

four charges are placed at the corners of a square with sides of length 'd' the electric potential at point 'X' in the center of the square is?

Solution

If 'r' is the distance of any corner to the center of the square, then $r = \frac{d}{\sqrt{2}}$, where 'd' is the side of the square. So that potential at the center of the square $V_X = 4 \times V_c$, V_c where is potential due to each charge at the center:

$$V_c = \frac{kq}{r} = \sqrt{2} \frac{kq}{d},$$

where k is the Coulomb's constant, q is charge.

$$\text{So } V_X = 4 \times \sqrt{2} \frac{kq}{d} = 4\sqrt{2} \frac{kq}{d}.$$

Answer: $4\sqrt{2} \frac{kq}{d}$.