

Exercise MCQs

1. A positive electric charge:

- (A) Attracts other positive charge (B) Attracts a neutral charge
(C) repels other positive charge (D) repels a neutral charge

2. An object gains excess negative charge after being rubbed against another object which is:

- (A) Neutral (B) Negatively charged
(C) positively charged (D) either a, b or c

3. Two unchanged objects A and B are rubbed against each other.

- (A) Remains unchanged (B) Becomes negatively charged
(C) becomes positively charged (D) unpredictable

4. When you rub a plastic rod against your hair several times and put it near some bits of paper, the pieces of paper are attracted towards it. What does this observation indicate?

- (A) The rod acquires a negative charge (B) The rod and the paper are oppositely charged
(C) the rod acquires a positive charge (D) the rod and the paper has the same charges

5. According to coulomb's law, what happens to the attraction of two oppositely charged objects as their distance of separation increases?

- (A) Increases (B) Remains unchanged
(C) decreases (D) cannot be determined

6. The coulomb's law is valid for the charges which are:

- (A) Moving and point charges (B) Stationary and point charges
(C) moving and non-point charges (D) stationary and large size charges

7. A positive and a negative charge are initially 4 cm apart. When they are moved closer together so that they are now only 1 cm apart, the force between them is:

- (A) 4 times smaller than before (B) 8 times larger than before
(C) 4 times larger than before (D) 16 times larger than before

8. Five joules of work is needed to shift 10 C of charge from one place to another, The potential difference between the places is:

- (A) 0.5 V (B) 2 V (C) 5 V (D) 10 V

9. Two small charged spheres are separated by 2 mm. Which of the following would produce the greatest attractive force?

- (A) +1 q and +4 q (B) -1 q and -4 q
(C) +2 q and +2 q (D) +2 q and -2 q

10. Electric field lines:

- (A) Always cross each other (B) cross each other in the region of strong field
(C) Never cross each other (D) cross each other in the region of weak field

11. Capacitance is defined as:

- (A) VC (B) Q/V (C) V/Q (D) QV

Answer Key:

1	(C)	7	(D)
2	(B)	8	(A)
3	(B)	9	(D)
4	(B)	10	(C)
5	(C)	11	(B)
6	(B)		

Short Questions

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Q1. How electric charge is produced?

Ans: The electric charge is produced by rubbing a neutral body with another neutral body.

Q2: Define electrostatic induction?

Ans: If in the presence of charged body, an insulated conductor has like charges at one end and unlike charges at the other end then this is called the electrostatic induction.

Q3: What is Gold leaf electroscope?

Ans: "The gold leaf electroscope is sensitive instrument for detecting charges".

Q4: How can a charge are detected on a body?

Ans: In order to detect the presence of charge on anybody, bring the body near the disk of an unchanged electroscope. If the body is neutral there will be no deflection of the

leaves. But if the body is positively or negatively charged, the leaves of the electroscope diverge.

Q5: Define Charge?

Ans: Charge is the property of a body which attracts or repels the other bodies.

Q6: Explain Coulomb's law of electrostatics and write its mathematical form?

Ans: "The force of attraction or repulsion between two point charges is directly proportional to the product of the magnitude of charges and inversely proportional to the square of the distance between them".

Mathematical form:

If there are two point charges q_1 and q_2 , separated by a distance (r), then the electrostatic force F between the charges.

$$F \propto q_1 q_2$$

$$\text{Force} \propto \frac{1}{\text{Distance}^2}$$

$$F \propto \frac{1}{R^2}$$

Combining above both two equations:

$$F \propto \frac{q_1 q_2}{R^2}$$

$$F \propto \frac{q_1 q_2}{R^2}$$

Above equation is called Coulomb's law.

Q7: What is meant by Electric field and Electric intensity?

Ans: Electric Field:

The electric field is a region around a charge in which it exerts electrostatic force on another charges.

Electric field Intensity:

The strength of electric field at any point in space is known as electric field intensity.

Q8: For what purpose electroscope is used?

Ans: Electroscope is used to detect the presence of charge on a body.

Q9: How would you define Potential difference between two points? Define its unit.

Ans: Potential difference between two points becomes equal to the energy supplied by the charge. Thus, we define potential difference between two points as the energy supplied by a unit charge as it moves from one point to the other in the direction of the field.

Unit:

Unit of potential difference is Volt.

Q10: What is meant by electroscope?

Ans: The instrument which is used to detect the presence of electric charge and a body is called electroscope.

Q11: What do you mean by the Capacitance of a capacitor? Define units of capacitance.

Ans: Capacitance of capacitor is defined as “the ability of the capacitor to store charge”. It is given ratio of charge and the electric potential as:

$$C = \frac{Q}{V}$$

Unit:

SI unit of capacitance is farad.

Q12: Derive the formula for the equivalent capacitance for a series combination of a number of capacitors?

Ans: In this combination, the capacitors are connected side by side.

$$V = V_1 + V_2 + V_3$$

$$V = \frac{Q}{C_1} + \frac{Q}{C_2} + \frac{Q}{C_3}$$

$$V = Q \left(\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} \right)$$

$$\frac{V}{Q} = \left(\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} \right)$$

$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$$

Q13: Discuss different Types of Capacitors?

Ans: Capacitors are either Variable or Fixed.

1. Variable Capacitor
2. Fixed Capacitor

Fixed Capacitors are two types:

1. Paper Capacitor
2. Mica Capacitor

Q14: What is difference between variable and fixed type capacitor?

Ans: A **fixed capacitor** is constructed in such manner that it possesses a fixed value of capacitance which cannot be adjusted. While in **variable type of capacitors** some arrangement is made to change the area of the plates facing each other.

Q15: Enlist some Uses of capacitors?

Ans: Uses of Capacitors:

- Capacitors are used for tuning transmitters, receivers and transistor radios.
- Capacitors are used in electronic circuits of computers.
- Capacitors are used to differentiate high and low frequency.

Q16: Discuss one Application of static electricity?

Ans: Powder Painting use static electricity to paint new cars.

Q17: What are Hazards of static electricity?

Ans: Hazards of static electricity are as follows given: -

(i) Lightning

(ii) Fires or Explosions

Q18: Write the use of capacitor?

Ans: The uses of capacitor are:

1. Tuning transmitters
2. Table fans, exhaust fans
3. Receiver and transistor radios

Q19: What is the difference between capacitor and dielectric?

Ans: The difference between capacitor and dielectric is:

Capacitor	Dielectric
A device used for storing electric charge is called a capacitor.	The medium between the two plates is air or a sheet of some insulator. This medium is known as dielectric.

Q20: In what direction will a positively charged particle move in an electric field?

Ans: It depends upon the source of electric current.



Q21: Define Volt?

Ans: If one joule of work is done against the electric field in bringing one coulomb positive charge from infinity to a point in the electric field then the potential at that point will be one volt.

Q22: Define electric potential?

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.

Q23: Describe two properties of electric lines of force?

Ans: Two properties of electric lines of force are:

- Field lines always move away from positive charge towards negative charge.
- The spacing between the field lines shows the strength of electric field.

Q24: Define electric field lines?

Ans: In electric field, the direction of electric intensity is represented by lines which are called electric field lines.

Q25: What is unit of capacitance? Define it.

Ans: The SI unit of capacitance is farad.

★ Additional Short Questions ★

Q1. Define electrolyte?

Ans: Electrolyte is a solution in which current flow because of ions.

Q2: Write two uses of electrostatics?

Ans: Two uses of electrostatics are:

1. Electrostatics is used in photocopying.
2. Electrostatics is used in Car Painting.

Q3: How a capacitor store charge?

Ans: The charge on each plate attract each other and thus remained bound with in the plates, in this way charge is stored in a capacitor for long time.

Q4: Distinguish between watt and kilowatt hour?

Ans: Distinguish between watt and kilowatt hour is:

Watt	kilowatt hour
The electric power is said to be one watt if one joule of energy is supplied by current in one second.	The amount of energy delivered by a power of one kilowatt in one hour is called kilowatt hour.

Q5: Define electrostatics?

Ans: The study of charges at rest is called electrostatics.