**SAINIK SCHOOL GOPALGANJ**

**SUB: PHYSICS**

**CLASS - XII**

**SUMMER VACATION ASSIGNMENT**

**CHAPTER - 1**

1. Five balls numbered 1 to 5 are suspended using separate threads. Pairs (1, 2), (2, 4) and (4, 1) show electrostatic attraction, while pair (2, 3) and (4, 5) show repulsion. Therefore ball 1 must be

(a) Positively charged (b)Negatively charged

(c) Neutral (d) Made of metal

1. Equal charges  are placed at the four corners  of a square of length . The magnitude of the force on the charge at *B* will be

(a)  (b) 

(c)  (d) 

1. Two identical conductors of copper and aluminium are placed in an identical electric fields. The magnitude of induced charge in the aluminium will be

(a) Zero (b) Greater than in copper

(c) Equal to that in copper (d) Less than in copper

1. Two spherical conductors *B* and *C* having equal radii and carrying equal charges in them repel each other with a force *F* when kept apart at some distance. A third spherical conductor having same radius as that of *B* but uncharged is brought in contact with *B*, then brought in contact with *C* and finally removed away from both. The new force of repulsion between *B* and *C* is

(a)  (b) 

(c)  (d) 

1. When a body is earth connected, electrons from the earth flow into the body. This means the body is…..

(a) Unchanged (b) Charged positively

(c) Charged negatively (d) An insulator

1. The charges on two sphere are +7*μC* and – 5*μC* respectively. They experience a force *F*. If each of them is given and additional charge of – 2*μC*, the new force of attraction will be**]**

(a) *F* (b) *F* / 2

(c)  (d) 2*F*

1. The ratio of electrostatic and gravitational forces acting between electron and proton separated by a distance  will be (Charge on electron = 1.6 × 10–19 *C*, mass of electron = 9.1 × 10–31 *kg*, mass of proton =  

(a) 2.36 × 1039 (b)2.36 × 1040

(c) 2.34 × 1041 (d) 2.34 × 1042

1. Two point charges 3 × 10–6 *C* and 8 × 10–6 *C* repel each other by a force of 6 × 10–3 *N*. If each of them is given an additional charge – 6 × 106 *C*, the force between them will be

(a) 2.4 × 10–3 *N* (attractive) (b) 2.4 × 10–9 *N* (attractive)

(c) 1.5 × 10–3 *N* (repulsive) (d) 1.5 × 10–3 *N* (attractive)

1. Two equally charged, identical metal spheres *A* and *B* repel each other with a force '*F*'. The spheres are kept fixed with a distance '*r*' between them. A third identical, but uncharged sphere *C* is brought in contact with *A* and then placed at the mid-point of the line joining *A* and *B*. The magnitude of the net electric force on *C* is

(a) *F* (b)3*F*/4

(c) *F*/2 (d) *F*/4

1. Two charges of equal magnitudes and at a distance *r* exert a force *F* on each other. If the charges are halved and distance between them is doubled, then the new force acting on each charge is

(a) *F* / 8 (b) *F* / 4

(c) 4 *F* (d) *F* / 16

1. Identify the wrong statement in the following. Coulomb's law correctly describes the electric force that

(a) Binds the electrons of an atom to its nucleus

(b) Binds the protons and neutrons in the nucleus of an atom

(c) Binds atoms together to form molecules

(d) Binds atoms and molecules together to form solids

1. Two charges  and are at a distance apart. At what distance, a charge  must be placed from charge so that it is in equilibrium

(a)  (b) 

(c)  (d) 

1. On rotating a point charge having a charge *q* around a charge *Q* in a circle of radius *r*. The work done will be

(a)  (b) 

(c) Zero (d) 

1. Two point charges  and – 3*Q* are placed at some distance apart. If the electric field at the location of  is  then at the locality of , it is

(a)  (b) 

(c)  (d) 

1. The number of electrons to be put on a spherical conductor of radius to produce an electric field of  just above its surface is

(a) (b)

(c)  (d) 

1. Two plates are  apart, a potential difference of is applied between them, the electric field between the plates is

(a)  (b)

(c)  (d) 

1. The intensity of the electric field required to keep a water drop of radius  just suspended in air when charged with one electron is approximately

(a)  (b) 

(c)  (d) 



1. Conduction electrons are almost uniformly distributed within a conducting plate. When placed in an electrostatic field , the electric field within the plate

(a) Is zero

(b) Depends upon 

(c) Depends upon 

(d) Depends upon the atomic number of the conducting element

1. Three particles, each having a charge of  are placed at the corners of an equilateral triangle of side . The electrostatic potential energy of the system is (Given )

(a) Zero (b) Infinite

(c)  (d) 

1. The electric field near a conducting surface having a uniform surface charge density  is given by

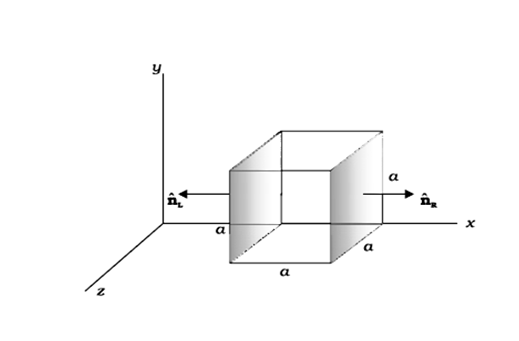
(a)  and is parallel to the surface

(b)  and is parallel to the surface

(c)  and is normal to the surface

(d)  and is normal to the surface

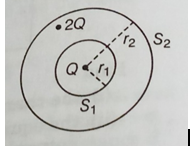
1. The dimension of (1/2) : permittivity of free space; : electric field) is \_\_\_\_\_\_.
2. Why can one ignore quantization of charge when dealing with macroscopic charges?
3. Two parallel uniformly charged infinite plane sheets, ‘1’ and ‘2’, have charge densities + ρ and – 2 ρ respectively. Given the magnitude and direction of the net electric field at a point (i) In between the two sheets and (ii) outside near the sheet ‘1’.
4. An electric dipole is placed in an uniform electric field. What is the net translational force acting on it? Derive an expression for the torque experienced by it.
5. The electric field components in Figure are *Ex*= *x*1/2, *Ey*= *Ez*= 0, in which  *= 800 N/C m1/2*. calculate
6. The flux through the cube, and
7. The charge within the cube. Assume that *a* = 0.1 m.



1. A sphereS1 of radius r1 encloses a net charge Q. If there is another concentric sphere S2 of radius r2 (r2˃ r1) enclosing charge 2Q.

(a) Find the ratio of the electric flux through sphere S1 and S2.

(b) How will the electric flux through sphere S1 change, if a medium of dielectric constant 5 is introduced in the space inside S1 in place of air?



1. (a) Three point charges q, -4q and 2q are placed at the vertices of an equilateral triangle ABC of side ‘L’. Obtain the expression for the magnitude of the resultant electric force acting on the charge q.

(b)Two identical circular loops ‘1’ and ‘2’ of radius R each have linear charge densities – ρ and + ρ C/m respectively. The loops are placed coaxially with their centers distance R√3 apart. Find the magnitude and direction of the net electric field at the center of loop ‘1.

1. (a)Using Gauss’ s law deduce the expression for the electric field due to a uniformly charged spherical conducting shell of radius R at a point (i) outside and (ii) inside the shell. Plot a graph showing the variation of electric field as a function of r ˃ R and r ˂ R (r being the distance from the centre of the shell).
2. A Dipole is made up of two charges + q and – q separated by a distance 2a.Derive an expression for the electric field ***𝐸*** due to this dipole at a point distant **r** from the center of the dipole on the equatorial plane.
3. Show that the electric field due to a uniformly charged infinite plane sheet at any point distant x from it, is independent of x.
4. An electric dipole of length 4cm, when placed with its axis making an angle of 60o with a uniform electric field experiences a torque of 4 Ѵ3 Nm. Calculate the magnitude of electric field potential energy of dipole if the dipole have charged of ± 8nC.