

Your Class ID

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3 Numbers	3 Letters

PHYSICS 2220

Spring Semester 2005
Exam 2
Friday, 25 February 2005
1:30 PM - 2:20 PM

Closed Book
Equation Sheets Permitted (Unmarked)
Calculators Permitted

Question 1. A $3.75 \mu\text{C}$ charged particle is located at a position $(1.2, 0.0)\text{m}$.
Located at point P, $(3.7, 0.0)\text{m}$ is a test charge particle of charge $2.73 \mu\text{C}$.

a) Calculate the electric force on the charged particle at point P.

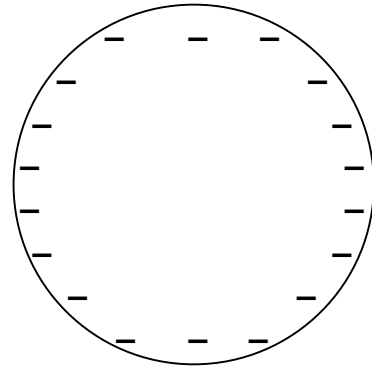
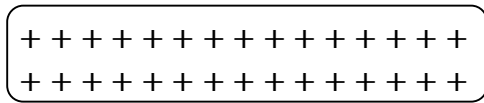
b) What is the direction of this force?

A third charged particle is located at $(2.7, 1.5)\text{m}$ and has a charge of $-3.1 \mu\text{C}$.

c) Calculate the force and its direction that this third particle has on the charge at point P.

d) Calculate the magnitude and direction of the total force on the charge at point P.

Question 2.



The schematic shows a uniform charged, positive, bar and a negatively charged disk.

- a) Draw the electric field vectors
 - 1) near each surface
 - 2) in the region between
 - 3) join up the electric field lines

- b) Draw at least 5 equipotential lines on this schematic (use a dashed line for the equipotential lines).

A parallel plate capacitor has an electric field of 2.65 V/m and each plate has an area of 0.37m^2 and a spacing of 0.072m.

- c) Calculate the charge on the capacitor.

- d) How much kinetic energy will an electron gain if it is accelerated across the capacitor from the negative plate to the positive plate?

- e) If the electron begins from rest and has a mass of 9.1×10^{-31} kg, what will be its final speed? $\left(K = \frac{1}{2}mv^2\right)$

