**18 APRIL PRACTICE SHEET SOLUTIONS**

1. (c) The force will still remain 
2. (b)  ⇒ 
3. (a) The force between 4*q* and *q*; 

The force between *Q* and *q*; 

We want  or  ⇒ 

1. (a) The position of the balls in the satellite will become as shown below

*+Q*

*L*

*L*

*+Q*

180o

Thus angle *θ* = 180° and Force 

1. (a) 
2. (b)  and ⇒ 
3. (d) In the presence of medium force becomes .
4. (a) ⇒ 

Electrons are removed, so chare will be positive.

1. (a) Let separation between two parts be *r* ⇒ 

For *F* to be maximum  ⇒ 

1. (a)  *i.e.* 
2. (a) In second case, charges will be  and 

Since  *i.e.* 

∴  ⇒ (Attractive)

1. (b) By using  .
2. (b) *FA* = force on *C* due to charge placed at *A*



*FB* = force on *C* due to charge placed at *B*



*+*1*μC*

*–* 1*μC*

*+*2*μC*

10 *cm*

*FB*

*B*

*A*

*C*

*FA*

120o

Net force on *C*



1. (b)  ⇒ 
2. (c) Effective air separation between them becomes infinite so force becomes zero.
3. (d) They will not experience any force if 

⇒⇒ 

1. (c) Since both are metals so equal amount of charge will induce on them.
2. (b) The schematic diagram of distribution of charges on *x*-axis is shown in figure below :

*x* =1

1*μC*

1*μC*

1*μC*

1*C*

*O*

*x* =4

*x* =8

*x* =2

1*μC*

Total force acting on 1 *C* charge is given by





= 12000 *N*

1. (b) ; where *n* = number of moles × 6.02 × 1023 × 10

⇒ 

1. (c) Suppose third charge is similar to *Q* and it is *q*

So net force on it





*θ*

*B*

*C*

*Q*

*Q*

*F*

*F*

*θ*

*q*

*x*

*θ*

*θ*

**

**

*Fnet* = 2*F* cos*θ*

Where and 

∴



For *Fnet* to be maximum 

*i.e.* 

or 

*i.e.* 

1. (c)

*b*

*θ*

*θ*

*a*

*F*3cos *θ*

*F*3

*F*2

*+q*2

*– q*3

*F*3sin *θ*

*– q*1

*F*2 = Force applied by  on 

*F*3 = Force applied by  on –

*x-*component of Net force on  is

*F­x* = *F*2 + *F*3 sin*θ* 

⇒ 

⇒ ⇒ 

1. (c)

*b*

*θ*

*θ*

*a*

*F*3cos *θ*

*F*3

*F*2

*+q*2

*– q*3

*F*3sin *θ*

*– q*1

*F*2 = Force applied by  on 

*F*3 = Force applied by  on –

*x-*component of Net force on  is

*F­x* = *F*2 + *F*3 sin*θ* 

⇒ 

⇒ ⇒ 

1. (a) Suppose the balls having charges *Q*1 and *Q*2 respectively.

Initially :

*A*

*B*

*r*

*Q*1

*Q*2

Finally :

*r*





*A*

*B*



It is given that  so 

⇒ . On solving it gives 

1. (c) Let us consider 1 ball has any type of charge. 1 and 2 must have different charges, 2 and 4 must have different charges *i.e.* 1 and 4 must have same charges but electrostatics attraction is also present in (1, 4) which is impossible.
2. (c) Number of atoms in given mass 

*+*

*–*

*A*

*B*

10 *cm*

*e–*

= 9.48 × 1022

Transfer of electron between balls 

= 9.48 × 1016

Hence magnitude of charge gained by each ball.

*Q* = 9.48 × 1016 × 1.6 × 10–19 = 0.015 *C*

Force of attraction between the balls 