

Electricity

Q1 Assertion: The current flowing through a conductor is directly proportional to the voltage applied across it.

Reason: According to Ohm's Law, $V = IR$, where V is the voltage, I is the current, and R is the resistance of the conductor.

- ☒ (A) Both Assertion and Reason are correct, and Reason is the correct explanation of Assertion.
- (B) Both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.
- (C) Assertion is correct, but Reason is incorrect.
- (D) Assertion is incorrect, but Reason is correct.

Q2 Ohm's law establishes the relationship between what?

- ☒ (A) Voltage, current and resistance
- (B) Power, energy and time
- (C) speed, mass and acceleration
- (D) frequency, wavelength and velocity

Q3 According to Ohm's law, if current (I) increases and potential difference (V) remains constant,

then:

- (A) Resistance unchanged
- (B) Resistance increases
- (C) Potential difference decreases
- ☒ (D) Resistance decreases

Q4 Match the following

- (a) Right-hand thumb rule (i) Voltage Current Relation
- (b) Joules Heating (ii) Force between two charges
- (c) Coloumb's Law (iii) Fuse
- (d) Ohms Law (iv) Direction of Current due to Magnetic Field
- (A) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)
- (B) (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv)
- (C) (a) - (iv), (b) - (ii), (c) - (iii), (d) - (i)
- (D) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)

Q5 What is the relationship between current (I), voltage (V), and resistance (R) in Ohm's Law?

- (A) $I = V + R$
- ☒ (B) $I = V / R$
- (C) $I = V * R$
- (D) $I = R / V$



Answer Key

Q1 (A)

Q2 (A)

Q3 (D)

Q4 (A)

Q5 (B)



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Hints & Solutions

Q1 Text Solution:

Key Concept: Ohm's Law

Explanation:

Assertion: Ohm's Law states that the current (I) through a conductor is directly proportional to the voltage (V) applied across it, provided the temperature remains constant.

Reason: Ohm's Law is mathematically expressed as $V = IR$, where R is the resistance of the conductor.

This equation shows that for a given resistance, the current is directly proportional to the voltage.

Hence, the correct answer is Option A.

Video Solution:



Q2 Text Solution:

- Ohm's law shows the relationship between voltage (V), current (I) and resistance (R) in electrical circuits.
- The potential difference (voltage) across a conductor at a given temperature is directly proportional to the electric current flowing through it and inversely proportional to its resistance.
- $V = IR$
- V = voltage (in volts)
- I = current (in ampere)
- R = resistance (in ohms)

Video Solution:



Q3 Text Solution:

- Ohm's law states that resistance (R) decreases if current (I) increases and potential difference (V) remains constant.
- According to Ohm's law, the voltage at two points and the current flowing through a conductor between them are directly proportional.
- $V = IR \Rightarrow R = V/I \Rightarrow R \propto V/I$
- From the above equation, it is clear that:
- $I \propto V$: Increasing the voltage will cause the current to increase.
- $R \propto 1/I$: Increasing the resistance will cause the current to decrease.
- So if the current increases voltage will be constant and resistance will decrease.

Hence, the correct answer is "Resistance decreases".

Video Solution:



Q4 Text Solution:

- Right-hand thumb rule: If we hold the current-carrying conductor in the right hand such that the thumb points in the direction of current, the fingers encircle the wire in the direction of magnetic lines of force.
- Joule's law of heating states that "when a current I passes through a conductor of resistance R for a time t , then the heat developed in the conductor is equal to the product of the square of current, the resistance, and time. This is used to make fuses that meltdown in case of excess current and protect the electrical devices.
- Coloumb's Law: The force of interaction of two stationary point charges in a vacuum is directly proportional to the product of these



charges and inversely proportional to the square of their separation.

- Ohms Law: At a particular temperature, the current's strength is directly proportional to the potential difference across its ends.

Hence, the correct answer is '(a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)'.

Video Solution:



Q5 Text Solution:

According to Ohm's Law, the current (I) flowing through a conductor between two points is directly proportional to the voltage (V) across the two points and inversely proportional to the resistance (R) of the conductor, which is mathematically expressed as $I=V/R$.

Video Solution:



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