TWO IDENTICAL CAPACITORS ARE JOINED IN PARALLEL CHARGED TO A POTENTIAL V , SEPARATED AND THEN CONNECTED IN SERIES I.e. THE POSITIVE PLATE OF ONE IS CONNECTED TO THE NEGATIVE OF THE OTHER PLATE.THEN -

1. THE CHARGES OF THE FREE PLATES CONNECTED TOGETHER ARE DESTROYED

2. CHARGES ON THE FREE PLATES ARE ENHANCED

3. ENERGY STORED IN THE SYSTEM INCREASES

4. POTENTIAL DIFFERENCE BETWEEN THE FREE PLATES IS 2V

Solution

The charges on two capacitors are equal to

$q_1 = q_2 = CV,$

where C – capacitance of each capacitor.

V' - new potential difference between free plates.

Using charge conservation,

$$q_1 + q_2 = CV + CV = 2CV,$$

$$q_1' + q_2' = CV_1 + CV_2 = CV',$$

$$q_1 + q_2 = q_1' + q_2' \rightarrow 2CV = CV', V' = 2V.$$

Answer: 4. potential difference between free plates is 2V.