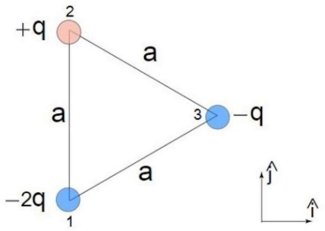
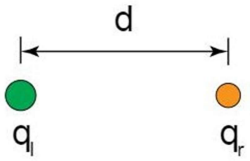
36.



Three point-like objects of charges $q_1 = -2q, q_2 = +q$, and $q_3 = -q$ (where q is positive) are glued to the vertices of an equilateral triangle of side a as shown. Consider the coordinate system indicated in the figure.

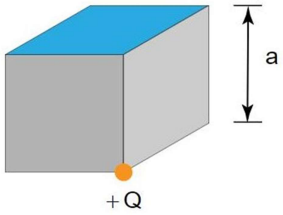
Calculate $\vec{F}_3$, the force exerted by objects 1 and 2 on object 3. Express your answer in terms of $k_e, q, a, \hat{\imath}, \hat{\jmath}$ as needed.

37.



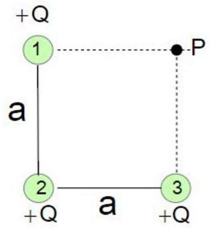
Two charges, $q_l = -2\mu C$ and $q_r = 1\mu C$ lie on the x-axis, with the left charge q_l at x = 0 and the right charge q_r at $x = d$ = 1m. At what point along the x-axis will the electric field be zero, other than at infinity?

38.



Consider a cube with each side of length a. A point-like object with charge Q is placed at one corner of the cube which is shared by three faces, as shown in the sketch. What is the flux of the electric field emerging from each of the other three square faces of the cube, that is, the three faces which do not have the charge at one of their corners (one of these faces is shown in blue at the top of the image above)? Express your answer using some or all of the following: Q, a and ε_0.

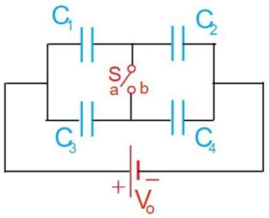
39.



Three identical point-like charged objects each of charge $+Q$ are fixed on the corners of a square of side a, as shown in the figure.

What is the electric potential difference $V(P) - V(\infty)$? Write your answers in terms of k_e, Q and a.

40.



A 12-Volt battery charges the four capacitors shown in the figure above. Let $C_1 = 1\mu F, C_2 = 2\mu F, C_3 = 3\mu F$, and $C_4 = 4\mu F$.

a) What is C_{eq}, the equivalent capacitance of the group of four capacitors when the switch S is opened (as shown)?
b) Calculate the charge on each of the four capacitors.
c) What is the charge on the four capacitors if the switch S is closed? (To close the switch move its end labeled a towards wire b.)