

Q.7] The avg. conc. of  $\text{SO}_2$  in the atmosphere over a city on a certain day is 10 ppm. when the avg temp  $298\text{K}$ . Given that the solubility of  $\text{SO}_2$  in water at  $298\text{K}$ . Given the stability of  $\text{SO}_2$  in water at  $298\text{K}$  is  $1.365\text{ mol/L}$  &  $\text{p}K_a$  of  $\text{H}_2\text{SO}_3$  is 1.9. Estimate pH of rain [2005]

$$= -\log 0.1$$

$$= \textcircled{1}$$

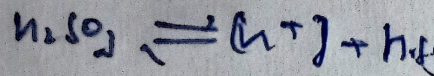
$\text{SO}_2$

Partial Pressure of  $\text{SO}_2$  ( $P_{\text{SO}_2}$ ) =  $10^{-5}\text{ atm}$

$$[\text{SO}_2]_{\text{aq}} = 1.365 \times 10^{-5} \text{ mol L}^{-1}$$

$\text{p}K_a = 1.92$  & conc. of  $\text{H}_2\text{SO}_3$  is very low, it is almost completely ionised.

$$[\text{H}^+] = 1.3653 \times 10^{-5} \text{ M}$$



$$\text{pH} = -\log [\text{H}^+] = -\log(1.3653 \times 10^{-5}) = \boxed{4.86}$$