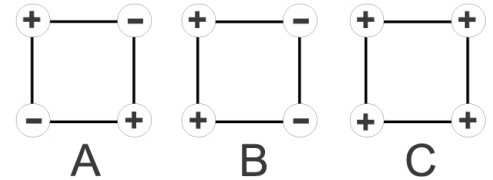


## Homework #3

- 1- Four charges are placed on the corners of a square as shown in the figure. All of the charges have the same magnitude, but as indicated in the figure some of the charges are positive and some are negative. In which of the three cases is the electric field at the center of the square zero?

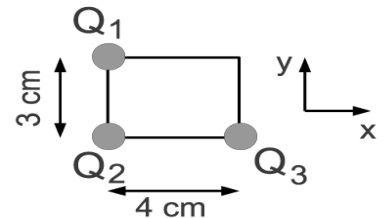
(1) A,B (2) A only (3) A,C (4) C only (5) B only



- 2- Two concentric shells of negligible thickness have radius  $r_1=10$  cm and  $r_2=20$  cm. If the electric field at  $r=15$  cm is directed radially outwards with magnitude  $1000$  V/m and the electric field at  $r=25$  cm is directed radially inwards with magnitude  $500$  V/m, what is the sum of the charges on the two shells?

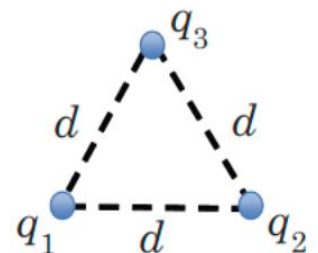
(1)  $+2.5$  nC (2)  $-3.5$  nC (3)  $-1.0$  nC (4)  $+3.5$  nC (5)  $+6.0$  nC

- 3- Three charges are placed on the corners of a rectangle as shown in the figure. If  $Q_1=-2\text{ }\mu\text{C}$ ,  $Q_2=1\text{ }\mu\text{C}$ , and  $Q_3=3\text{ }\mu\text{C}$ , what is the x component of the force on  $Q_3$  due to  $Q_1$  and  $Q_2$ ?



(1)  $+9.8$  N (2)  $+17$  N (3)  $+34$  N (4)  $-4.7$  N (5)  $-0.4$  N

- 4- Three charges form an equilateral triangle of side length  $d=2$  cm. The top charge is  $q_3=3\text{ }\mu\text{C}$ , while the bottom two are  $q_1=q_2=-6\text{ }\mu\text{C}$ . What is the magnitude of the net force acting on  $q_3$ ?



(1)  $350$  N (2)  $810$  N (3)  $700$  N (4)  $405$  N (5)  $0$  N