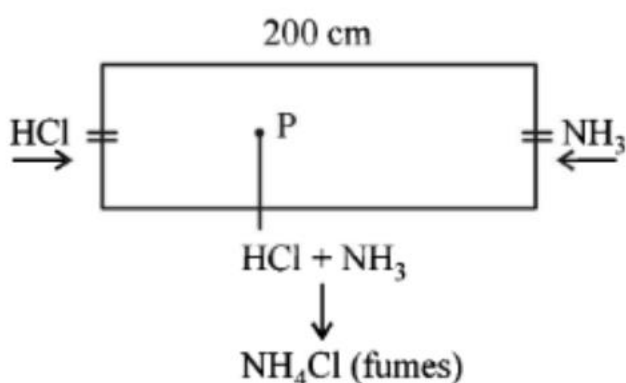


Previous year JEE questions 4

A straight glass tube has two inlets X and Y at two ends. The length of tube is 200 cm. HCl gas through inlets X and NH_3 gas through inlet Y are allowed to enter the tube at the same time. What fumes appear at point P inside the tube. Find distance of P from X . (1980)

Let NH_3 diffuse through = x cm

HCl diffuses through = y cm



According to Graham's law of diffusion

$$\frac{x}{y} = \sqrt{\frac{\text{Mol. wt HCl}}{\text{Mol. wt of NH}_3}} = \sqrt{\frac{36.5}{17}} = \sqrt{2.14} = 1.465$$

$$x = 1.465y \quad \dots (1)$$

$$x + y = 200 \text{ cm} \quad \dots (2)$$

From these equations; $y = 85.2$ cm

Distance between P and $X = y = \mathbf{85.2 \text{ cm}}$.