Answer on Question #54451, Physics / Electromagnetism

Electric charge Q,Q and -2Q respectively are placed at the three corners of an equilateral triangle of side a. Magnitude of the electric dipole moment of the system is

- (1)√2Qa (2)√3Qa
- (3)Qa
- (4)2Qa

Solution:



The -2Q charge can be thought to be made of (-Q)(-Q), so that there is pair of dipoles inclined at 60°.

Their individual dipole moment is P = Qa

Resultant dipole moment can be found from resultant of vector formula.

$$P_r = \sqrt{P^2 + P^2 + 2PP\cos 60^\circ} = \sqrt{3}P = \sqrt{3}Qa$$

Answer: (2) √3Qa

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