

1Q) Discuss the applications of reference electrodes.

Ans) (i) pH Measurement: Used with glass electrodes to accurately measure pH in solution.

(ii) Electrochemical Analysis: Provides a stable potential in techniques like voltammetry and potentiometry for ion and compound detection.

(iii) Battery Testing and corrosion studies: Helps assess electrochemical behavior of materials by providing a constant reference point.

2Q) Write the equation to determine pH using a reference electrode.

Ans) The pH of a solution can be determined using the potential difference between a reference electrode and a pH-sensitive electrode.

$$pH = \frac{E_{reference} - E_{glass}}{0.0591}$$

Where :

- $E_{reference}$ is the potential of the reference electrode,
- E_{glass} is the potential of the glass electrode,
- $0.0591 V$ is the potential change per pH unit at $25^{\circ}C$.

This allows for the calculation of pH based on the voltage difference.