Quiz

Chapter (22) (Electric Fields) + Chapter (21) (Coulombs Laws)

Topics Included:

1) Coulombs Law
2) Charge Quantization & Conservation
3) Electric Field
4) Electric Field due to point charge
5) Electric Field due to a dipole

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QUIZ 5

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Semester 01 Class Applied Physics Section BCS-1B

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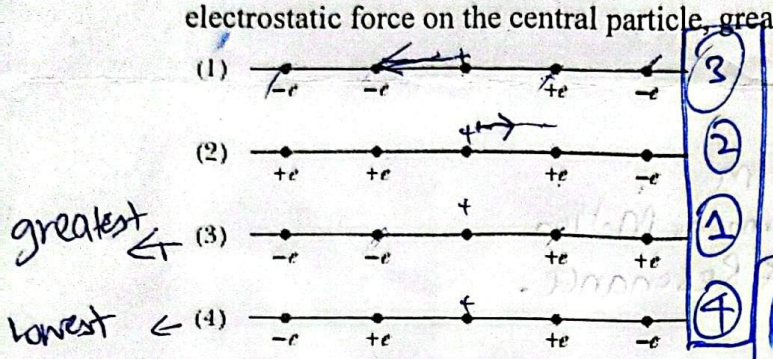
Q1: Figure shows four situations in which five charged particles are evenly spaced along an axis. The charge values are indicated except for the central particle, which has the same charge in all four situations. Rank the situations according to the magnitude of the net electrostatic force on the central particle, greatest first.



3 > 2 > 1 > 4

Rank: (3) (2) (1) (4)

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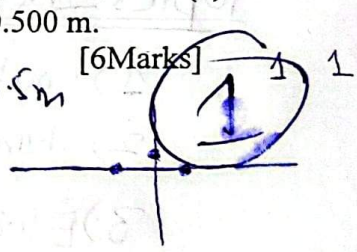
Q2: Two 2.00 μC charged particles are located on the x axis. One is at x = 1.00 m, and the other is at x = -1.00 m. (a) Determine the electric field on the y axis at y = 0.500 m. (b) Calculate the electric force on a -3.00 μC charge placed on the y axis at y = 0.500 m. [6Marks]



$E = \frac{kq}{r^2}$

$E = \frac{F}{q}$

a) so net electric field at y = 0.5m is zero.

i.e $E_{net} = 0$

b) now $E = \frac{F}{q}$

$0 = \frac{F}{q}$

$F = 0$

$F = \frac{kq_1q_2}{r^2}$

a) $E_1 = \frac{kq}{r^2}$

here $r = \sqrt{1^2 + (0.5)^2} = 1.118$

now $E_1 = \frac{(9 \times 10^9)(2 \times 10^{-6})}{(1.118)^2} = 14400.8$

similarly $E_2 = 14400.8$

$E_{net} = E_1 - E_2 = 0$

$F = \frac{0.0}{4}$

$F_1 = 0.0432$

$F_2 = 0.0432$

$F_{net} = 0$