

## Redox potentials, Cell Diagrams and EMF. Cadmium and nickel.

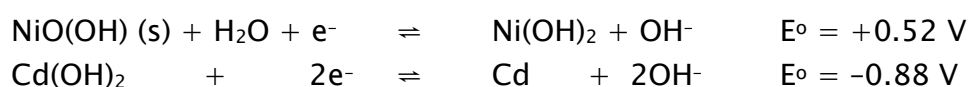
### AIM

We are learning to:

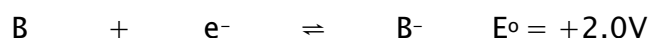
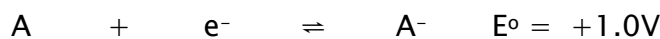
- work out e.m.f. of a cell from Redox potentials
- write overall equation for the reaction

### QUESTION

Use the following data to work out the e.m.f. and write the overall equation for the reaction in a nickel–cadmium alkaline battery.

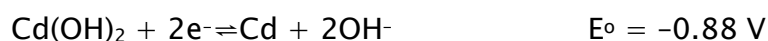
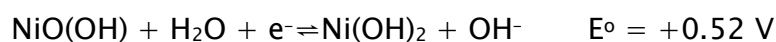


### DEFINITIONS



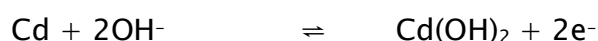
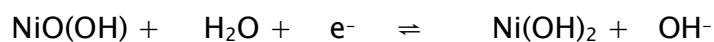
the more **positive** electrode will proceed in the **forward** direction

### WORKING THROUGH THE EXAMPLE



∴ E.M.F =

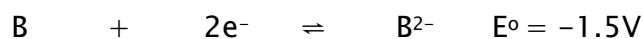
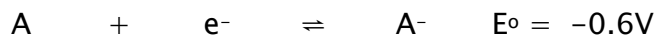
To write out full equation, re-write with more negative electrode reversed



## SUMMARY

1) to determine the cell EMF

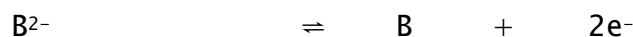
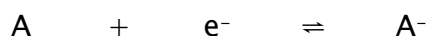
a) more **positive** electrode will proceed in the **forward** direction



b)  $EMF = E^\circ$  more positive electrode -  $E^\circ$  more negative electrode

2) to write a balanced equation

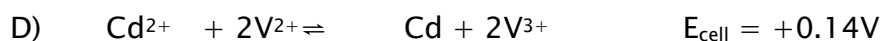
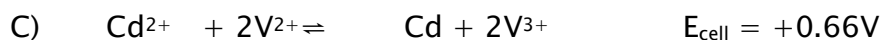
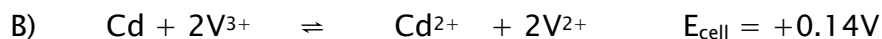
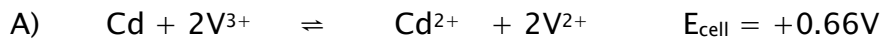
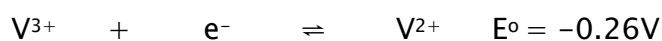
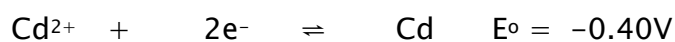
a) re-write half equations with more **negative** electrode **reversed**



b) multiply up to balance electrons, then add half equations together.

## ASSESSMENT

What would the correct EMF and equation be for the reaction which would occur between  $Cd^{2+}$ , Cd and  $V^{3+}$ ,  $V^{2+}$ ?



ANSWER: B