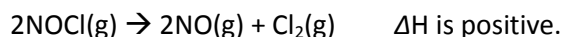
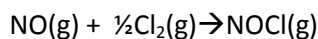


Revision 3 Equilibrium, galvanic cells and organic pathways

1) Consider the reaction shown below

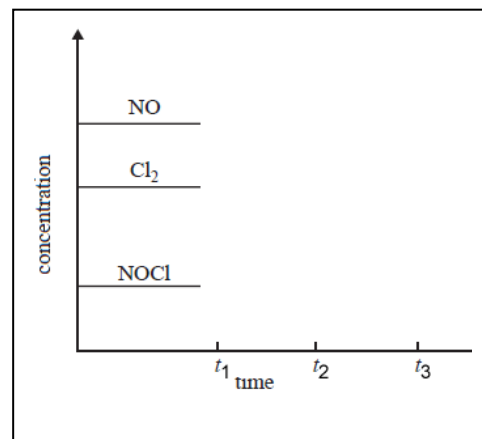


a) The equilibrium constant for this reaction is 1.23×10^{-4} M at a given temperature. What is the equilibrium constant for the reaction below, taking place at the same temperature as the reaction above.



b) A concentration-time graph for the system $2\text{NOCl}(\text{g}) \rightarrow 2\text{NO}(\text{g}) + \text{Cl}_2(\text{g})$ ΔH is positive is shown on the right.

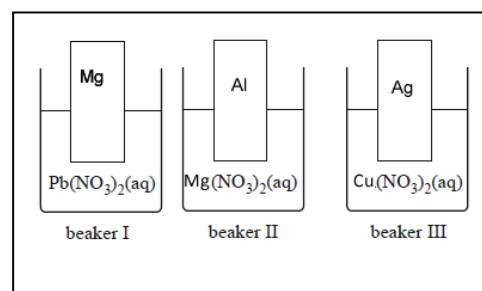
On the graph indicate the changes that take place when at
 - t_1 NO is added
 - t_2 the pressure was decreased by increasing of the volume
 - t_3 a catalyst was added at constant temperature.



2) Three pieces of metal were placed in different solutions as shown on the right.

a) In which beaker/s will a reaction occur?

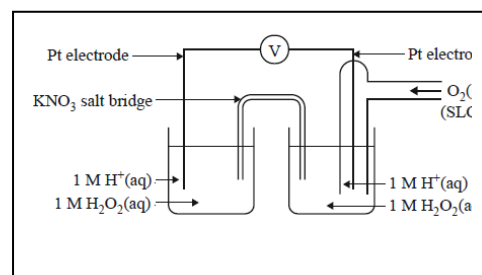
b) give the overall equation to each reaction.



c) A student set up the galvanic cell shown on the right.

i. Write the balanced overall equation to the reaction taking place.

ii. The student, however, notices that there is no measurable voltage output.



The following students offer their opinion as to why no measurable voltage is recorded.

Student 1 "The setup is not constructed with standard half cells"

Student 2 "H₂O₂ will oxidise water in preference to itself"

Student 3 "The reaction occurs too slowly"

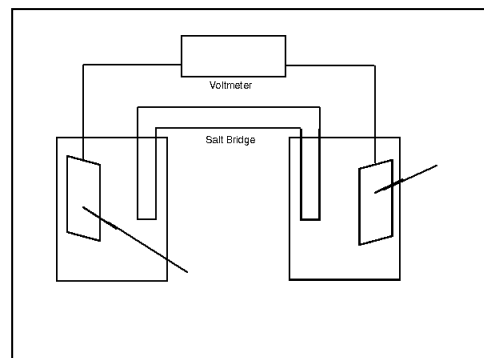
Which one of the students is likely to be correct? Explain why and suggest why the others are not correct.

- d) Four standard galvanic cells are set up as indicated below.
 cell I a Br_2/Br^- standard half-cell connected to a Cu^{2+}/Cu standard half-cell
 cell II an Sn^{2+}/Sn standard half-cell connected to a Zn^{2+}/Zn standard half-cell
 cell III a Br_2/Br^- standard half-cell connected to an I_2/I^- standard half-cell
 cell IV a Co^{2+}/Co standard half-cell connected to an $\text{Fe}^{3+}/\text{Fe}^{2+}$ standard half-cell

Draw galvanic cell II in the diagram on the right.

Indicate the :

- EMF
- cathode and anode
- polarity of the electrodes
- what the electrodes are made from
- direction of electron flow
- direction of positive ion flow
- The oxidation half equation
- The reduction half equation



- e) Explain why KNO_3 is used to form the salt bridge.
- f) Which cell has the highest EMF?

3) Consider the reaction pathways shown on the right.

a) Identify substance :

- A -
- B -
- C -
- D -
- F -

b) To what group of molecules does substance B belong to?

c) To what group of molecules does substance E belong to?

