

Chapter: 14

Current Electricity

www.pakcity.org

www.pakcity.org

Exercise MCQs

pakcity.org

1. An electric current in conductors is due to the flow of:
(A) positive ions (B) negative ions
(C) positive charges (D) free electrons
2. What is the voltage across a $6\ \Omega$ resistor when 3 A of current passes through it?
(A) 2 V (B) 9 V (C) 18 V (D) 36 V
3. What happens to the intensity or the brightness of the lamps connected in series as more and more lamps are added?
(A) increases (B) decreases
(C) remains the same (D) cannot be predicted
4. Why should household appliances be connected in parallel with the voltage source?
(A) to increase the resistance of the circuit
(B) to decrease the resistance of the circuit
(C) to provide each appliance the same voltage as the power source
(D) to provide each appliance the same current as the power source
5. Electric potential and E.M.F
(A) are the same terms (B) are the different terms
(C) have different units (D) both (b) and (c)
6. When we double the voltage in a simple electric circuit, we double the
(A) current (B) power (C) resistance (D) both (a) and (b)
7. If we double both the current and the voltage in a circuit while keeping its resistance constant, the power
(A) Remains unchanged (B) halves (C) doubles (D) quadruples
8. What is the power rating of a lamp connected to a 12 V source when it carries 2.5 A?
(A) 4.8 W (B) 14.5 W (C) 30 W (D) 60 W
9. The combined resistance of two identical resistors, connected in series is $8\ \Omega$. Their combined resistance in a parallel arrangement will be?

(A) 2 Ω (B) 4 Ω (C) 8 Ω (D) 12 Ω **Answer Key:**

1	(D)	6	(D)
2	(C)	7	(D)
3	(C)	8	(C)
4	(C)	9	(A)
5	(B)		

Short Questions



Q1. Define the term Electric Current.

Ans: “The rate of flow of electric charge through any cross-sectional area is called Electric current”.

Formula:

$$\text{Current} = \frac{\text{Charge}}{\text{Time}} \quad \text{or} \quad I = \frac{Q}{t}$$

Unit:

SI unit of Current is Ampere.

Q2: What is the difference between Electronic current and Conventional current?

Ans: The difference between Electronic current and Conventional current is:

Electronic Current	Conventional Current
The current due to the motion of negative charges that flows from the negative terminal of the battery to the positive terminal in the electrical circuit is called Electronic current.	The current due to the motion of positive charges that flows from the positive terminal of the battery to its negative terminal is called Conventional current.

Q3: How can we differentiate between E.M.F and Potential difference?

Ans: The difference between E.M.F and Potential difference is:

E.M.F	Potential Difference
-------	----------------------

- | | |
|--|--|
| <ul style="list-style-type: none"> ➤ Electromotive force is the total voltage in the battery. ➤ Electromotive force is always greater. ➤ EMF is only applicable to an electric field. | <ul style="list-style-type: none"> ➤ Potential difference is the work done in moving a charge against the electric field. ➤ The potential difference is always small. ➤ Potential difference is only applicable to magnetic, gravitational, and electric field. |
|--|--|

Q4: Define Ohm's Law.

Ans: If V is the potential difference across the two ends of any conductor, then current I will flow through it. The value of the current changes with the changes in potential difference and explained by Ohm's law.

Q5: Define Resistance and its Units.

Ans: "The property of a substance which offers opposition to the flow of current through it is called its Resistance."

Unit:

SI unit of resistance R is ohm.

Q6: What is the difference between Conductors and Insulators?

Ans: The difference between Conductors and Insulators is:

Conductors	Insulators
<ul style="list-style-type: none"> ➤ A material or an object that conducts heat, electricity, light, or sound is called Conductors. ➤ Conductors have a very small value of resistance. 	<ul style="list-style-type: none"> ➤ A material that does not easily transmit energy, such as electric current or heat is called Insulators. ➤ Insulators have a very large value of resistance.
Example: Gold and Silver	Example: Wood and Plastic

Q7: What is Joule's law?

Ans: Joule's Law:

The amount of heat generated in resistance due to the flow of charges is equal to the product of the square of the current (I), resistance (R), and the time duration (t).

Q8: What is the difference between D.C and A.C?

Ans: The difference between D.C and A.C is:

D.C	A.C
-----	-----

- | | |
|---|--|
| <ul style="list-style-type: none"> ➤ If the current flows in only one direction it is called direct current. ➤ The positive and negative terminals of d.c sources have fixed polarity. ➤ The current derived from a cell or a battery. | <ul style="list-style-type: none"> ➤ If the current constantly changes direction, it is called alternating current. ➤ Alternating current is a current which changes its polarity again and again. ➤ The current is produced by A.C generation. |
|---|--|

Q9: Discuss the main features of Parallel combination of resistors.

Ans: In parallel combination, one end of each resistor is connected with positive terminal of the battery while the other end of each resistor is connected with the negative terminal of the battery.

Equivalent resistance:

From Ohm's Law:

$$\frac{V}{R_e} = V \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \right)$$

$$\frac{1}{R_e} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots + \frac{1}{R_n}$$

Q10: Determine the equivalent resistance of a Series combination of resistors.

Ans: In series combination, resistors are connected end to end and electric current has a single path through the circuit. This means that the current passing through each resistor is the same.

Equivalent resistance:

From Ohm's Law:

$$V = IR$$

$$IR_e = I(R_1 + R_2 + R_3 + \dots)$$

$$R_e = R_1 + R_2 + R_3 + \dots$$

Q11: Describe briefly the Hazards of household electricity.

Ans: Major dangers of electricity are electric shock and fire by short circuit.

Q12: Describe two safety measures that should be taken in connection with the household circuit?

Ans: Take much care to use fuses and circuit breakers in an electric circuit as safety devices.

Q13: Define circuit breaker.

Ans: The circuit breaker acts as a safety device in the same way as a fuse.

Q14: What is a difference between a cell and a battery?

Ans: A cell is a single unit at the base voltage. A battery can be a single cell or multiple cells connected together in series or parallel to make the voltage/current rating desired.

Q15: Can current flow in a circuit without potential difference?

Ans: No, current does not flow in a circuit without potential difference. Current flows from higher potential to a lower potential.

Q16: What are damp conditions?

Ans: Never operate any electrical appliance with wet hands. Also keep switches, plugs sockets, and wires dry.

Q17: In order to measure current in a circuit why ammeter is always connected in series?

Ans: In order to measure current in a circuit the ammeter is connected in series, so the current flowing in the circuit also passes through the ammeter.

Q18: In order to measure voltage in a circuit voltmeter is always connected in parallel. Discuss?

Ans: Voltmeter is always connected in parallel with the resistance across which the potential difference is to be measured. Higher the resistance of the voltmeter, more reliable would be its readings.

Q19: What is meant by earth wire?

Ans: There is no current in earth wire. The earth wire is connected to a large metal plated buried deep in the ground near the house.

Q20: Why diamond does not conduct electricity?

Ans: Diamond does not conduct electricity because it has no free electrons.

Q21: Define electric potential and write its unit?

Ans: Electric potential at a point in an electric field is equal to the amount of work done in bringing a unit positive charge from infinity to that point.

Unit:

The unit of electric potential is Volt (V).

Q22: Define unit of power.

Ans: The unit of electric power is Watt.

Watt:

The electric power is said to be one watt if one joule of energy is supplied by current in one second.

Q23: Does a fuse in a circuit control the potential difference or the current?

Ans: Fuse in a circuit controls the excess amount of current.

Q24: Differentiate between Galvanometer and Ammeter?

Ans: Difference between Galvanometer and Ammeter is:

Galvanometer	Ammeter
Galvanometer is very sensitive instrument and can detect small current in a circuit.	Ammeter is also used to measure current. A current as 1A to 10A can be measured by ammeter.

Q25: Define unit of current.

Ans: SI unit of current is ampere (A)

Ampere:

If a charge of one coulomb passes through a cross sectional area in one second, then current is one ampere.

Q26: Differentiate between Ohmic and Non-Ohmic Materials.

Ans: Difference between Ohmic and Non-Ohmic Materials is:

Ohmic Materials	Non-Ohmic Materials
Materials that have a constant resistance over change of voltages and currents.	Materials having resistance that changes with voltage or current.

Q27: Define Resistivity and write its unit.

Ans: The resistance of one metre cube of a substance is called resistivity.

Unit:

The unit of resistivity is ohm metre.

Q28: Define Kilowatt hour.

Ans: The amount of energy delivered by a power of one kilowatt in one hour is called kilowatt hour.

Q29: Define electric power.

Ans: The amount of energy supplied by current in unit time is known as electric power.