	INDIAN SCHOOL AL WADI AL KABIR	
Class: XII	**Department: Science 2022 – 23** **Subject: Physics**	**Date of submission: 21.08.2022**
Worksheet FOR PRACTICE	**Topic:** ELECTRIC CHARGES AND FIELDS	**Note: A4 FILE FORMAT**

Instructions; -Please solve the following questions and submit on or before 21 Aug. 2022.

1. How can you charge a metal sphere positively without touching it?

2. If 10^9 electrons move out of a body to another body every second. How much time is required to get a total charge of 1 C on the other body?

3. How much positive and negative charge is there in a cup of water?

4. Coulomb's law for electrostatics force between two-point charges and Newton's law of gravitation force between two stationary point masses, both have inverse-square dependence on the distance between the charge/masses. (a) compare the strength of these forces by determining the ratio of their magnitudes (i) for an electron and a proton (ii) for two protons. (b) Estimate the accelerations of electron and proton due to the electric force of their mutual attraction when they are 1 angstrom apart?

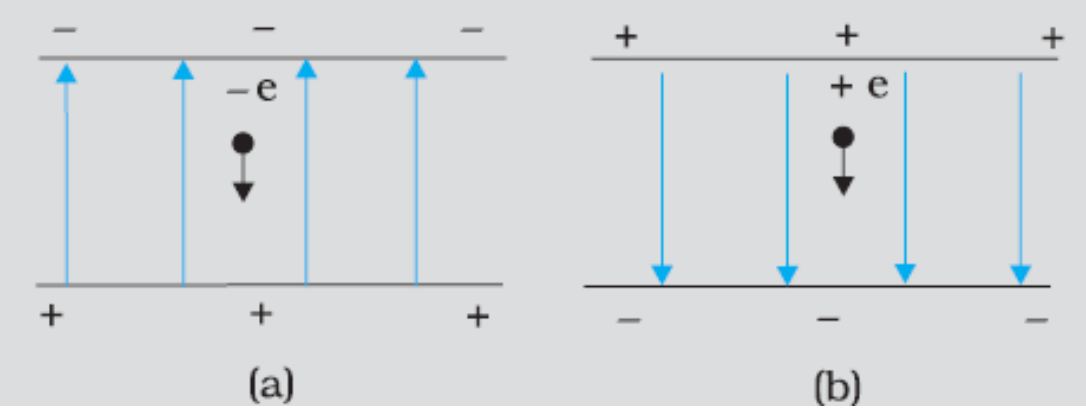
5. A charged metallic sphere A is suspended by a nylon thread. Another charged metallic sphere B held by an insulating handle is brought close to A such that the distance between their centers is 10 cm. The resulting repulsion of A is noted (for example, by shining a beam of light and measuring the deflection of its shadow on a screen). Spheres A and B are touched by uncharged spheres C and D respectively. C and D are then removed and B is brought closer to A to a distance of 5.0 cm between their centers. What is the expected repulsion of A on the basis of Coulomb's law? Spheres A and C and spheres B and D have

identical sizes. Ignore the sizes of A and B in comparison to the separation between their centers.

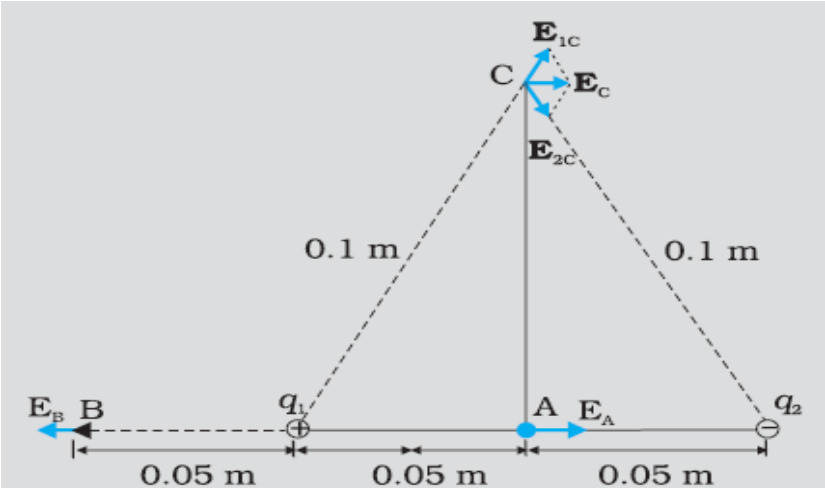
6. Consider three charges q_1, q_2, and q_3 each equal to 'q' at the vertices of an equilateral triangle of side l. what is the force on a charge 'Q' (with the same sign) placed at the centroid of the triangle?

7. Consider the charges q, q and –q placed at the vertices of an equilateral triangle of side l, what is the force on each charge?

8. An electron falls through a distance of 1.5 cm in uniform electric field of magnitude 2.0 x 10^4 NC^{-1} (fig. a). The direction of field is reversed keeping its magnitude unchanged (fig. b) and a proton falls through the same distance compute the time of fall in each case.

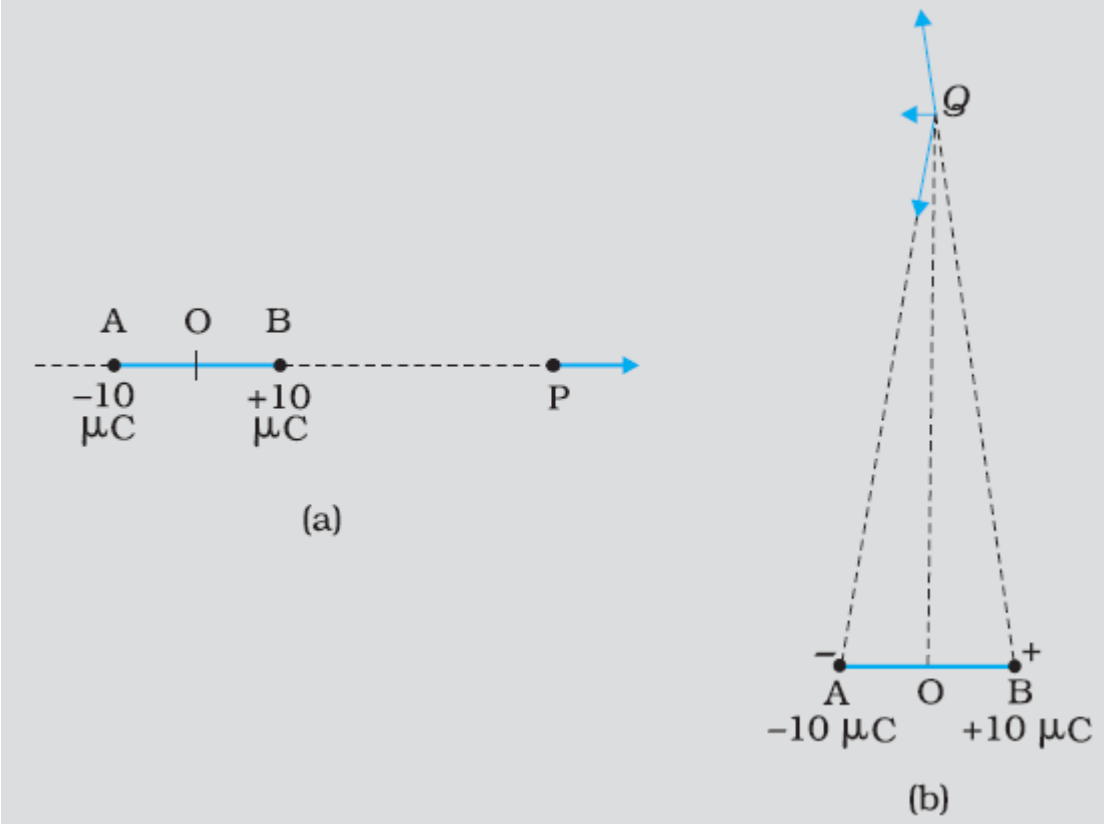


9. Two point charges q1 and q2, of magnitude 10-8 C and -10-8 C, respectively are placed 0.1 m apart. Calculate the electric fields at points A, B and C shown in figure.

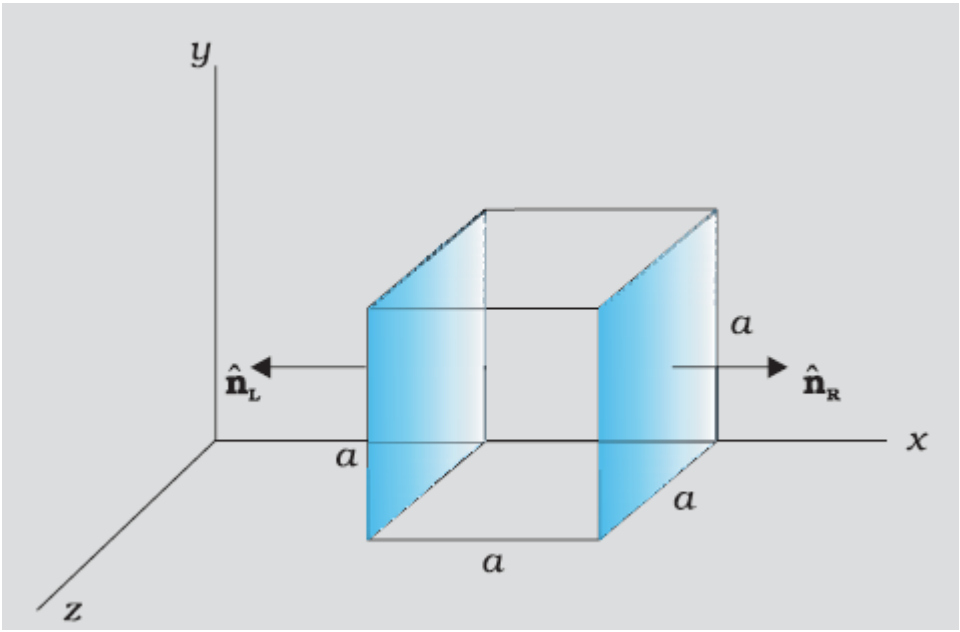


10. Two charges $\pm 10\mu C$ are placed 5.0 mm aaprt. Determine the electric field at (a) a point on the axis of the dipole 15 cm away from its centre o on the side of the positive charge. As

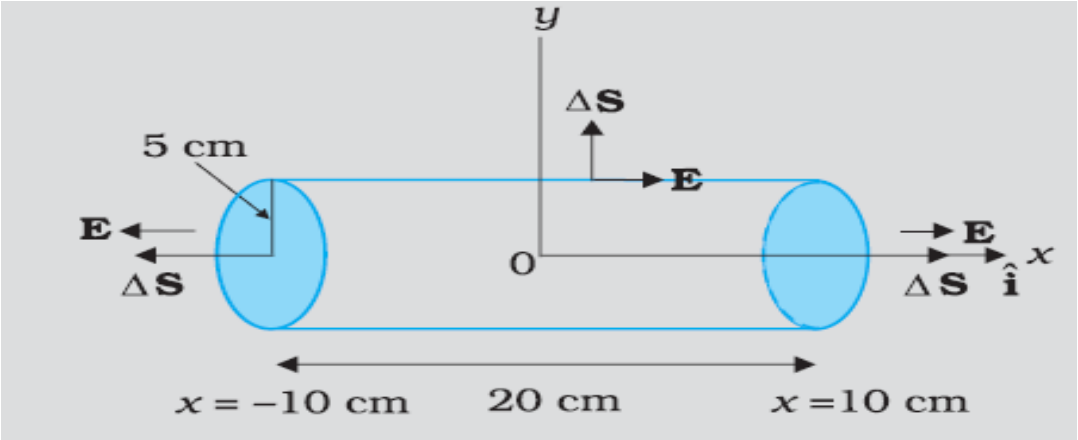
shown in figure a, and (b) a point Q 15 cm away from O on the line Pssing through O and normal to the axis of the dipole as shown in figure b.



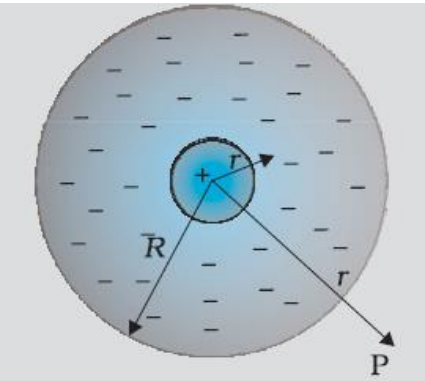
11. The electric field components in fig. are Ex = α $x^{1/2}$, E_y=E_z= 0, in which α = 800 N/C $m^{1/2}$. Calculate (a) the flux through the cube, and (b) the charge within the cube. Assume that a = 0.1 m.



12. An electric field is uniform, and in the position x directed for positive x, and uniform with the same magnitude but in the negative x direction for negative x. it is given that E = 200 i N/C for x> 0and E = -200i N/C for x< 0. A right circular cylinder of length 20 cmand radius 5 cm has its centre at the origin and its axis along the x axis so that one face is at x = +10 cm and the other face is at x = -10 cm as shown. (a) what is the net outward flux through each flat face? (b) what is the flux through the side of the cylinder? (c) what is the net out ward flux through the cylinder? (d) what is the net charge in saide the cylinder?(36)



13. An early model of an atom cosidered it to have a positively charged point nucleus of charge Ze, surrounded by a uniform density of negative charge up to a radius R. the atom as a whole is neutral. For this model, what is the electric field at a distance r from the nucleus?



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