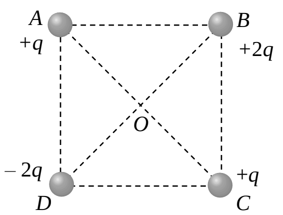
1. When the distance between the charged particles is halved, the force between them becomes

(a) One-fourth (b) Half
(c) Double (d) Four times

2. F_g and F_e represents gravitational and electrostatic force respectively between electrons situated at a distance 10 cm. The ratio of F_g / F_e is of the order of

(a) 10^{42} (b) 10
(c) 1 (d) 10^{-43}

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



(a) Zero (b) Along the diagonal AC
(c) Along the diagonal BD (d)Perpendicular to side AB

4. In the absence of other conductors, the surface charge density

(a) Is proportional to the charge on the conductor and its surface area
(b) Inversely proportional to the charge and directly proportional to the surface area
(c) Directly proportional to the charge and inversely proportional to the surface area
(d) Inversely proportional to the charge and the surface area

5. Out of gravitational, electromagnetic, Vander Waals, electrostatic and nuclear forces; which two are able to provide an attractive force between two neutrons

(a) Electrostatic and gravitational
(b) Electrostatic and nuclear
(c) Gravitational and nuclear
(d) Some other forces like Vander Waals

6. Two small spheres each having the charge $+Q$ are suspended by insulating threads of length L from a hook. This arrangement is taken in space where there is no gravitational effect, then the angle between the two suspensions and the tension in each will be

(a) $180^o, \frac{1}{4\pi\varepsilon_0}\frac{Q^2}{(2L)^2}$ (b) $90^o, \frac{1}{4\pi\varepsilon_0}\frac{Q^2}{L^2}$

(c) $180^o, \frac{1}{4\pi\varepsilon_0}\frac{Q^2}{2L^2}$ (d) $180^o, \frac{1}{4\pi\varepsilon_0}\frac{Q^2}{L^2}$

7. $+2C$ and $+6C$ two charges are repelling each other with a force of $12N$. If each charge is given $-2C$ of charge, then the value of the force will be

(a) $4N$ (Attractive) (b) $4N$ (Repulsive)
(c) $8N$ (Repulsive) (d) Zero

8. Dielectric constant of pure water is 81. Its permittivity will be

(a) 7.12×10^{-10} MKS units (b) 8.86×10^{-12} MKS units
(c) 1.02×10^{13} MKS units (d) Cannot be calculated

9. Three equal charges are placed on the three corners of a square. If the force between q_1 and q_2 is F_{12} and that between q_1 and q_3 is F_{13}, the ratio of magnitudes $\frac{F_{12}}{F_{13}}$ is

(a) $1/2$ (b) 2
(c) $1/\sqrt{2}$ (d) $\sqrt{2}$

10. Two charges q_1 and q_2 are placed in vacuum at a distance d and the force acting between them is F. If a medium of dielectric constant 4 is introduced around them, the force now will be

(a) $4F$ (b) $2F$
(c) $\frac{F}{2}$ (d) $\frac{F}{4}$

11. A force F acts between sodium and chlorine ions of salt (sodium chloride) when put $1cm$ apart in air. The permittivity of air and dielectric constant of water are ε_0 and K respectively. When a piece of salt is put in water electrical force acting between sodium and chlorine ions $1cm$ apart is

(a) $\frac{F}{K}$ (b) $\frac{FK}{\varepsilon_0}$

(c) $\frac{F}{K\varepsilon_0}$ (d) $\frac{F\varepsilon_0}{K}$

12. Two similar spheres having $+q$ and $-q$ charge are kept at a certain distance. F force acts between the two. If in the middle of two spheres, another similar sphere having $+q$ charge is kept, then it experience a force in magnitude and direction as

(a) Zero having no direction
(b) $8F$ towards $+q$ charge
(c) $8F$ towards $-q$ charge
(d) $4F$ towards $+q$ charge

13. A charge Q is divided into two parts of q and $Q-q$. If the coulomb repulsion between them when they are separated is to be maximum, the ratio of $\frac{Q}{q}$ should be

(a) 2 (b) $1/2$
(c) 4 (d) $1/4$

14. When air is replaced by a dielectric medium of constant k, the maximum force of attraction between two charges separated by a distance

(a) Decreases k times (b) Remains unchanged
(c) Increases k times (d) Increases k^{-1} times

15. The force between two charges $0.06m$ apart is $5N$. If each charge is moved towards the other by $0.01m$, then the force between them will become

(a) $7.20N$ (b) $11.25N$
(c) $22.50N$ (d) $45.00N$

16. Two charged spheres separated at a distance d exert a force F on each other. If they are immersed in a liquid of dielectric constant 2, then what is the force (if all conditions are same)

(a) $\frac{F}{2}$ (b) F
(c) $2F$ (d) $4F$

17. Electric charges of $1\mu C, -1\mu C$ and $2\mu C$ are placed in air at the corners A, B and C respectively of an equilateral triangle ABC having length of each side 10 cm. The resultant force on the charge at C is

(a) 0.9 N (b) 1.8 N
(c) 2.7 N (d) 3.6 N

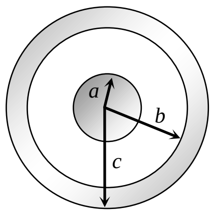
18. Two charges each equal to $2\mu C$ are $0.5m$ apart. If both of them exist inside vacuum, then the force between them is

(a) 1.89 N (b) 2.44 N
(c) 0.144 N (d) 3.144 N

19. Two copper balls, each weighing 10g are kept in air 10 cm apart. If one electron from every 10^6 atoms is transferred from one ball to the other, the coulomb force between them is (atomic weight of copper is 63.5)

(a) $2.0\times10^{10}\,N$ (b) $2.0\times10^{4}\,N$
(c) $2.0\times10^{8}\,N$ (d) $2.0\times10^{6}\,N$

20. A solid conducting sphere of radius a has a net positive charge $2Q$. A conducting spherical shell of inner radius b 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



(a) $-\frac{2Q}{4\pi b^2}, \frac{Q}{4\pi c^2}$

(b) $-\frac{Q}{4\pi b^2}, \frac{Q}{4\pi c^2}$

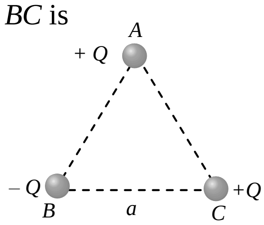
(c) $0, \frac{Q}{4\pi c^2}$

(d) None of the above

21. Two charges placed in air repel each other by a force of $10^{-4}N$. When oil is introduced between the charges, the force becomes $2.5\times10^{-5}N$. The dielectric constant of oil is

(a) 2.5 (b) 0.25
(c) 2.0 (d) 4.0

22. Three charges are placed at the vertices of an equilateral triangle of side 'a' as shown in the following figure. The force experienced by the charge placed at the vertex A in a direction normal to BC is



(a) $Q^2/(4\pi\varepsilon_0 a^2)$
(b) $-Q^2/(4\pi\varepsilon_0 a^2)$
(c) Zero
(d) $Q^2/(2\pi\varepsilon_0 a^2)$

23. Two particle of equal mass m and charge q are placed at a distance of 16 *cm*. They do not experience any force. The value of $\frac{q}{m}$ is

(a) l (b) $\sqrt{\frac{\pi\varepsilon_0}{G}}$

(c) $\sqrt{\frac{G}{4\pi\varepsilon_0}}$ (d) $\sqrt{4\pi\varepsilon_0 G}$

24. An electron is moving round the nucleus of a hydrogen atom in a circular orbit of radius r. The coulomb force $\vec{F}$ between the two is (Where $K=\frac{1}{4\pi\varepsilon_0}$)

(a) $-K\frac{e^2}{r^3}\hat{r}$ (b) $K\frac{e^2}{r^3}\vec{r}$

(c) $-K\frac{e^2}{r^3}\vec{r}$ (d) $K\frac{e^2}{r^2}\hat{r}$

25. A body has – 80 *micro coulomb* of charge. Number of additional electrons in it will be

(a) 8×10^{-5} (b) 80×10^{-17}

(c) 5×10^{14} (d) 1.28×10^{-17}

26. Two spherical conductors B and C having equal radii and carrying equal charges in them repel each other with a force F when kept apart at some distance. A third spherical conductor having same radius as that of B but uncharged is brought in contact with B, then brought in contact with C and finally removed away from both. The new force of repulsion between B and C is

(a) $F/4$ (b) $3F/4$

(c) $F/8$ (d) $3F/8$

27. The charges on two sphere are $+7\mu C$ and $-5\mu C$ respectively. They experience a force F. If each of them is given and additional charge of $-2\mu C$, the new force of attraction will be

(a) F (b) $F/2$

(c) $F/\sqrt{3}$ (d) $2F$

28. The ratio of electrostatic and gravitational forces acting between electron and proton separated by a distance $5\times10^{-11} m$, will be (Charge on electron = 1.6×10^{-19} *C*, mass of electron = 9.1×10^{-31} *kg*, mass of proton = $1.6\times10^{-27} kg$, $G=6.7\times10^{-11} Nm^2/kg^2$)

(a) 2.36×10^{39} (b) 2.36×10^{40}

(c) 2.34×10^{41} (d) 2.34×10^{42}

29. Two equally charged, identical metal spheres A and B repel each other with a force 'F'. The spheres are kept fixed with a distance 'r' between them. A third identical, but uncharged sphere C is brought in contact with A and then placed at the mid-point of the line joining A and B. The magnitude of the net electric force on C is

(a) F (b) $3F/4$

(c) $F/2$ (d) $F/4$

30. An infinite number of charges, each of charge 1 μC, are placed on the x-axis with co-ordinates x = 1, 2, 4, 8, ...∞. If a charge of 1 C is kept at the origin, then what is the net force acting on 1 C charge

(a) 9000 N (b) 12000 N

(c) 24000 N (d) 36000 N

SUBJECT : TOPIC: COULOMB'S LAW TIME: DATE:

PHY			
DPP - 2			
Q.	Ans.	Q.	Ans.
1	D	26	D
2	D	27	A
3	C	28	A
4	C	29	A
5	C	30	B
6	A		
7	D		
8	A		
9	B		
10	D		
11	A		
12	C		
13	A		
14	A		
15	B		
16	A		
17	B		
18	C		
19	C		
20	A		
21	D		
22	C		
23	D		
24	C		
25	C		