For More Questions *Click Here*

1. When a glass rod is rubbed with silk, it
(a) gains electrons from silk.
(b) gives electrons to silk.
(c) gains protons from silk.
(d) gives protons to silk.

Answer/Explanation
Answer: b
Explaination:
(b) On rubbing a glass rod with silk, excess electrons are transferred from glass to silk. So glass rod becomes positive and silk becomes negative.

---

2. In general, metallic ropes are suspended on the carriers taking inflammable materials. The reason is
(a) to control the speed of the carrier.
(b) to keep the centre of gravity of the carrier nearer to the earth.
(c) to keep the body of the carrier in contact with the earth.
(d) none of these.

Answer/Explanation
Answer: c
Explaination:
(c) For providing a path to the charge induced on the surface of the carriers.

---

3. 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 ______ .

Answer/Explanation
Answer:
Explaination: $\frac{F}{4}$.In the presence of medium, force becomes $\frac{1}{K}$ time

---

4. When 10^{14} electrons are removed from a neutral metal sphere, the charge on the sphere becomes ______ .

Answer/Explanation
Answer:
Explaination:

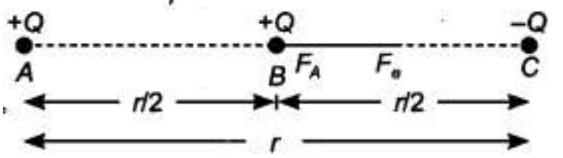
16 μC, Q = ne= 10^{14} x 1.6 × 10^{-19} or 0=1.6 × 10^{-5} C = 16 μC
As electrons are removed, so charge will be positive.

---

5. Two similar spheres having +Q and -Q charges are kept at a certain distance. F force acts between the two. If at the middle of two spheres, another similar sphere having +Q charge is kept, then it experiences 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.

Answer/Explanation
Answer: c
Explaination:
(c) Initially, force between A and C,

$$F = \frac{kQ^2}{r^2}$$



When a similar sphere B having charge +Q is kept at the mid-point of line joining A and C, then net force on B is

$$F_{net} = F_A + F_C = \frac{kQ^2}{\left(\frac{r}{2}\right)^2} + \frac{kQ^2}{\left(\frac{r}{2}\right)^2} = \frac{8kQ^2}{r^2}$$
$$= 8F$$

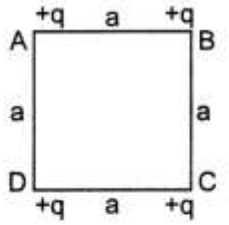
The direction is shown in figure.

---

6. 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 Q/q should be
(a) 2:1
(b) 1/2
(c) 4:1
(d) 1/4

Answer/Explanation
Answer: a
Explaination:
(a) Let separation between two parts be r, then
F = k.q(Q – q)/r^2 , For F to be maximum dF/dq = 0 then Q/q = 2/1 = 2 : 1

7. Four equal charges q are placed at the four comers A, B, C, D of a square of length a. The magnitude of the force on the charge at B will be



(a) $\frac{3q^2}{4\pi\varepsilon_0 a^2}$ (b) $\frac{4q^2}{4\pi\varepsilon_0 a^2}$

(c) $\frac{(1+2\sqrt{2})q^2}{2\times 4\pi\varepsilon_0 a^2}$ (d) $\frac{\left(\frac{2+1}{\sqrt{2}}\right)q^2}{4\pi\varepsilon_0 a^2}$

Answer/Explanation

---

8. Dielectric constant for metal ______ .

Answer/Explanation

---

9. Two charges of equal magnitudes kept at a distance r exert a force F on each other. If the charges are halved and distance between them is doubled, then the new force acting on each charge is

(a) $\frac{F}{8}$ (b) $\frac{F}{4}$

(c) $4F$ (d) $\frac{F}{16}$

Answer/Explanation

Answer: d

Explaination:

(d) F = $\frac{k \cdot Q^2}{r^2}$. If Q is halved, r is doubled then F = $\frac{1}{16}$ time

---

10. The electric field inside a spherical shell of uniform surface charge density is

(a) zero.

(b) constant, less than zero.

(c) directly proportional to the distance from the centre.

(d) none of the these

Answer/Explanation

Answer: a
Explaination:
(a) All charges reside on the outer surface of the shell so according to Gauss’s law, electric field inside the shell is zero.