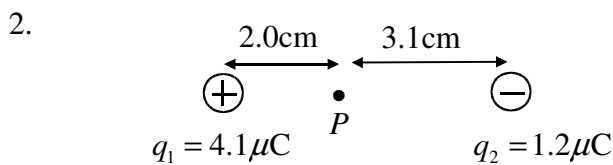


- 1.
- a) Explain in your own words what an electric field is. /2
- b) Explain what electric field lines are. Make sure you say what the arrows mean and what the density of the lines represents. /2
- c) Copy the following diagrams and draw electric field lines around them:

i.  /1

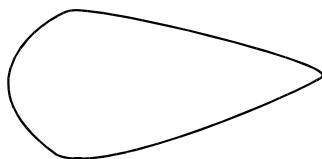
ii.  /2

iii.  /2



- a) Calculate the electric field strength  $E$  at point  $P$  due to  $q_1$ . /3
- b) Calculate the electric field strength  $E$  at point  $P$  due to  $q_2$ . /3
- c) Hence calculate the electric field strength at point  $P$  due to both  $q_1$  and  $q_2$ . /3

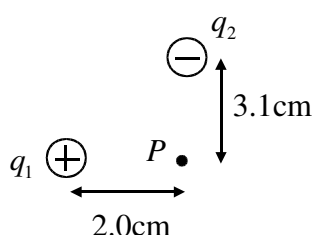
- 3.
- a) Describe the electric field on the inside of a metal tin, if the only charges present are outside the tin (the answer is the same whether the tin is charged or not). /1
- b) Describe the location of the charges on this negatively charged metal conductor:



/2  
 TOTAL /21

[Bonus question] Consider the charges in question 2.

If  $q_2$  is moved instead to a position 3.1 cm directly above  $P$ , the charges will be positioned like this:



Calculate the electric field strength at  $P$ .