



MODERN SCIENCE ACADEMY

CHATHA BAKHTAWAR, ISLAMABAD

13. "ELECTROSTATICS"

Sr.	Statements	A	B	C	D
1	A positive electric charge:	attracts other positive charge	repels other positive charge	attracts a neutral charge	repel neutral charge
2	An object gains excess negative charge after being rubbed against another object which is:	neutral	negatively charged	positively charged	either a, b or c
3	Two uncharged objects A and B are rubbed against each other. When object B is placed near a negatively charged object C, two objects repel each other. Which of these statements is true about A?	remains unchanged	becomes positively charged	becomes negatively charged	cannot be predicted
4	When combing our hair, we shift electrons from our hair onto the comb. The charge on our hairs is:	positive	negative	infinite	zero
5	Initially, sphere A has charge of $-50e$ and sphere B has charge of $+20e$. The spheres are made of conducting material and are identical in size. If the spheres then touch, what is the resulting charge on sphere A ?	$+15e$	$-15e$	$+30e$	$-30e$
6	What happens to attraction of two oppositely charged objects as distance b/w them increases?	increase	decreases	remains unchanged	cannot be determined
7	The Coulomb's law is valid for the charges which are:	moving point charges	moving & non-point charges	stationary & point charges	stationary & large charges
8	A positive and negative charge are initially 4 cm apart. When they are moved close together so that they are now only 1 cm apart, force b/w them is:	4 times larger than before	4 times smaller than before	8 times larger than before	16 times larger than before
9	Five joules of work is needed to shift 10 C of charge from one place to another. The potential difference between the plates is:	0.5 V	2 V	5 V	10 V
10	Two charged spheres are separated by 2mm. Which of the following produce greatest attractive force?	$+1q$ and $+4q$	$-1q$ and $-4q$	$+2q$ and $+2q$	$+2q$ and $-2q$
11	Electric field lines:	always cross each other	never cross each other	cross in region of strong field	cross in weak field
12	Capacitance is defined as:	VC	Q/V	QC	V/Q
13	If the potential difference between plates of a capacitor is reduced to half, then capacitance of the capacitor becomes:	half	double	$\frac{1}{4}$ th	remains same
14	If a capacitor stores charge of 10 C when potential difference of 5 V is applied, what will be charge on capacitor if 20 V are applied on it?	20 C	30 C	40 C	10 C
15	Charges are of types:	1	2	3	4
16	Unit of charge:	volt	coulomb	ampere	ohm
17	The electroscope is an instrument which is used for:	detecting electric charges	identifying conductors	storing charge	both A & B
18	To protect the gold leaves from external disturbances, a foil grounded is made of:	aluminium	silver	copper	brass
19	Which of the followings is touched with disc of charged electroscope but gold leaves of electroscope do not collapse?	paper rod	steel rod	copper rod	graphite rod
20	Formula for Coulomb's force:	$F = k \frac{q_1 q_2}{r^2}$	$F = k \frac{q_2}{r^2}$	$F = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2}$	Both A & C
21	What is electrostatic force between two charges each of 1mC separated by 1m?	900 N	9000 N	9×10^9 N	90 N

22	If the distance between charges is doubled, then force between them becomes:	half	$\frac{1}{4}$ th	double	4 times
23	The value of Coulomb's constant is:	$9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$	$9 \times 10^{-9} \text{ Nm}^2\text{C}^{-2}$	$9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$	$9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$
24	The value of "k" depends on:	medium	size of charges	separation between charges	all of these
25	If both the magnitude of charges and distance b/w them is doubled, then Coulomb's force will be:	doubled	half	remains same	one fourth
26	The electric lines of force were introduced by:	Newton	Faraday	Coulomb	Einstein
27	How will be the electric lines of force where electric field is strong?	apart	closer	from +ve to -ve charge	from -ve to +ve charge
28	If 4 J work is done on a 2 C charge against the direction of electric field, the electric potential is:	1 volt	2 volts	4 volts	8 volts
29	The unit of electric potential is:	Js	JC^{-1}	J	Jm^{-1}
30	The unit of electric intensity is:	NC^{-1}	Vm^{-1}	V	Both A & B
31	If a charge of 2 C experiences force of 10 N in the electric field of 5 C charge, electric field intensity at that point is:	5 N/C	2 N/C	10 N/C	20 N/C
32	Formula for electric potential is:	$V = \frac{q}{W}$	$V = \frac{W}{q}$	$V = \frac{F}{q}$	$V = qW$
33	Capacitors are used to store charge:	resistance	voltage	charge	current
34	Factors on which capacitance depends:	2	3	4	5
35	S.I unit of capacitance is:	newton	volt	coulomb	farad
36	If three capacitors of 3 pF, 4 pF and 5 pF are connected in parallel with a battery of 6V. Total capacitance will be:	6 pF	12 Pf	14 pF	17 pF
37	Capacitor blocks:	DC	AC	both	none
38	In series combination of capacitors, each capacitor will have same:	voltage	charge	capacitance	none
39	Which one is incorrect when three capacitors are connected in parallel:	$V_1=V_2=V_3$	$Q=Q_1+Q_2+Q_3$	$C_{eq}=C_1+C_2+C_3$	$Q_1=Q_2=Q_3$
40	If two capacitors are connected in series then capacitance of their combination:	increases	decreases	remains same	always increase 4 times
41	An additional capacitor is added parallel to a group of capacitors already connected in parallel, the equivalent capacitance:	increases	stays the same	decreases	goes to zero
42	In Mica capacitor, the dielectric is:	aluminium	plastic	paper	mica
43	Capacitors used to differentiate between high frequency and low frequency signals:	series circuit	parallel circuit	filter circuit	none of these
44	How many electrons form 1C charge?	1.6×10^{-19}	6.25×10^{-19}	1.6×10^{19}	6.25×10^{-19}
45	Which is a vector quantity?	electric field intensity	electric potential	potential difference	capacitance
46	Four identical $1\mu\text{F}$ capacitors are connected together electrically. What is the least possible capacitance of the combination?	$4\mu\text{F}$	$1\mu\text{F}$	$1/4\mu\text{F}$	$1/8\mu\text{F}$
47	A capacitor C has a charge Q. The actual charges on its plates are:	Q, Q	Q, 0	Q, -Q	$Q/2$, $-Q/2$

"Important Short Questions"

- 1) Define charge. Write three properties of charge.
- 2) How can you show by simple experiments that there are two types of electric charges?
- 3) Normally, objects with large number of electrons are electrically neutral. Why?
- 4) Rub plastic ruler with your hair. Place it near running water from tap. You see that thin stream is deflected, why?
- 5) How does shuffling feet across a carpet cause hair to stand on our body?
- 6) Two identical spheres have same masses. Then we charge both sphere oppositely charged. After charging, will there be both bodies have same masses or different masses? Explain.

- 7) Why the pieces of paper initially attracted by charged comb fly away when they touch it?
- 8) Define electrostatic induction. Describe the methods of charging bodies by electrostatic induction?
- 9) How does electrostatic induction differ from charging by friction?
- 10) Why neutral objects are always attracted by charged object? Not repelled.
- 11) You take your car to service station to get it polished. After a while, you observe that your car attracts the dust. Why is dust attracted by the car?
- 12) With the help of electroscope, how you can find presence of charge on a body?
- 13) Describe how would you determine nature of charge on a body using electroscope.
- 14) Is it necessary for a charged body actually to touch the ball of the electroscope for the leaves to diverge? Justify your answer.
- 15) What is meant by electric field and electric intensity?
- 16) Is electric intensity a vector quantity? What will be its direction?
- 17) What are electric field lines? Write their three characteristics.
- 18) What is the relation between electric potential and electric potential energy?
- 19) How would you define potential difference between two points? Define its unit.
- 20) What do you mean by the capacitance of a capacitor? Define units of capacitance.
- 21) Do two capacitors of different plate area gain same or different amount of charge if connected with same e.m.f?
- 22) A device has capacitance of 250 nC. You are asked to decrease its capacitance to 50 nC. How can you get it by connecting another capacitor with it?
- 23) The force between two point charges is 10 N. If their charge is doubled and distance between them is reduced to half, what will be magnitude of force between them?
- 24) A 100 C charged body of mass 20 kg repels 1 C charged body of 10 g with a force of 2000 N. Will smaller charged body apply same force or smaller force? Justify your answer.
- 25) What would happen if two insulating plates were used instead of conducting plates to construct a capacitor?
- 26) The sum of charges on both plates of a capacitor is zero. What does a capacitor store?
- 27) What is paper capacitor and mica capacitor?
- 28) What is the difference between variable and fixed type capacitor?
- 29) Write some uses of capacitors.
- 30) An electrified rod attracts pieces of paper. After a while, these pieces fly away. Why?
- 31) In what direction will a positively charged particle move in an electric field?
- 32) Does each capacitor carry equal charge in series combination? Explain.
- 33) If you wish to store a large amount of energy in a capacitor bank, would you connect capacitors in series or parallel? Justify your answer.
- 34) Each capacitor in parallel combination has equal potential difference between its two plates. Why?
- 35) What is the purpose of hanging metal chain beneath gasoline truck?
- 36) How electrostatic paintings is better than conventional spray painting?
- 37) Why are lightning rods normally at higher elevation than the buildings they protect?
- 38) Why is it dangerous for construction workers to hold long steel pole upright during lightning weather condition?

“Important Long Questions”

- 1) State Coulomb’s law. Derive its expression and write its limitations.
- 2) What is gold leaf electroscope. Discuss its construction, working and uses.
- 3) Derive the formula for the effective capacitance for a parallel combination of capacitors.
- 4) Explain series combination of capacitors.
- 5) Discuss one application and one hazard of static electricity.