

Chemistry Practical Class 12 Variation of cell potential in $\text{Zn}|\text{Zn}^{2+}||\text{Cu}^{2+}|\text{Cu}$ with change in concentration of electrolytes (CuSO_4 or ZnSO_4) at room temperature Viva Questions with Answers

Q 1. What happens when the Daniell cell's standard electrode potential is 1.1 V?

Answer. You will notice that the voltmeter does not show any current flow in the cell.

Q 2. What happens when a zinc rod is immersed in a 0.1 M solution of ZnSO_4 ?

Answer. As the concentration of ZnSO_4 solution decreases, so does the standard electric potential.

Q 3. What happens when current flows from zinc electrodes to copper electrodes?

Answer. When current flows from the zinc electrode to the copper electrode, copper deposits in the cathode and zinc dissolves in the electrolyte.

Q 4. What is oxidation?

Answer. According to Classical or earlier concept oxidation is a process which involves the addition of oxygen or any electronegative element or the removal of hydrogen or any electropositive element.

According to electronic concept oxidation is defined as the process in which an atom or ion loses one or more electrons.

According to Classical or earlier concept reduction is a process which involves the addition of hydrogen or any electropositive element or the removal of oxygen or any electronegative element.

According to electronic concept reduction is defined as the process in which an atom or ion gains one or more electrons.

Q 5. What is reduction?

Answer. According to Classical or earlier concept reduction is a process which involves the addition of hydrogen or any electropositive element or the removal of oxygen or any electronegative element.

According to electronic concept reduction is defined as the process in which an atom or ion gains one or more electrons.

Q 6. What is a voltaic cell or electrochemical cell?

Answer. A galvanic cell or voltaic cell is an electrochemical cell that converts the chemical energy of spontaneous redox reactions into electrical energy.

Q 7. Can copper be oxidised by zinc ions?

Answer. An element in the highest oxidation state acts only as a reducing agent. Cu cannot be oxidised by Zn^{2+} ion.

Q 8. What is a salt bridge?

Answer. A salt bridge is a connection in a galvanic cell that contains a weak electrolyte between the oxidation and reduction half-cells (e.g., voltaic cell, Daniell cell). Its purpose is to prevent the electrochemical reaction from reaching equilibrium too soon. Without a salt bridge, one solution quickly accumulates positive charge while the other quickly accumulates negative charge. This would put an end to the reaction and, as a result, the generation of electricity.

Q 9. What is the function of a porous pot in a Daniell cell?

Answer. The porous pot serves two purposes in Daniell Cell.

- (i) To complete the circuit by allowing ions to pass through it.
- (ii) To create a barrier between two solutions and keep them from mixing.

Q 10. Name the electrolytes that can be used in salt bridge.

Answer. Sodium Chloride (NaCl), Potassium Chloride (KCl), Potassium Nitrate (KNO_3), Potassium Sulphate (KSO_4) are generally used electrolytes.

Q 11. What is the direction of flow of current in an electrochemical cell?

Answer. In an electrolytic cell, current flows from cathode to anode in the outer circuit.

Q 12. What is the direction of flow of current in a Daniell cell?

Answer. In a Daniell cell, current flows from anode to cathode in the outer circuit.

Q 13. What is the effect of $[\text{Zn}^{2+}]$ on E.M.F. of the cell $\text{Zn} | \text{Zn}^{2+} || \text{Cu}^{2+} | \text{Cu}$?

Answer. E.M.F. decreases with the increase in molar concentration of Zn^{2+} ions.

Q14. What is the effect of $[\text{Cu}^{2+}]$ on E.M.F. of the cell $\text{Zn} | \text{Zn}^{2+} || \text{Cu}^{2+} | \text{Cu}$?

Answer. E.M.F. increases with the increase in molar concentration of Cu^{2+} ions.

Q 15. What is the sign of ΔG for the reaction in electrochemical cell?

Answer. For spontaneous reaction, ΔG is negative and $K > 1$.

Q 16. What factor is kept in mind while selecting an electrolytic solution for the construction of a salt bridge?

Answer. Ions of the electrolyte in the salt should not react with ions of electrolytes near electrodes.

Q 17. Is it possible to measure the single-electrode potential?

Answer. The absolute value of a single electrode cannot be determined experimentally because half-cell reactions cannot occur independently. Only the difference between the electrode potentials of any two half-cell reactions can be determined.

Q. 18. Define the term E.M.F?

Answer. The electric potential generated by an electrochemical cell or a changing magnetic field is referred to as electromotive force. It is also referred to as voltage. It is electrical action generated by a non-electrical source, such as a battery (which converts chemical energy to electrical energy) or a generator (converts mechanical energy into electrical energy).

Electromotive force is commonly abbreviated as emf, EMF, or a cursive letter E.

The volt is the SI unit for electromotive force.

Q 19. What is a half cell?

Answer. A half-cell is one-half of an electrolytic or voltaic cell that undergoes either oxidation or reduction. The anode half-cell reaction is oxidation, while the cathode half-cell reaction is reduction.

Q 20. Mention the names of anode and cathode of a Daniell cell?

Answer. Copper strips act as cathode whereas zinc strips act as anode.