difference, V = 220volt**

**Current, I = 3.4 amperes**

**Resistance, R = ?**

**Putting these values in the above formula, we get :**

$\frac{220}{3.4}$ **= R**

**64.7 = R**

**R = 64.7**$\Omega$

This resistance will now be used to find out the current drawn when the electric iron is connected to 110 V supply line.

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

$\frac{220}{I}$ **=34.7**

**I =** $\frac{110}{64.7}$ **=1.7 A**

**15.**
**Name the law which relates the current in a conductor to the potential difference across its ends.**

**16.**
**Name the unit of electrical resistance and give its symbol.**

**17.**
**Name the physical quantity whose unit is “ohm”.**

**18.**
**What is the ratio of potential difference and current known as**

**19.**
**Write down the formula which states the relation between potential difference, current and resistance.**

**20**

**A copper wire of length 2 m and area of cross-section 1.7 × 10–6 m2 has a resistance of 2 × 10–2 ohms. Calculate the resistivity of copper.**

**Solution**

**Resistivity** $(\rho) = \frac{R\ X\ A}{l}$

**Resistance, R = 2 ×** $10^2\ \Omega$

**Area of cross-section, A = 1.7 ×** $10^6$ **m2**

**Length, l = 2 m**

$$(\rho) = \frac{2 \times 10^2\ X\ 1.7 \times 10^6}{2}$$

$$= 1.7 \times 10^8\ \Omega\ \text{m}$$

**21.**

**What happens to the resistance as the conductor is made thicker ?**

**22.**

**If the length of a wire is doubled by taking more of wire, what happens to its resistance**

**24.**

**(a) What do you understand by the "resistivity" of a substance ?**

**(b) A wire is 1.0 m long, 0.2 mm in diameter and has a resistance of 10 $\Omega$ . Calculate the resistivity of its material ?**

**25.**

**If four resistances, each of value 1 ohm, are connected in series, what will be the resultant resistance ?**

**Solution**

**we have four resistances, each of 1 ohm, connected in series.**

**if we have four resistances R1, R2, R3 and R4 connected in series, then their resultant resistance R is given by :**

**R = R1 + R2 + R3 + R4**

**Resultant resistance, R = 1 + 1 + 1 + 1**

**R = 4 $\Omega$**

**26**

**Give the law of combination of resistances in series.**

**27. If five resistances, each of value 0.2 ohm, are connected in series, what will be the resultant resistance ?**

**28. State the law of combination of resistances in parallel.**

**29.**

**What will be the current drawn by an electric bulb of 40 W when it is connected to a source of 220 V ?**

**Solution.**

**In this case we have been given power P and voltage V, so the formula to be used for calculating the current will be :**

**P =V × I**

**Power, P =40 watts**

**Voltage, V =220 volts And, Current, I =?**

**putting these values in the above formula,**

**we get : 40 =220 × I**

**I =** $\frac{40}{220}$ **=** $\frac{2}{11}$

**Current, I =0.18 ampere**

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