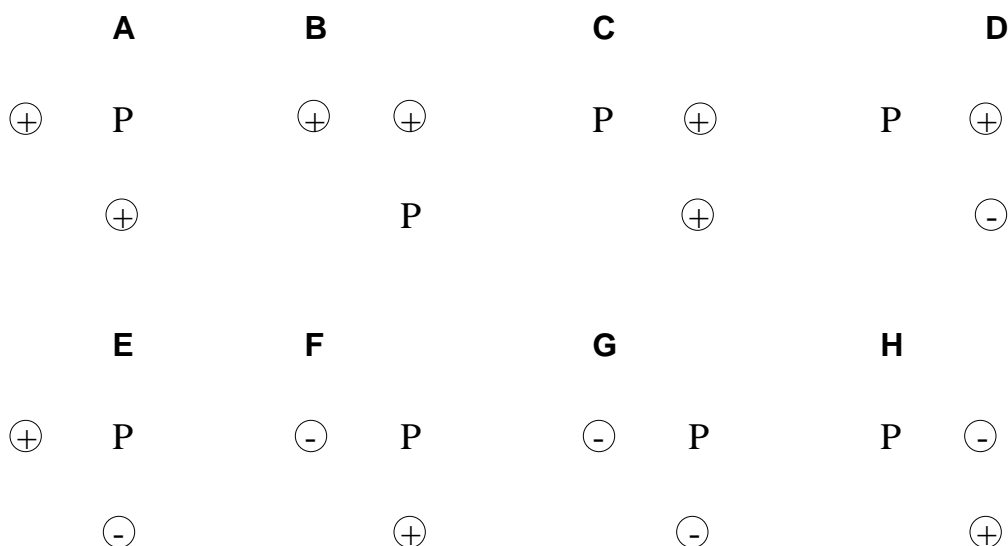


## Two Nonlinear Electric Charges—Electric Force<sup>128</sup>

Given below are arrangements of two fixed electric charges. In each figure, a point labeled P is also identified. All of the charges are the same size,  $q$ , but they can be either positive or negative as indicated. The distances between adjacent items, either between two charges or between a charge and point P, are all the same. There are no other charges in this region. For this problem, we are going to place a test charge,  $+Q$ , at point P.

Rank these arrangements from greatest to least on the basis of the strength (magnitude) of the electric force on the test charge,  $+Q$ , at P.



Greatest 1\_\_\_ 2\_\_\_ 3\_\_\_ 4\_\_\_ 5\_\_\_ 6\_\_\_ 7\_\_\_ 8\_\_\_ Least

Or, all of these arrangements exert the same magnitude force on the  $+Q$  test charge. \_\_\_\_\_

Or, all of these arrangements will exert zero force on the  $+Q$  test charge. \_\_\_\_\_

Please carefully explain your reasoning.

How sure were you of your ranking? (circle one)

Basically Guessed					Sure				Very Sure
1	2	3	4	5	6	7	8	9	10

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<sup>128</sup> T. O’Kuma