According to the Coulomb's electrostatic force(F) of attraction or repulsion between two charges is directly proportional to product of charges.
So $F \alpha q_1 q_2$
The one of the charges should be negative.
a) IN the first case $q_1 = -3Q$ and $q_2 = 5Q$
Now $F_1 \alpha (3Q)(5Q)$
And in the second case when the two charges are touch each other then the common charge on each sphere is

$$q = (-3Q + 5Q) / 2$$
$$= Q$$

Then $F_2 \alpha (Q)(Q)$

$$\frac{F_2}{F_1} = \frac{(Q)(Q)}{(3Q)(5Q)}$$

Then

$$= 1 / 15$$

Now $F_2 = (1 / 15)F_1$

$$= (1 / 15)(10N) = 2/3 \text{ N}$$

b)
The nature of force is repulsive