Answer on Question #45027 – Chemistry – Other

Question

How much water in liters, must be added to 0.5 liter of 6 M HCl to make the solution 2 M?

A) 0.33
B) 0.5
C) 1
D) 1.5
E) 2

Solution

Number of moles of HCl in 0.5 L (V_o) of 6 M (C_o) solution:

$$n = C_o \cdot V_o = 6 \text{ mol/L} \cdot 0.5 \text{ L} = 3 \text{ mol}$$

Volume (V) of 2 M (C) solution of HCl, containing 3 mol of HCl (n):

$$V = n / C = 3 \text{ mol} / 2 \text{ mol/L} = 1.5 \text{ L}$$

Volume of water which must be added to the initial solution to make the final solution:

$$V_w = V - V_o = 1.5 \text{ L} - 0.5 \text{ L} = 1 \text{ L}$$

Answer: correct option is **C) 1**