1. **Four charges are arranged at the corners of a square , as shown in the adjoining figure. The force on the charge kept at the centre *O* is**

*O*

*C*

+*q*

*+*2*q*

*B*

*A*

*+q*

*D*

*–* 2*q*

(a) Zero (b) Along the diagonal 

(c) Along the diagonal  (d) Perpendicular to side 

1. **The force between two charges  apart is . If each charge is moved towards the other by , then the force between them will become**

(a)  (b)  (c)  (d) 

1. **A solid conducting sphere of radius *a* has a net positive charge 2*Q*. A conducting spherical shell of inner radius  and outer radius *c* is concentric with the solid sphere and has a net charge – *Q*. The surface charge density on the inner and outer surfaces of the spherical shell will be**

*c*

*b*

*a*

(a)  (b) 

(c) 

(d) None of the above

1. **The distance between the two charges  and  is  At what point on the line joining the two, the intensity will be zero**

(a) At a distance of from  (b) At a distance of from 

(c) At a distance of from  (d) At a distance of from 

1. **Two spheres and  of radius  and  are given charges of  and respectively. If they are connected by a fine wire, the amount of charge flowing from one to the other is**

(a) from to  (b)  from to 

(c) from  to  (d)  from to 

1. **The intensity of electric field required to balance a proton of mass  and charge is nearly**

(a)  (b) 

(c)  (d) 

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. **If a charged spherical conductor of radius has potential  at a point distant  from its centre, then the potential at a point distant  from the centre will be**

(a)  (b)  (c)  (d) 

1. **The ratio of momenta of an electron and an *α*-particle which are accelerated from rest by a potential difference of 100 *volt* is**

(a) 1 (b)  (c)  (d) 

1. **Two metal spheres of radii  and  are charged to the same potential. The ratio of charges on the spheres is**

(a)  (b)  (c)  (d) 

1. **Two positive point charges of  and  are 10*cm* apart. The work done in bringing them 4 *cm* closer is**

(a) 5.8 *J* (b) 5.8 *eV* (c) 13 *J* (d) 13 *eV*

1. **Two electric charges  and  are placed 20 *cm* apart in air. There will be a point *P* on the line joining these charges and outside the region between them, at which the electric potential is zero. The distance of *P* from  charge is**

(a) 0.10 *m* (b) 0.15 *m* (c) 0.20 *m* (d) 0.25 *m*

1. **In the rectangle, shown below, the two corners have charges  and . The work done in moving a charge  from  to  is (take )**

*A*

*q*2

*B*

15 *cm*

*q*1

(a) 2.8 *J* (b) 3.5 *J*

5 *cm*

(c) 4.5 *J* (d) 5.5 *J*

1. **An electric dipole consisting of two opposite charges of  each separated by a distance of  is placed in an electric field of  *N*/*C*. The maximum torque on the dipole will be**

(a)  (b) 

(c)  (d) 

1. **Two charges and  placed at  apart form an electric dipole. It is placed in a uniform electric field of intensity . The electric dipole moment is**

(a)  (b) 

(c)  (d) 

1. **Eight dipoles of charges of magnitude  are placed inside a cube. The total electric flux coming out of the cube will be**

(a)  (b)  (c)  (d) Zero

1. **The inward and outward electric flux for a closed surface in units of  are respectively  and  Then the total charge inside the surface is [where  permittivity constant]**

(a)  *C* (b)  *C* (c)  *C* (d) *C*

1. **The capacity of a parallel plate condenser is . When a glass plate is placed between the plates of the conductor, its potential becomes of the original value. The value of dielectric constant will be**

(a) 1.6 (b) 5 (c) 8 (d) 40

1. **The capacity of a condenser is  *farad* and its potential is. The energy released on discharging it fully will be**

(a)  (b)  (c)  (d) 

1. **Eight drops of mercury of equal radii possessing equal charges combine to form a big drop. Then the capacitance of bigger drop compared to each individual small drop is**

(a) 8 times (b) 4 times (c) 2 times (d) 32 times

1. **A parallel plate condenser has a capacitance  in air and when immersed in an oil. The dielectric constant  of the oil is**

(a) 0.45 (b) 0.55 (c) 1.10 (d) 2.20

1. **1000 small water drops each of radius *r* and charge coalesce together to form one spherical drop. The potential of the big drop is larger than that of the smaller drop by a factor of** (a) 1000 (b)100 (c) 10 (d) 1
2. **The area of each plate of a parallel plate capacitor is and the distance between the plates is. It is filled with mica of dielectric 6. The radius of the equivalent capacity of the sphere will be**

(a)  (b) 4.77  (c) 477  (d) None of the above

1. **Four plates of equal area are separated by equal distances  and are arranged as shown in the figure. The equivalent capacity is**

*A*

*B*

(a)  (b) 

(c)  (d) 

1. **A parallel plate capacitor with air as medium between the plates has a capacitance of . The area of capacitor is divided into two equal halves and filled with two media as shown in the figure having dielectric constant and . The capacitance of the system will now be**

*k*1

*k*2

(a) 

(b) 

(c) 

(d) 

1. **Four condensers are joined as shown in the adjoining figure. The capacity of each is. The equivalent capacity between the points and  will be**

*A*

*B*

(a) 

(b) 

(c) 

(d) 

1. **The capacities and connection of five capacitors are shown in the adjoining figure. The potential difference between the points  and  is . Then the equivalent capacity between  and  and the charge on  capacitance will be respectively**

12*μF*

10*μF*

5*μF*

9*μF*

8*μF*

*A*

*B*

(a) 

(b) 

(c) 

(d) 

1. **In the adjoining figure, four capacitors are shown with their respective capacities and the P.D. applied. The charge and the P.D. across the  capacitor will be**

300 *Volt*

20*μF*

4*μF*

4*μF*

12*μF*

(a) 

(b) 

(c) 

(d) 

1. **A parallel plate capacitor of area *A,* plate separation *d* and capacitance *C* is filled with three different dielectric materials having dielectric constants  and  as shown. If a single dielectric material is to be used to have the same capacitance *C* in this capacitor, then its dielectric constant *k* is given by**

*d*

*d/*2

*A*

*A =* Area of plates

*A/*2

*A/*2

*K*­1

*K­*2

*K*­3

(a)  (b)  (c) (d) 

1. **Three plates of common surface area *A* are connected as shown. The effective capacitance will be**

(a) 

(b) 

*A*

*B*

*d*

*d*

(c) 

(d) 