

**Electricity Class 10 Sample Paper Set 1 – cbsephysics.com****I. Multiple Choice Questions (1 Mark)**

Choose the correct answer from the given options.

1. Electrical resistivity of a current-carrying conductor does not depend on -

(a) its length, (b) its thickness, (c) its shape, (d) nature of the material

2. In a conductor's electric current flows from 'A' to 'B.'

Which point has higher potential-

(a) A (b) B (c) Both have the same potential (d) Both have zero potential

3. If electrons flow from B to A, current will flow from

(a) A to B (b) B to A (c) Current will not flow (d) None of these

4. When a 2V battery is connected across an unknown resistor, there is a current of 50 mA in the circuit. The value of the resistance of the resistor is:

(a) 4  $\Omega$  (b) 40  $\Omega$  (c) 400  $\Omega$  (d) None of these

**II. Assertion-Reason Type Questions (1 Mark)**

For question numbers 1 and 2, two statements are given-one labeled as **Assertion** (A) and the other labeled **Reason** (R). Select the correct answer to these questions

(a) Both 'A' and 'R' are true, and 'R' is the correct explanation of the Assertion.

(b) Both 'A' and 'R' are true, but 'R' is not the correct explanation of the Assertion.

(c) 'A' is true, but 'R' is false.

(d) 'A' is false, but 'R' is true.

1. **Assertion:** Resistance depends only on the length and area of the cross-section of material, not on temperature.

**Reason:** Resistivity is a characteristic property of a material.

2. **Assertion:** Fuse wire should be thick and has high resistance.

**Reason:** Working principle of fuse wire is the joules law of heating.

### III. Very Short Answer Type Questions (1 Mark)

1. If the resistance of an electrical circuit remains constant, the potential difference across the two ends of the circuit decreases to half of its initial value. What change will occur in the current flowing through the circuit?
2. Which material is a better conductor, Silver or Copper?
3. What is the S.I. unit of resistivity? For an insulator, should it be high or low?
4. Why is an alloy used for making filaments of electric lamps? Write the name of the alloy.
5. Resistivity of a conductor always remains constant - [true or false]
6. Write the difference between a wire used in the electric heater and an Electric fuse wire.
7. Name a device that helps maintain the potential difference across a conductor.
8. Draw a circuit diagram that should have the following components:  
(a) Voltmeter (b) A two-cell battery (c) Bulb (d) A open key
9. On Which factor resistance of a current-carrying conductor depends?
10. How does the resistance of a current-carrying conductor change when its temperature is increased?
11. Why is Nichrome used to make an electric heating element coil?
12. Mention two special features of the material to be used as an element of an electric heater.
13. **How** does the resistance of a conductor change when its area of cross-section is decreased?
14. What do you mean by an electric circuit?
15. List the factors the resistance of a semiconductor depends on?
16. In an electric circuit, Write the relationship between the direction of conventional current (I) and the flow of electrons.

17. A given length of Wire is doubled on itself, and the process is repeated once again. The resistance of the Wire will increase or decrease?

#### V. Short Answer Type Questions-II (3 Marks)

1. Resistance of a copper wire length 2 m is  $52 \Omega$  at  $20^\circ\text{C}$ . If the diameter of the Wire is 0.6 mm, what will be the resistivity of the metal at that temperature?

3. Calculate the resistance of 1m wire of copper of diameter 2 mm. Given resistivity of copper is

$$1.72 \times 10^{-8} \Omega \text{ m.}$$

4. The resistance of a wire of 0.1 mm radius is  $20 \Omega$ . And, if the resistivity of the wire material is  $50 \times 10^{-8}$  ohm meter, find the Wire's length.

5. The resistance of a wire length 500 m is 2 ohm. If the resistivity of the material of Wire is

$1.6 \times 10^{-8}$  ohm meter, find the cross-section area of The Wire. How much does the resistance change

if the length of the Wire is doubled?

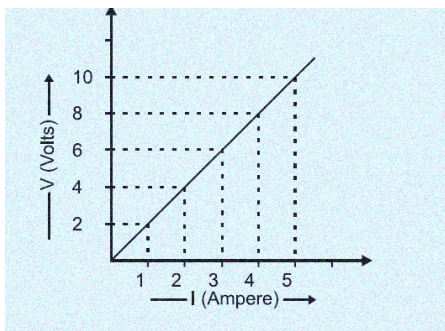
6. The electrical resistivity of three materials, X, Y, Z, are given below:

$$'X' = 2.3 \times 10^{-3} \text{ ohm metre } 'Y' = 2.63 \times 10^{-8} \text{ ohm metre } 'Z' = 1.0 \times 10^{-15} \text{ ohm metre}$$

Which material should you use for making (i) electric wires, (ii) handles for soldering iron and (iii) solar cells? Give supportive sentences to your answer.

7. If the ammeter or voltmeter you are using in Ohm's law experiment does not have any +ve and -ve terminal markings, how will you use that ammeter or voltmeter in the circuit?

8. Study the V–I graph and find the current value for  $V = 20$  volts. How can we determine the resistance of the resistor from this graph?



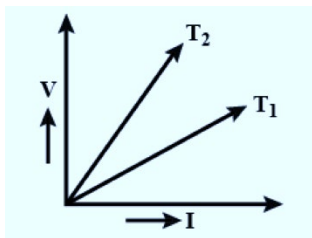
9. What do you mean by 1-ohm resistance? Calculate the resistance of a resistor if the current flowing through it is 500 mA when the applied potential difference is 1 V.

10. V–I graph for two wires, A and B, are shown in the figure. If both the wires are of the same

length and same thickness, which of the two is made of a material of high resistivity?

Give justification for your answer.

11. The voltage-current graph of a metallic conductor at two different temperatures,  $T_1$  and  $T_2$ , is shown below. At which temperature is the resistance higher?



12. The potential difference between the terminals of an electric heater is 100 V when it draws a current of 2 A from the source. What current will the heater draw if the potential difference is increased up to 120 V?

13. (i) How much current will an electric bulb draw from a 120 V source if the resistance of a bulb's filament is  $600 \Omega$ ?

(ii) How much current will an electric heater coil draw from a 110 V source. If the resistance of the

the heater coil is  $220 \Omega$ ?

14. A wire of given material having length  $L$  and area of cross-section  $A$  has a resistance of  $4 \Omega$ . What would be the resistance of another wire of the same material having length  $2L$  and area of cross-section  $A/2$ ?

15. A copper wire has a diameter of  $0.5 \text{ mm}$  and resistivity of  $1.6 \times 10^{-8} \Omega \text{ m}$ . What will be the length of this Wire to make its resistance  $10 \Omega$ ? How much does the resistance change if the diameter of the Wire is halved?

16. The values of current flowing in a given resistor for the corresponding potential difference  $V$  across a resistor is given below

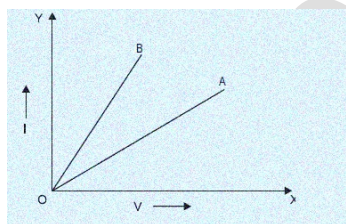
I (amperes)	0.5	1	2	3
V (volts)	1.6	3.4	6.7	10.2

Plot a graph between  $V$  and  $I$  and calculate the resistance of that resistor.

17. When a  $24 \text{ V}$  battery is connected across an unknown resistor, Find the value of the resistance of the resistor if the current flowing through the resistor is  $5 \text{ mA}$ .

18. A bulb is connected to a line of  $300\text{V}$  consumes  $100 \text{ watts}$  of power. The resistance of the filament of the bulb is?

19. The figure shows the  $V$ - $I$  graph for 'A' and 'B' for two wires. If both the wires have the same length and thickness, which Wire has less resistivity? Give justification for



your answer.

20. Draw the symbols of battery, Cell and Rheostat?

#### VI. Long Answer Type Questions (5 Marks)

1. (i) Define ohms law and its mathematical expression.

(ii) What do you mean by  $1 \text{ Ampere}$  current?

(iii) What is the relation between resistance and resistivity?

(iv) Name two factors on which the resistance of a conductor depends and two factors on which it does not depend.

3. State Ohm's law. Draw a labeled circuit diagram to verify this law in the laboratory. What kind of curve will you get if you draw a graph between the potential difference and current flowing through a metallic conductor? Explain how you would use this graph to determine the resistance of the conductor.

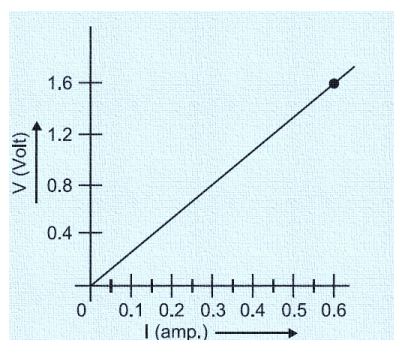
4. You have been assigned a duty to create awareness about the importance of saving electricity in your area.

(i) Write any two ways by which you will create awareness about saving electricity.

(ii) Explain how saving electricity is important at the individual and national levels.

5. (i) Draw a closed circuit diagram consisting of a 1 m long nichrome wire AB, an ammeter, a voltmeter, two cells of 6 V each and a switch.

(ii) Following graph was plotted between V and I values:



What would be the values of  $V/I$  ratios when the potential difference is 0.4 V, 0.8 V and 1.6 V, respectively? What conclusion can we draw from these values?

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