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TARGET : NEET (UG) 2024

Course : SARANSH (Youtube Live CRASH COURSE)

I-CHEMISTRY

DPP

DAILY PRACTICE PROBLEMS

DPP NO. 3

Physical Chemistry : ELECTROCHEMISTRY

DPP No. : 3

1. The number of Faradays(F) required to produce 20 g of calcium from molten $CaCl_2$ (Atomic mass of Ca = 40 g mol^{-1}) is :

(1) 2 (2) 3 (3) 4 (4) 1

2. A device that converts energy of combustion of fuels like hydrogen and methane, directly into electrical energy is know as :

(1) Electrolytic cell (2) Dynamo (3) Ni–Cd cell (4) Fuel Cell

3. In a typical fuel cell, the reactant (R) and product (P) are

(1) R = $H_2(g)$, $O_2(g)$; P = $H_2O_2(\ell)$

(2) R = $H_2(g)$, $O_2(g)$; P = $H_2O(\ell)$

(3) R = $H_2(g)$, $O_2(g)$, $Cl_2(\ell)$; P = $HClO_4(aq)$

(4) R = $H_2(g)$, $N_2(g)$; P = $NH_3(aq)$

4. The molar conductivity of a 0.5 mol/ dm^3 solution of $AgNO_3$ with electrolytic conductivity of 5.76×10^{-3} S cm^{-1} at 298 K is

(1) 28.8 S cm^2/mol (2) 2.88 S cm^2/mol (3) 11.52 S cm^2/mol (4) 0.086 S cm^2/mol

5. The specific conductance of a saturated solution of silver bromide is S cm^{-1}. The limiting ionic conductivity of Ag^+ and Br^- ions are x and y, respectively. The solubility of silver bromide is gL^{-1} is :
(Molar mass of AgBr = 188)

(1) $\frac{k \times 1000}{x - y}$ (2) $\frac{k}{x + y} \times 188$ (3) $\frac{k \times 1000 \times 188}{x + y}$ (4) $\frac{x + y}{k} \times \frac{100}{188}$

6. The conductivity of centimolar solution of KCl at 25°C is 0.0210 ohm^{-1} cm^{-1} and the resistance of the cell containing the solution at 25°C is 60 ohm. The value of cell constant is -

(1) 3.28 cm^{-1} (2) 1.26 cm^{-1} (3) 3.34 cm^{-1} (4) 1.34 cm^{-1}

7. Molar conductance of an electrolyte increases with dilution according to the equation:

$\Lambda_m = \Lambda_m^0 - A\sqrt{c}$

Which of the following statements are true?

(A) This equation applies to both strong and weak electrolytes.

(B) Value of the constant A depends upon the nature of the solvent.

(C) Value of constant A is same for both $BaCl_2$ and $MgSO_4$.

(D) Value of constant A is same for both $BaCl_2$ and $Mg(OH)_2$.

Choose the most appropriate answer from the options given below:

(1) (A) and (B) only (2) (A),(B) and (C) only

(3) (B) and (C) only (4) (B) and (D) only

8. Limiting molar conductivity of NH_4OH $\left(\text{i.e. } \overset{0}{\Lambda}_m(NH_4OH)\right)$ is equal to :

(1) $\overset{0}{\Lambda}_m(NH_4Cl) + \overset{0}{\Lambda}_m(NaCl) - \overset{0}{\Lambda}_m(NaOH)$

(2) $\overset{0}{\Lambda}_m(NaOH) + \overset{0}{\Lambda}_m(NaCl) - \overset{0}{\Lambda}_m(NH_4Cl)$

(3) $\overset{0}{\Lambda}_m(NH_4OH) + \overset{0}{\Lambda}_m(NH_4Cl) - \overset{0}{\Lambda}_m(HCl)$

(4) $\overset{0}{\Lambda}_m(NH_4Cl) + \overset{0}{\Lambda}_m(NaOH) - \overset{0}{\Lambda}_m(NaCl)$

9. Molar conductivities (Λ^o_m) at infinite dilution of NaCl, HCl and CH_3COONa are 126.4, 425.9 and 91.0 S cm^2 mol^{-1} respectIvely. Λ^o_m for CH_3COOH will be :

(1) 425.5 S cm^2 mol^{-1} (2)180.5 S cm^2 mol^{-1}

(3) 290.8 S cm^2 mol^{-1} (4) 390.5 S cm^2 mol^{-1}

10. At 25ºC molar conductivity of 0.1 molar aqueous solution of ammonium hydroxide is 9.54 ohm^{-1} cm^2 mol^{-1} and at infinite dilution its molar conductivity is 238 ohm^{-1} cm^2 mol^{-1}. The degree or ionisation of ammonium hydroxide at the same concentration and temperature is :

(1) 20.800% (2) 4.008% (3) 40.800% (4) 2.080%

11. Following limiting molar conductivities are given as

$\lambda_m^0(H_2SO_4) = x\,S\,cm^2\,mol^{-1}$

$\lambda_m^0(K_2SO_4) = y\,S\,cm^2\,mol^{-1}$

$\lambda_m^0(CH_3COOK) = z\,S\,cm^2\,mol^{-1}$

$\lambda_m^0\left(\text{in}\,S\,cm^2\,mol^{-1}\right)$ for CH_3COOH will be –

(1) x – y + 2z (2) x + y + z (3) x – y + z (4) $\frac{(x-y)}{2}+z$

12. The molar conductance of NaCl, HCl and CH_3COONa at infinite dilution are 126.45, 426.16 and 91.0 S cm^2 mol^{-1} respectively. The moalr conductance of CH_3COOH at infinite dilution is.
Choose the right option for your answer.

(1) 390.71 S cm^2 mol^{-1} (2) 698.28 S cm^2 mol^{-1}

(3) 540.48 S cm^2 mol^{-1} (4) 201.28 S cm^2 mol^{-1}

13. The molar conductivity of 0.007 M acetic acid is 20 S cm^2 mol^{-1}. What is the dissociation constant of acetic acid ? Choose the correct option.

[$\Lambda^\circ_{H^+}$ = 350 S cm^2 mol^{-1} ; $\Lambda^\circ_{CH_3COO^-}$ = 50 S cm^2 mol^{-1}]

(1) 2.50×10^{-4} mol L^{-1} (2) 1.75×10^{-5} mol L^{-1}

(3) 2.50×10^{-5} mol L^{-1} (4) 1.75×10^{-4} mol L^{-1}

Answer Key

1.	(4)	**2.**	(4)	**3.**	(2)	**4.**	(3)	**5.**	(3)	**6.**	(2)	**7.**	(4)
8.	(4)	**9.**	(4)	**10.**	(2)	**11.**	(4)	**12.**	(1)	**13.**	(2)		