1. (c) We put a unit positive charge at *O*. Resultant force due to the charge placed at *A* and *C* is zero and resultant charge due to *B* and *D* is towards *D* along the diagonal *BD*.
2. (b) ⇒

– *Q* + 2*Q* = *Q*

*–* 2*Q*

*+*2*Q*

*b*

*c*

*a*

1. (a) Surface charge density (*σ*) 

So  and 

1. (a) Suppose electric field is zero at point *N* in the figure then

*E*2

*E*1

*N*

*x*1

*x*2

*Q*1 = 25*μC*

*Q*2 = 36*μC*

*x* = 11 *cm*

At *N* |*E*1| = |*E*2|

which gives 

1. (d) Total charge . By using the formula . New charge on sphere *A* is . Initially it was  *i.e.,*  charge flows from *A* to *B*.
2. (a) Since *qE* = *mg* or  = 10.0 × 10–8 = 1 × 10–7 *V/m*
3. (c) For pair of charge 

 

1. (b) Potential inside the sphere will be same as that on its surface *i.e.* , 

∴ ⇒ 

1. d) Momentum  where *K* = kinetic energy = *Q.V*

⇒⇒

1. (b) Spheres have same potential *i.e.* ⇒ 
2. (c)  ⇒ = 12.96 *J* ≈ 13 *J*
3. (c) Point *P* will lie near the charge which is smaller in magnitude *i.e.* – 6 *μ C*. Hence potential at *P*

*x*

*P*

12*μC*

20 *cm*

*–* 6*μC*

 ⇒ *x* = 0.2 *m*

1. (a) Work done  where

 and 

∴ = 2.8 *J*

1. (b) Maximum torque = *pE* = 2 × 10–6 × 3 × 10–2 × 2 × 105 = 12 × 10–3 *N-m*.
2. (c) Dipole moment *p* = *q* (2*l*) 
3. (d)  *i.e.* net charge on dipole is zero.
4. (d) By Gauss’s law  (*Qenclosed*)

⇒ 

 *Coulomb*.

1. (c)  ⇒  ⇒ *K* = 8
2. (a) 
3. (c) Volume of 8 small drops = Volume of big drop  ⇒ *R* = 2*r*

As capacity is *r*, hence capacity becomes 2 times.

1. (d)  ⇒ 
2. (b) 
3. (b)  *r* = Radius of sphere of equivalent capacity

⇒ 

1. (a) The given circuit is equivalent to a parallel combination two identical capacitors

*C*

*C*

*B*

*A*

Hence equivalent capacitance between *A* and *B* is

*C* =  

1. (c)  
2. (a) Given circuit can be drawn as

*A*

8 *μF*

*B*

8 *μF*

8 *μF*

8 *μF*

Equivalent capacitance = 4 × 8 = 32*μF*

1. (d) The given circuit can be redrawn ass follows

9*μF*

60 *V*

5*μF*

10*μF*

8*μF*

12*μF*

*A*

*B*

*Q*'

*Q*

*A*

*B*

Equivalent capacitance of the circuit 

Charge given by the battery  Charge in 5*μF* capacitor 

1. d) Total capacitance  ⇒  Total charge 

Charge, through 4 *μF* condenser  and potential difference across it 

1. (b**)**   and 

 

 So 

1. (d) The given circuit is equivalent to parallel combination of two identical capacitors, each having capacitance . Hence 