

**CBSE Class 12 physics**  
**Important Questions**  
**Chapter 3**  
**Electrochemistry**

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**1 Marks Questions**

**1. Can you store AgCl solution in Zinc pot?**

**Ans.** No. We can't store AgCl solution in Zinc pot because standard electrode potential of Zinc is less than silver.

**2. Define the term – standard electrode potential?**

**Ans.** When the concentration of all the species involved in a half-cell is unity, then the electrode potential is called standard electrode potential.

**3. What is electromotive force of a cell?**

**Ans.** Electromotive force of a cell is also called the cell potential. It is the difference between the electrode potentials of the cathode and anode.

$$E_{\text{cell}} = E_{\text{cathode}} - E_{\text{anode}}$$

**4. Can an electrochemical cell act as electrolytic cell? How?**

**Ans.** Yes, An electrochemical cell can be converted into electrolytic cell by applying an external opposite potential greater than its own electrical potential.

**5. Single electrode potential cannot be determined. Why?**

**Ans.** A single half cell does not exist independently as reduction and oxidation occur simultaneously therefore single electrode potential cannot be measured.

**6. What is SHE? What is its electrode potential?**

**Ans.** SHE stands for standard Hydrogen electrode. By convention, its electrode potential is taken as 0 (zero).

**7. What does the positive value of standard electrode potential indicate?**

**Ans.** The positive value of standard electrode potential indicates that the element gets reduced more easily than  $H^+$  ions and its reduced form is more stable than Hydrogen gas.

**8. What is an electrochemical series? How does it predict the feasibility of a certain redox reaction?**

**Ans.** The arrangement of metals and ions in increasing order of their electrode potential values is known as electrochemical series.

The reduction half reaction for which the reduction potential is lower than the other will act as anode and one with greater value will act as cathode. Reverse reaction will not occur.

**9. Give some uses of electrochemical cells?**

**Ans.** Electrochemical cells are used for determining the

- a) pH of solutions
- b) solubility product and equilibrium constant
- c) in potentiometric titrations

**10. A cell is represented by notation  $-Cu(s) / Cu^{2+}(aq) // Ag^+(aq) / Ag(s)$**

**Calculate e.m.f of the cell if  $E^0_{Cu^{2+}/Cu} = +0.34V$  and  $E^0_{Ag^+/Ag} = 0.80V$  ?**

**Ans.**  $E^0_{cell} = E^0_{cathode} - E^0_{Anode}$

$$= E^0_{Ag^+/Ag} - E^0_{Cu^{2+}/Cu}$$

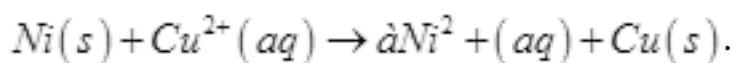
$$= 0.80V - (+0.34V)$$

$$= +0.46V$$

**11. What would happen if Nickel spatula is used to stir a solution of  $CuSO_4$  ?**

$$E^0_{Cu^{2+}/Cu} = 0.34 V, E^0_{Ni^{2+}/Ni} = -0.25V ?$$

**Ans.** From the reduction potential values, it is indicated that Nickel (more negative value) is more reactive than copper and will, then displace copper from  $CuSO_4$



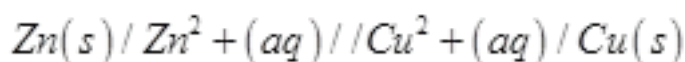
**12. State the factors that affect the value of electrode potential?**

**Ans.** Factors affecting electrode potential values are –

- a) Concentration of electrolyte
- b) Temperature.

**13. Write Nernst equation for a Daniel cell?**

**Ans.** Daniel cell:



Nernst equation – at 298 K

$$E_{cell} = (E^0_{Cu^{2+}/Cu} - E^0_{Zn^{2+}/Zn}) - \frac{0.059}{2} \log \frac{[Zn^{2+}]}{[Cu^{2+}]}$$

**14. Define the term specific resistance and give its SI unit**

**Ans.** The specific resistance of a substance is its resistance when it is one meter long and its area of cross Section is one  $m^2$ . Its SI unit is  $\Omega m$  (ohm meter)

**15. Give the unit of conductance?**

**Ans.** The SI unit of conductance is Siemens, denoted by the symbol, S & is equal to  $\Omega^{-1}$ .

**16. What do you understand by the term- conductivity?**

**Ans.** Conductivity of a material in  $S m^{-1}$  is its conductance when it is 1m long and its area of cross - section is  $1m^2$ . It is represented by  $\kappa$ .

**17. What do you understand by strong and weak electrolytes?**

**Ans.** An electrolyte that ionises completely in solution is a strong electrolyte eg.  $\text{NaCl}$ ,  $\text{CaCl}_2$  etc and an electrolyte that ionizes partially in solution is weak electrolyte eg  $\text{CH}_3\text{COOH}$ ,  $\text{NH}_4\text{OH}$  etc.

**18. State Kohlrausch's Law?**

**Ans.** Kohlrausch Law of independent migration of ion states that limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte.

**19. What is meant by Faraday's constant?**

**Ans.** Faraday's constant is the quantity of electricity carried by one mole of electrons.

$$1 \text{ F} = 96500 \text{ C/mol}$$

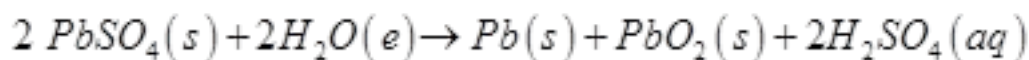
**20. How many faradays are needed to reduce 3g mole of  $\text{Cu}^{2+}$  to Cu metal?**

**Ans.**  $\text{Cu}^{2+} + 2e^- \rightarrow \text{Cu}$

Two faradays are needed to reduce 1g mole  $\text{Cu}^{2+}$  ∴ 6 Faradays will be needed to reduce 3g mole of  $\text{Cu}^{2+}$ .

**21. Give the reaction taking place in lead storage battery when it is on charging?**

**Ans.** When the lead storage battery is on charging –



**22. A Leclanche cell is also called dry cell. Why?**

**Ans.** Leclanche cell consists of zinc anode (container) and carbon cathode. The electrolyte is a moist paste of  $\text{MnO}_2$ ,  $\text{ZnCl}_2$ ,  $\text{NH}_4\text{Cl}$  and carbon black. Because there is no free liquid in the cell, it is called dry cell.

**23. Why is the voltage of a mercury cell constant during its working?**

**Ans.** As all the products and reactants are either in solid or liquid state, their concentration

does not change with the use of the cell.

**24. What are fuel cells?**

**Ans.** A fuel cell is a galvanic cell for converting the energy of a fuel directly into electrical energy without use of a heat engine.

**25. What do you understand by corrosion?**

**Ans.** Corrosion is an electrochemical phenomenon in which metal gets decomposed in the presence of air and water and forms compounds like oxides, sulphates, carbonates, sulphides etc.

**26. Name two metals that can be used for cathodic protection of iron?**

**Ans.** Names of the metals are – Zinc and Magnesium.

**27. Arrange the following metals in the order in which they displace each other from the solution of their salts. Al, Cu, Fe, Mg and Zn**

**Ans.** The following is the order in which the given metals displace each other from the solution of their salts. Mg, Al, Zn, Fe, Cu

**28. Suggest two materials other than hydrogen that can be used as fuels in fuel cells.**

**Ans.** Methane and methanol can be used as fuels in fuel cells.

**29. Suggest a list of metals that are extracted electrolytically.**

**Ans.** Metals that are on the top of the reactivity series such as sodium, potassium, calcium, lithium, magnesium, aluminium are extracted electrolytically.