Task:

molarity of a solution made by adding 750ml(.5M)Hcl with 250ml (2M)hcl

Solution:

The molarity of solution is the number of moles of substance in 1 L of solution.

C (M) = n (mol) / V(L)

C – molarity (M)

n – number of moles of substance

V- volume of solution (L)

If two solutions with different molarities are mixed, we have to find the total amount of substance (mol) and the total volume of new solution first.

The total number of moles of HCl is

$n = n_1 + n_2$

n_1 – number of moles of HCl in the first solution

n_2 - number of moles of HCl in the second solution

n - number of moles of HCl in the new solution

From the equation for molarity

n (mol) = C (M) · V(L)

n_1 (HCl) = C_1 (HCl) · V_1 (HCl)

n_2 (HCl) = C_2 (HCl) · V_2 (HCl)

n_1 (HCl) = 0.5 · 0.750 = 0.375 mol

n_2 (HCl) = 2 · 0.250 = 0.5 mol

The number of moles of HCl in the new solution

$n = n_1 + n_2$

n = 0.375 + 0.5 = 0.875 mol

The total volume of new solution:

$V = V_1 + V_2$

V = 0.750 + 0.250 = 1.00 L

The molarity of new solution is

C (M) = n(mol) / V(L)

C (HCl) = 0.875 / 1.00 = 0.875 M

Answer: C (HCl) = 0.875 M