

## Chem12 Electrochemistry : Quiz 1 - 35

### Electrochemical Cells

1) Draw a neat diagram of the Tin-Chromium electrochemical cell.  
(standard conditions)

2) Answer the following questions based on the cell above :

i) The cell voltage is \_\_\_\_\_

ii) On the diagram show the direction of electron flow.

iii) On the diagram label the anode and cathode.

iv) Name a suitable salt for each half-cell. \_\_\_\_\_

v) What is the purpose of the salt bridge ? \_\_\_\_\_

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vi) Name a suitable salt for the salt bridge. \_\_\_\_\_

vii) What happens in the region of the plugs of the salt bridge?

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viii) Give the oxidation half-reaction \_\_\_\_\_

Give the reduction half-reaction \_\_\_\_\_

ix) Give the overall balanced reaction for the cell.

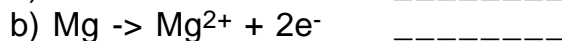
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x) Which electrode is decreasing in mass? \_\_\_\_\_

xi) If the current is 1.0 Amp, how much mass is lost by the above electrode in one hour ? (1.00 Coulomb =  $1.04 \times 10^{-5}$  moles)

\_\_\_\_\_ .

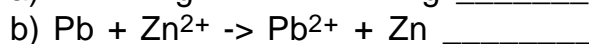
3) Give the standard reduction potentials.



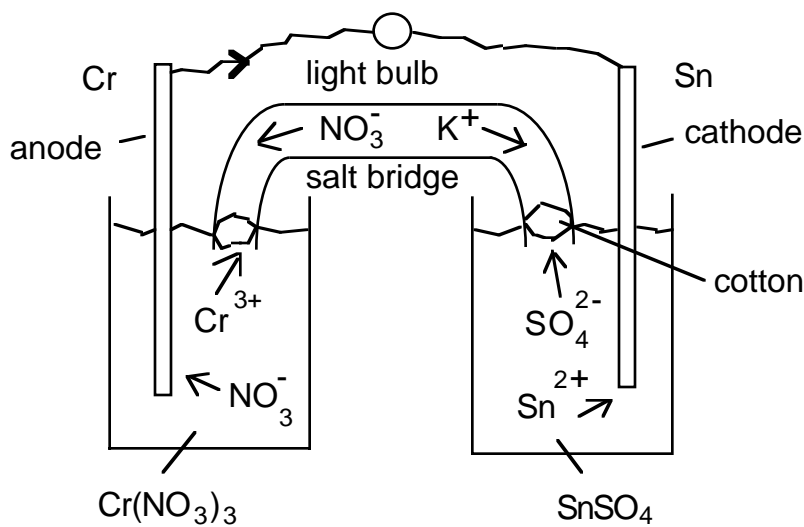
4) Define: a) Voltage

b) Current

5) Find the cell potential.



Answers : 1)



2)i) +0.60 volts, ii) current flows from Cr to Sn, iii) Cr is the anode, Sn is the cathode, iv)  $\text{Cr}(\text{NO}_3)_3$  for Cr cell,  $\text{Sn}(\text{SO}_4)_2$  for Sn cell and others. v) It completes the circuit and reduces charge build-up in both cells. vi)  $\text{KNO}_3$  and others. vii) A neutralization reaction occurs. Ions combine to form a salt. viii)  $\text{Cr} \rightarrow \text{Cr}^{3+} + 3\text{e}^-$ ,  $\text{Sn}^{2+} + 2\text{e}^- \rightarrow \text{Sn}$ , ix)  $3\text{Sn}^{2+} + 2\text{Cr} \rightarrow 3\text{Sn} + 2\text{Cr}^{3+}$ , x) Cr (anode), xi) 0.65 grams, 3)a) -0.45 volts, b) +2.37 volts, 4)a) It is the energy delivered per coulomb of electrons, b) It is the rate of flow of electrons, 5) +1.06 volts, -0.63 volts.