Q.12 A KCl solution of conductivity 0.14 S m⁻¹ shows a resistance of 4.19Ω in a conductivity cell. If the same cell is filled with an HCl solution, the resistance drops to 1.03Ω. The conductivity of the HCl solution is _____ × 10⁻² S m⁻¹. (Round off to the Nearest Integer).

17th March Evening Shift 2021

Ans 12. For KCl solution,

$$R = \left(\frac{1}{K}\right)\left(\frac{l}{A}\right) \Rightarrow \frac{l}{A} = R \times K = 4.19 \times 0.14$$

$$= 0.58$$

For HCl solution,

$$R = \left(\frac{1}{K}\right)\left(\frac{l}{A}\right)$$

$$\Rightarrow K = \frac{(l/A)}{R} = \frac{0.58}{1.03} = 0.56 = 56 \times 10^{-2} \text{ Sm}^{-1}$$