1. **A solid metallic sphere has a charge . Concentric with this sphere is a conducting spherical shell having charge . The radius of the sphere is  and that of the spherical shell is . What is the electric field at a distance  from the centre**

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

1. **If on the concentric hollow spheres of radii  and  the charge  is distributed such that their surface densities are same then the potential at their common centre is**

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

1. **Two equal charges  of opposite sign separated by a distance  constitute an electric dipole of dipole moment . If  is a point at a distance  from the centre of the dipole and the line joining the centre of the dipole to this point makes an angle  with the axis of the dipole, then the potential at  is given by  (Where)**

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

1. **A point charge *q* is placed at a distance *a*/2 directly above the centre of a square of side *a*. The electric flux through the square is**

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

1. **Two infinitely long parallel wires having linear charge densities  and  respectively are placed at a distance of *R* metres. The force per unit length on either wire will be **

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

1. **Two identical thin rings each of radius *R* meters are coaxially placed at a distance *R* meters apart. If *Q*1 coulomb and *Q*2 coulomb are respectively the charges uniformly spread on the two rings, the work done in moving a charge *q* from the centre of one ring to that of other is**

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

1. **A negatively charged plate has charge density of . The initial distance of an electron which is moving toward plate, cannot strike the plate, if it is having energy of **

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

1. **The charge on  of water due to protons will be**

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

1. **Electric potential is given by**

****

**Then electric force acting on  point charge placed on origin will be**

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

1. **The electric field in a region is radially outward with magnitude . The charge contained in a sphere of radius  centered at the origin is**

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

1. **Charge  is uniformly distributed over a thin half ring of radius . The electric field at the centre of the ring is**

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

1. **In the given figure two tiny conducting balls of identical mass *m* and identical charge *q* hang from non-conducting threads of equal length *L*. Assume that *θ* is so small that , then for equilibrium *x* is equal to**

*q*

*θ*

*θ*

*q*

*x*

*L*

*L*

(a)  (b) 

(c)  (d) 

1. **An infinite number of electric charges each equal to 5 *nano-coulomb* (magnitude) are placed along *X*-axis at *cm*, *cm*, *cm* *cm* ………. and so on. In the setup if the consecutive charges have opposite sign, then the electric field in *Newton/Coulomb* at  is **

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

1. **A small sphere carrying a charge ‘*q*’ is hanging in between two parallel plates by a string of length *L*. Time period of pendulum is . When parallel plates are charged, the time period changes to . The ratio  is equal to**

*m*

+

–

+

–

+

–

+

–

+

–

+

–

+

–

+

–

+

–

*L*

(a)  (b) 

(c)  (d) None of these

1. **Three charges  and  are placed as shown in the figure. The *x*-component of the force on  is proportional to**

(a) 

*θ*

*b*

*a*

*Y*

*X*

*– q*3

+*q*2

*– q*1

(b) 

(c) 

(d) 

1. **Five identical plates each of area A are joined as shown in the figure. The distance between the plates is *d*. The plates are connected to a potential difference of . The charge on plates 1 and 4 will be**

(a) 

1

2

3

4

5

–

+

*V*

(b) 

(c) 

(d) 

1. **To form a composite  capacitor from a supply of identical capacitors marked , we require a minimum number of capacitors**

(a) 40 (b) 32 (c) 8 (d) 2

1. **An infinite number of identical capacitors each of capacitance  are connected as in adjoining figure. Then the equivalent capacitance between  and  is**

8 *capacitors*

16 *capacitors*

*∞*

*A*

*B*

(a) 

(b) 

(c) 

(d) 

1. **Two condensers of capacities  and *C* are joined in parallel and charged upto potential *V*. The battery is removed and the condenser of capacity *C* is filled completely with a medium of dielectric constant *K*. The p.d. across the capacitors will now be**

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

1. **In the figure below, what is the potential difference between the point *A* and *B* and between *B* and *C* respectively in steady state**

3*μF*

3*μF*

1*μF*

1*μF*

*B*

10Ω

20Ω

100*V*

*A*

*C*

1*μF*

(a)  (b) 

(c)  (d) 

1. **Figure given below shows two identical parallel plate capacitors connected to a battery with switch closed. The switch is now opened and the free space between the plate of capacitors is filled with a dielectric of dielectric constant 3. What will be the ratio of total electrostatic energy stored in both capacitors before and after the introduction of the dielectric**

*B*

*A*

*V*

(a) 3 : 1

(b) 5 : 1

(c) 3 : 5

(d) 5 : 3

1. **A parallel plate capacitor of capacitance *C* is connected to a battery and is charged to a potential difference *V*. Another capacitor of capacitance 2*C* is connected to another battery and is charged to potential difference 2*V*. The charging batteries are now disconnected and the capacitors are connected in parallel to each other in such a way that the positive terminal of one is connected to the negative terminal of the other. The final energy of the configuration is**

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

1. **Condenser  has a capacity of  when it is filled with a medium of dielectric constant 15. Another condenser  has a capacity of with air between the plates. Both are charged separately by a battery of. After charging, both are connected in parallel without the battery and the dielectric medium being removed. The common potential now is**

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

1. **Four metallic plates each with a surface area of one side *A* are placed at a distance *d* from each other. The plates are connected as shown in the circuit diagram. Then the capacitance of the system between  and  is**

(a) 

*b*

*a*

(b) 

(c) 

(d) 

1. **In the given circuit if point *C* is connected to the earth and a potential of  is given to the point *A*, the potential at *B* is**

*C*

*B*

*A*

5*μF*

10*μF*

10*μF*

10*μF*

\ (a) 

(b) 

(c) 

(d) 

1. **A finite ladder is constructed by connecting several sections of  capacitor combinations as shown in the figure. It is terminated by a capacitor of capacitance *C*. What value should be chosen for *C* such that the equivalent capacitance of the ladder between the points *A* and *B* becomes independent of the number of sections in between**

2*μF*

2*μF*

2*μF*

*B*

*A*

4*μF*

4*μF*

*C*

4*μF*

(a) 

(b) 

(c) 

(d) 

1. **In an isolated parallel plate capacitor of capacitance *C*, the four surface have charges , ,  and  as shown. The potential difference between the plates is**

(a) 

*Q*1

*Q*2

*Q*3

*Q*4

(b) 

(c) 

(d) 

1. **For the circuit shown, which of the following statements is true**

*S*1

*S*3

*S*2

*+*

*–*

*+*

*–*

*V*1*=*30*V*

*V*2*=*20*V*

*C*1*=*2*pF*

*C*2*=*3*pF*

(a) With closed, 

(b) With  closed 

(c) With  and  closed 

(d) Withand closed, 

1. **Consider the situation shown in the figure. The capacitor *A* has a charge *q* on it whereas *B* is uncharged. The charge appearing on the capacitor *B* a long time after the switch is closed is**

*A*

*B*

*s*

*q*

+

+

+

+

+

–

–

–

–

–

(a) Zero (b) 

(c) *q* (d) 

1. **A capacitor of capacitance *C*1 = 1*μF* can with stand maximum voltage *V*1 = 6*kV* (*kilo-volt*) and another capacitor of capacitance *C*2 = 3*μF* can withstand maximum voltage *V*2 = 4 *kV*. When the two capacitors are connected in series, the combined system can withstand a maximum voltage of**

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