



ASSIGNMENT NO. 3

SUBJECT: PHYSICS

CLASS-X

OCTOBER'2026

1. Define electric current. Write its SI unit. A charge of 600 C flows through a conductor in 5 minutes. Calculate the current.
2. State Ohm's law. Draw a circuit diagram to verify it experimentally.
3. A potential difference of 12 V is applied across a resistor of 4 Ω . Calculate the current flowing through it.
4. Define resistance. State any two factors on which the resistance of a conductor depends.
5. Why are copper and aluminium commonly used for making electrical transmission wires? Give two reasons.
6. A wire of resistance 10 Ω is stretched to twice its original length. Assuming its volume and temperature remain constant, calculate its new resistance.
7. Three resistors of 2 Ω , 3 Ω and 6 Ω are connected in parallel. Calculate their equivalent resistance.
8. Two resistors of 5 Ω and 10 Ω are connected in series to a 30 V battery. Find (i) equivalent resistance, (ii) current in the circuit, and (iii) potential difference across each resistor.
9. Explain why household electrical appliances are connected in parallel rather than in series.
10. An electric bulb is rated 220 V, 100 W. Calculate (i) the current drawn by it and (ii) its resistance when operating at the rated voltage.
11. State Joule's law of heating. Write its mathematical expression and explain the meaning of each symbol.
12. An electric heater of resistance 40 Ω is connected to a 200 V supply. Calculate the heat produced in 2 minutes.
13. Two bulbs rated 60 W, 220 V and 100 W, 220 V are connected separately to a 220 V supply. Which bulb has greater resistance? Justify your answer with calculation.
14. What is the function of an electric fuse? Why is a fuse wire made of a material with a low melting point?
15. A 1.5 kW electric iron is used for 2 hours daily. Calculate the electrical energy consumed in 30 days in (i) kWh and (ii) joules.
16. Define electric resistance of a conductor?
17. A wire of length L and resistance R is stretched so that its length is double and the area of cross section is halved. How will its (i) resistance change (ii) resistivity change?
18. Draw a circuit diagram showing two resistors connected in series with a battery, a key and an ammeter. Connect a voltmeter to measure the potential difference across the combination. [3 marks]
19. Draw a circuit diagram showing two resistors connected in parallel across a battery. Show how an ammeter can be connected to measure the total current. [3 marks]

Assertion (A) AND Reason (R)

1. Assertion (A): The SI unit of electric current is the ampere.

Reason (R): Electric current is the rate of flow of electric charge.

2. Assertion (A): An ammeter is connected in series with the component through which current is to be measured.

Reason (R): An ammeter has very low resistance.

3. Assertion (A): A voltmeter is connected in parallel across a resistor.

Reason (R): A voltmeter has very high resistance.

4. Assertion (A): The resistance of a wire increases when its length increases, if its area of cross-section and material remain unchanged.

Reason (R): Resistance is directly proportional to the length of a conductor.

5. Assertion (A): In a series combination of resistors, the current through each resistor is the same.

Reason (R): The same charge per second passes through every resistor in a series circuit.

6. Assertion (A): The equivalent resistance of resistors connected in parallel is greater than the resistance of every individual resistor.

Reason (R): In a parallel combination, current has more than one path to flow.

7. Assertion (A): A fuse wire is connected in series with the electrical appliance.

Reason (R): A fuse melts when excessive current flows through it and breaks the circuit.

8. Assertion (A): The heating effect produced by a current-carrying resistor depends on the square of the current for a fixed resistance and time.

Reason (R): Joule's law of heating is $H = I^2Rt$.

9. Assertion (A): Two resistors connected in parallel have the same potential difference across them.

Reason (R): In a parallel combination, both resistors are connected across the same two points.

10. Assertion (A): A 100 W bulb consumes more electrical energy in one hour than a 60 W bulb operating for the same time.

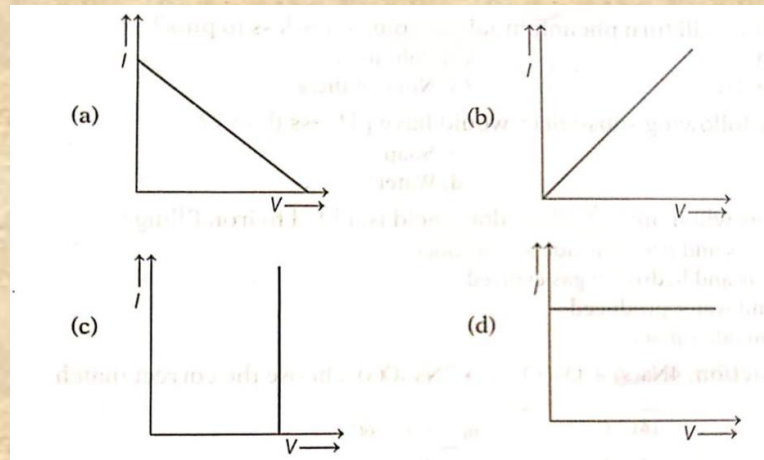
Reason (R): Electrical energy consumed is equal to power multiplied by time.

11. Read the following and answer any **four** questions from 20 (i) to 20 (v)

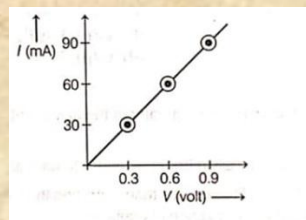
In an experiment, a student designed a circuit in order to verify Ohm's law. He used the components like ammeter, voltmeter, resistance (wire) and plug key in designing the circuit. He observed that the current was varying with respect to potential difference across the circuit. He recorded various readings of current corresponding to different values of potential difference as shown in the following table.

S.NO	Potential difference (in V)	Current (mA)
1	0.3	30
2	0.6	60
3	0.9	90

(i) The graph between current (I) and potential difference (V) in the experimental verification of Ohm's law should be of the type

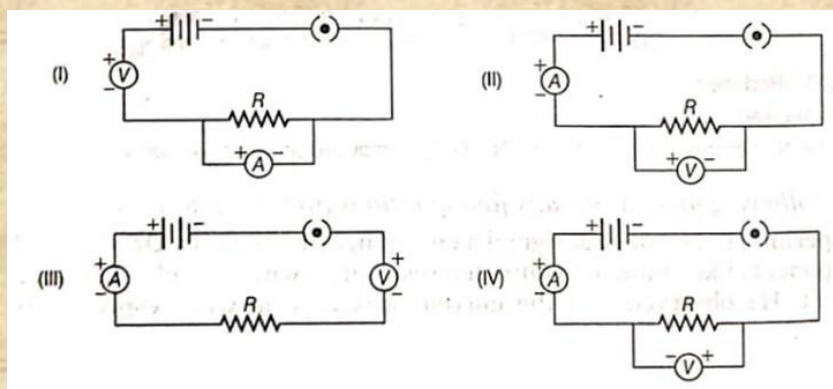


(ii) In the graph shown, the resistance of the conductor will be



(a) 1000Ω (b) 10Ω (c) 100Ω (d) 10Ω

(iii) Four students set up the circuit for the experiment of Ohm's law as shown



The correct circuit is

(a) I (b) II (c) III (d) IV

(iv) A copper wire has diameter 0.5mm and resistivity $\rho = 1.6 \times 10^{-8} \Omega - m$. what will be the length of its wire to make its resistance 10Ω ?

(a) 120m

(b) 123m

(c) 150m

(d) 160m

(v) If the diameter of the wire used in the experiment is doubled, then

(a) the resistance will remain unchanged

(b) the resistance will become four times of its original value

(c) the resistance will become one-fourth of its original value

(d) None of the above