1. (d) ; so when *r* is halved the force becomes four times.
2. (b) The same force will act on both bodies although their directions will be different.
3. (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*.
4. (a) Excess of electron gives the negative charge on body.
5. (c) Gravitational force and nuclear force both are attractive in nature.
6. (d)  ..... (i) and  .....(ii)

From (i) and (ii) 

For *F* to be maximum ⇒ 

1. (a) The force between 4*q* and *q*; 

 The force between *Q* and *q*; 

 We want  or  ⇒ 

1. (a) 
2. (c) Because in case of metallic sphere either solid or hollow, the charge will reside on the surface of the sphere. Since both spheres have same surface area, so they can hold equal maximum charge.
3. (c) For providing path to charge induced on the surface of the carriers which take inflammable material.
4. (d) In the presence of medium force becomes .
5. (a) Separation between the spheres is not too large as compared to their radius so due to induction effect redistribution of charge takes place. Hence effective charge separation decreases so force increases.
6. (a) When put 1 *cm* apart in air, the force between *Na* and *Cl* ions = *F*. When put in water, the force between *Na* and *Cl* ions 
7. (a)  *i.e.* 
8. (b) By using  .
9. (b)  ⇒ 
10. (c) By using 

⇒ 

1. (c) Effective air separation between them becomes infinite so force becomes zero.
2. (a) 
3. (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 

1. (d) By using 
2. (c) 

60o

*A*

*+Q*

*FB*

*FC*

*– Q*

*C*

*B*

*a*

*FC* sin60o

*FB* sin60o

60o

60o

*FC* cos60o

*FB* cos60o

60o

60o

Hence force experienced by the charge at *A* in the direction normal to *BC* is zero.

1. (d) They will not experience any force if 

⇒⇒ 

1. (b) On rubbing glass rod with silk, excess electron transferred from glass to silk. So glass rod becomes positive and silk becomes negative.
2. (c) By  or 
3. (a) Gravitational force 

= 3.9 × 10–47 *N*

Electrostatic force 

 = 9.22 × 10–8 *N*

So, 

1. (d)  ⇒ 

 

 ⇒  (Attractive)

1. (a) 
2. (a) In case of spherical metal conductor the charge quickly spreads uniformly over the entire surface because of which charges stay for longer time on the spherical surface. While in case of non-spherical surface, the charge concentration is different at different points due to which the charges do not stay on the surface for longer time.
3. (b) Nuclear force binds the protons and neutrons in the nucleus of an atom.
4. (b) Potential at the centre *O*, 

where  and 

****

*A*

*+q*

*+q*

*B*

*O*

*+q*

*D*

*C*

*+q*

So 

1. (b) Obviously, from charge configuration, at the centre electric field is non-zero. Potential at the centre due to 2*q* charge 

*– q*

*– q*

2*q*

*r*

*r*

*r*

*E*– *q*

*E*2*q*

*E*– *q*

and potential due to – *q* charge

 (*r* = distance of centre point)

∴ Total potential 

1. (a) Magnetic lines of force always makes a closed loop.
2. (a) By using 

⇒ 

1. (c) 
2. (b) Electric field at a point due to positive charge acts away from the charge and due to negative charge it act’s towards the charge.

2*q*

 *q*

 *q*

2*q*

*q*

2*q*

2*E*

*E*

2*E*

2*E*

*E*

*E*

⇒

*E*

2*E*

*E*

2*E*

*Enet = 0*

⇒

2*q*

2*q*

2*q*

2*q*

*q*

 *q*

2*E*

2*E*

2*E*

*E*

2*E*

*E*

*Enet = 0*

*q*

 *q*

*q*

*q*

 *q*

*E*

*E*

*E*

*E*

*E*

*E*

⇒

*Enet = 0*

 *q*

 *q*

⇒

2*E*

2*E*

2*E*

12*0o*

*Enet =* 2*E*

 *q*

 *– q*

 *– q*

*q*

 *q*

*E*

*E*

*E*

*E*

*E*

*E*

1. (a) Work done  where



and 

∴ = 2.8 *J*

1. (c) Electric lines of force are always normal to metallic body.
2. (c) Inside a conducting body, potential is same everywhere and equals to the potential of it’s surface
3. (c) Electric field between sheets 

+

+

+

+

+

+

+

+

+

+

+

+

+

+

*E* = 0

*E* ≠ 0

*E* ≠ 0

*σ*

*σ*

1. (d) Cathode rays (stream of negatively charged particles) deflect in opposite direction of field *i.e.* towards north.
2. (a) Potential is to be determined at a distance of 4 *cm* from centre of sphere *i.e*. inside the sphere.
3. (a) Work done  
4. (b) By using 

⇒  ⇒ 

1. (b) 