WORKSHEET ①

A. Tick (✓) the correct option.

1. The instrument used for measuring electric current is
   - a. potentiometer
   - b. ammeter
   - c. voltmeter
   - d. galvanometer.

2. Among which of the following resistance does not depend.
   - a. length of conductor
   - b. area of cross section
   - c. density
   - d. temperature.

3. A current of 5 A flows through a conductor whose ends are at a potential difference of 15 V. The resistance of the conductor is
   - a. 5 Ω
   - b. 0.3 Ω
   - c. 75 Ω
   - d. 3 Ω

4. The rheostat is used in the circuit to
   - a. increase the magnitude of current only
   - b. decrease the magnitude of current only
   - c. increase or decrease the magnitude of current
   - d. none of these.

5. The SI unit of resistance is
   - a. joule
   - b. volt
   - c. ohm
   - d. ampere.

B. Fill in the blanks.

1. The amount of work done in joules, when one unit electric charge moves from one point to another point in an electric circuit is called _____

2. _____ is always connected in parallel with the resistor.

3. A continuous and closed path along which an electric current flows is called an _____

4. Those substances which have comparatively higher electrical resistivity are called _____

5. The property of a conductor by virtue of which it opposes the flow of electric current through it is called its _____

C. State whether the given statements are true or false.

1. The minimum current which can flow through a fuse without melting it, is called its rating.

2. Electric power is the rate at which electrical energy is consumed in an electric circuit.

3. Kilowatt-hour is the unit of electrical energy.

4. One kilowatt (1 kW) is equal to 10000 W.

5. As current flows through a conductor, the free electrons lose energy which is converted into heat.

Name: ....   Teacher's signature: ....

Class: .... X ....   Date: ....

D. Match the following.

1. Amount of heat produced $V \times I$

2. Electric power $I^2 \times R \times t$

3. Electrical energy $\dfrac{W}{Q}$

4. Resistance $P \times t$

5. Potential difference $\dfrac{V}{I}$

E. Answer the following questions.

Very Short Answer Questions

1. How much work is done in moving 5 C across two points having potential difference 8 V?

2. The manufacturer specifies that a certain lamp will allow 0.8 ampere of current when 120 volts is applied to it. What is the resistance of the lamp?

Short Answer Questions

1. What are the factors on which the resistance of a conductor depends?

2. Draw the circuit diagram to verify Ohm's law.

Long Answer Questions

1. Differentiate between resistors connected in series and resistors connected in parallel.

2. An electric heater of resistance 8 W draws 15 A from the service mains in 2 hours. Calculate the rate at which heat is developed in the heater.

ANSWERS

WORKSHEET 1

A. Tick (✓) the correct option.

1. b
2. c
3. d
4. c
5. c

B. Fill in the blanks.

1. potential difference
2. voltmeter
3. electric circuit
4. resistors
5. resistance.

C. State whether the given statements are true or false.

1. F
2. T
3. T
4. F
5. T

D. Match the following.

1. Amount of heat produced $I^2 \times R \times t$
2. Electric power $V \times I$
3. Electrical energy $P \times t$
4. Resistance $\dfrac{V}{I}$
5. Potential difference $\dfrac{W}{Q}$

E. Answer the following questions.

Very Short **Answer Questions**

1. $W = V \times Q = 8 \text{ V} \times 5 \text{ C} = 40 \text{ J}$
2. $V = I \times R$ So, $R = \dfrac{V}{I} = \dfrac{120 \text{ V}}{0.8 \text{ A}} = 150 \text{ W}$

Short Answer **Questions**

1. The electrical resistance of a conductor (or a wire) depends on the following factors:
   a. length of the conductor
   b. area of cross section of the conductor (or thickness of the conductor)
   c. temperature of the conductor
   d. nature of the material of the conductor

2.
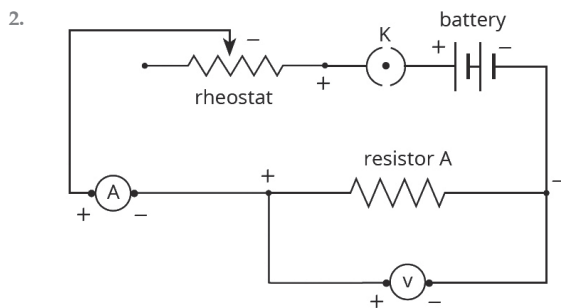
Long Answer **Questions**

1. Differences between resistors connected in series and resistors connected in parallel

Parameter	Resistors in series	Resistors in parallel
1. Current	The current is same in every resistor.	The current is not the same as the current through each resistor is inversely proportional to the resistance of the resistor, i.e. $I \propto \dfrac{1}{R}$.
2. Potential difference	The potential difference across each resistor is not the same, it is directly proportional to the resistance of that resistor, i.e. $V \propto R$.	The potential difference across each resistor is the same.
3. Total resistance	The total resistance in the series circuit is more than the greatest resistance in the circuit.	The total resistance of the circuit is always less than the smallest resistance in the circuit.
4. Total resistance (R)	$R = R_1 + R_2 + R_3$	$\dfrac{1}{R} = \dfrac{1}{R_1} + \dfrac{1}{R_2} + \dfrac{1}{R_3}$

2. Here,

$$\text{Resistance } (R) = 8 \ \Omega$$

$$\text{Current } (I) = 15 \ A$$

$$\text{Time } (t) = 2 \ h = 2 \times 3600 \ s = 7200 \ s$$

We know heat produced by heater,

$$H = I^2 \times R \times t$$

Putting the given values in the above equation, we get

$$H = (15 \ A)^2 \times 8 \ \Omega \times 7200 \ s$$

$$H = 225 \times 8 \times 7200 \ \text{joules}$$

$$H = 12960000 \ J$$

Rate at which heat is developed

$$= \frac{12960000 \ J}{7200 \ s} = 1800 \ J/s$$

Thus, the rate at which heat is developed in the heater is 1800 J/s.