Electrochemical cells. Conduction of electro current in solution of salt, acids, etc. The device through which chemical energy changes to electrical energy is called electrochemical cell or voltaic cell or galvanic cell. The change energy to electrical energy causes lowering of free energy which appears as electrical energy and measured in terms of EMF electromotive force. In an electrochemical cell chemical reaction takes place in two compartments each of

which is called a half cell and contains a suitable electrolyte and electrodes. The two compartments are connected through an inverted U-shaped tube containing a mixture of agaragar jelly and an electrolyte like KCN, potassium cyanide or KNO3, potassium nitrate or NH4NO3, ammonium nitrate is called salt bridge. Salt bridge connects the two half cells. It prevents transference of the solution from cell to another, help to maintain electrical neutrality in the half cells, prevents accumulation of changes, prevents liquid-liquid junction potential. The salt bridge can be replaced by a porous partition like paper strip, clay porous pot,

unglazed porcelain or asbestos fiber. unglazed porcelain or asbestos fiber. The electrochemical cells can be reversible or irreversible.

Summary:

- Electrochemical cells convert chemical energy into electrical energy, leading to a decrease in free energy that appears as electromotive force (EMF).
- The chemical reactions occur in two compartments called **half-cells**, which contain **electrolytes and electrodes**.
- A salt bridge is used to connect the two half-cells, prevent charge accumulation, maintain electrical neutrality, and avoid liquid-liquid junction potential.
- Salt bridges are made of **agar-agar jelly mixed with electrolytes** like **KNO**₃ (potassium nitrate), NH₄NO₃ (ammonium nitrate), or KCN (potassium cyanide).
- **Porous materials** such as **porous paper strips, unglazed porcelain, or asbestos fibers** can **replace salt bridges** in electrochemical cells.
- Electrochemical cells can be **reversible or irreversible**, depending on whether the reaction can be reversed.

Question 1:

What is the function of an **electrochemical cell**?

- A) It converts electrical energy into heat energy
- B) It converts electrical energy into chemical energy
- C) It converts chemical energy into electrical energy 🗹 (Correct)
- D) It converts mechanical energy into electrical energy

Question 2:

What is the purpose of a **salt bridge** in an electrochemical cell?

- A) To connect the electrodes
- B) To maintain electrical neutrality in half-cells 🗹 (Correct)
- C) To conduct electricity directly between electrodes
- D) To increase the EMF of the cell

Question 3:

Which of the following is **NOT** a function of a **salt bridge**?

- A) It prevents transference of solutions between half-cells
- B) It helps maintain electrical neutrality
- C) It prevents accumulation of charges
- D) It increases the voltage of the electrochemical cell 🗹 (Correct)

Question 4:

What type of electrolyte is used in a salt bridge?

- A) Strong acids like HCl
- B) Metals like copper
- C) A mixture of **agar-agar jelly** and an electrolyte like **KNO**₃ or **NH**₄**NO**₃ (Correct)
- D) Pure water