

### Answer on Question #54784, Physics Electric Circuits

There is a triangle ABC with each of its side having a capacitor of capacitance  $1F$ . Now, another triangle DEF is concentrically placed over triangle ABC and has capacitors of capacitance  $1F$  on each of its side. Points A and D, B and E, C and F are connected with  $1F$  capacitors between them. Find the equivalent capacitance between the points A and D. Please explain how.

### Solution

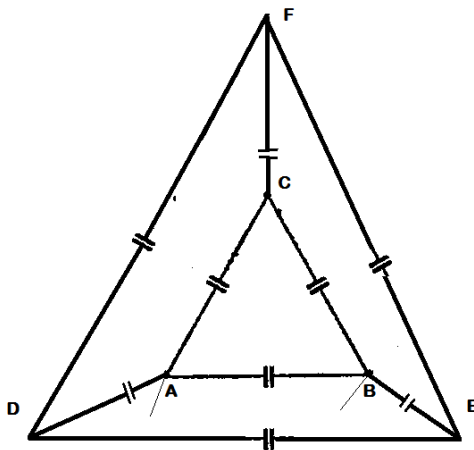


Fig.1

The electric circuit in Figure 1 can be more convenient to represent (see. Figure 2)

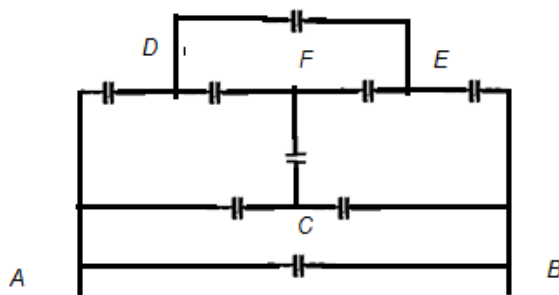


Fig.2

The capacitor between points F and C can be thrown to the scheme (we got a balanced Wheatstone bridge).

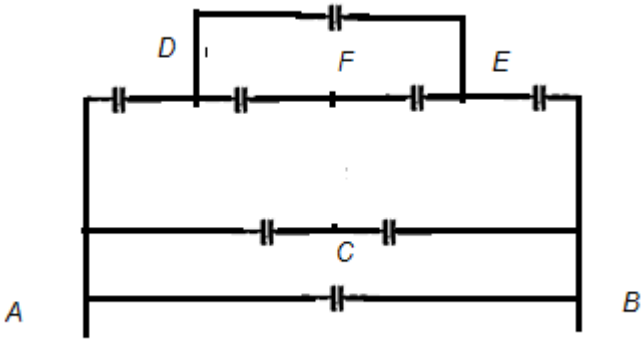


Fig.3

The capacity between points D and E:

$$C_{DE} = \frac{1F}{2} + 1F = 1.5F \tag{1}$$

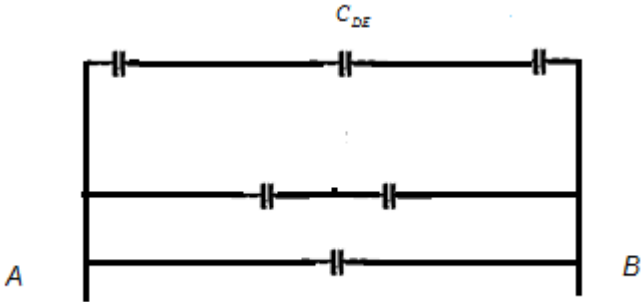


Fig.4

The capacity between points A and B:

$$C_{AB} = \left( \frac{1}{1F} + \frac{1}{1F} + \frac{1}{1.5F} \right)^{-1} + \left( \frac{1}{1F} + \frac{1}{1F} \right)^{-1} + \left( \frac{1}{1F} \right)^{-1} = 19F/16 = 1.1875F \tag{2}$$

**Answer:**  $C_{AB} = 19F/16 = 1.1875F$