Electrochemical Cells

Fully *label* each cell, write the *half reactions* and *overall reaction*, and use the *cell voltage* to predict whether the reaction is *spontaneous* or *nonspontaneous*:

Cell 1

$$Cd_{(s)} \mid Cd^{2+}_{(aq)} \mid \mid Cu^{2+}_{(aq)} \mid Cu_{(s)}$$

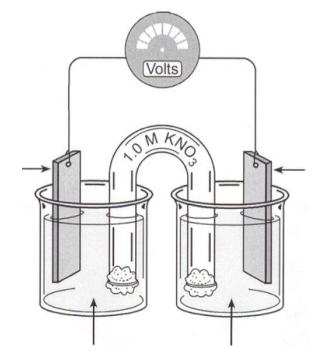
Ε°

Oxidation:

Reduction:

Overall:

spontaneous or nonspontaneous



Cell 2

$$Cd_{(s)} \mid Cd^{2+}_{(aq)} \mid \mid Zn^{2+}_{(aq)} \mid Zn_{(s)}$$

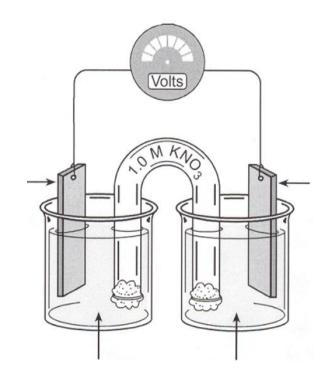
 E^o

Oxidation:

Reduction:

Overall:

spontaneous or nonspontaneous



Cell 3

$$Cd_{(s)} \mid Cd^{2+}_{(aq)} \mid \mid Fe^{3+}_{(aq)}$$
, $Fe^{2+}_{(aq)} \mid C_{(s)}$

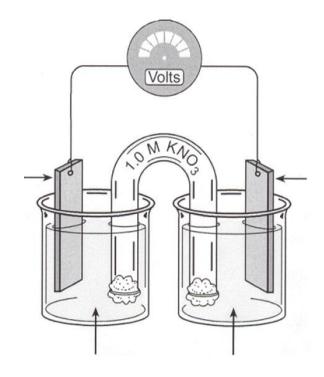
 E^o

Oxidation:

Reduction:

Overall:

spontaneous or nonspontaneous



Cell 4

 $\mathsf{Pb}_{(\mathsf{s})} \mid \mathsf{Pb}^{\mathsf{2+}}_{(\mathsf{aq})} \mid\mid \mathsf{Ag}^+_{(\mathsf{aq})} \mid \mathsf{Ag}_{(\mathsf{s})}$

Е

Oxidation:

Reduction:

Overall:

spontaneous or nonspontaneous

