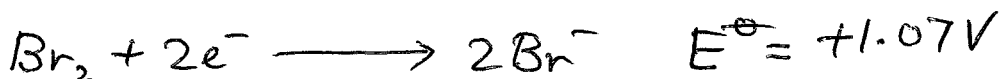
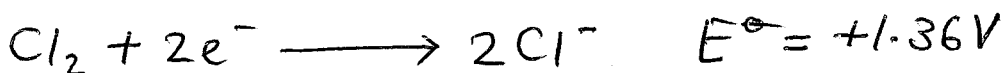
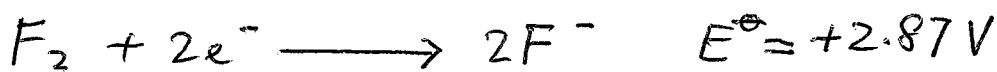


# GROUP VII (A2)

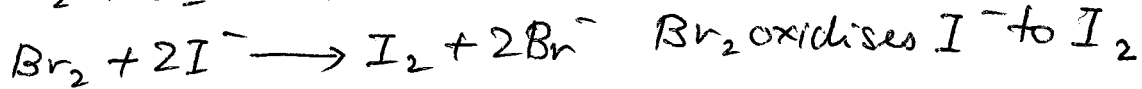
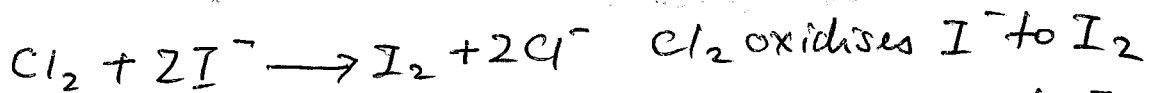
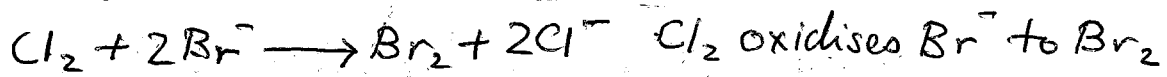
## Relative reactivity of Group VII elements as oxidising agents

- All halogens are oxidising agents
  - The oxidising power of the elements decreases down Group VII because,
    - the elements become less reactive as atomic number increases
    - the electron affinity decreases
- (increasing nuclear charge which should attract electrons more; but is offset by  $\uparrow$  shielding  $\uparrow$  atomic radius)
- Down group VII, the  $E^\ominus$  values become less positive.



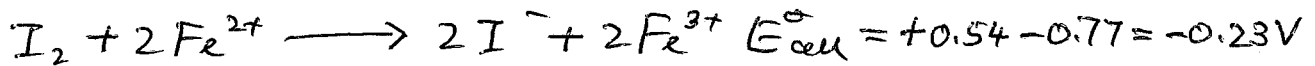
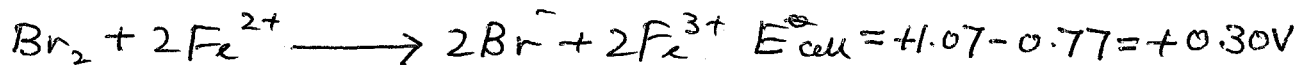
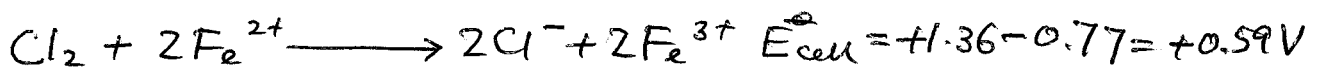
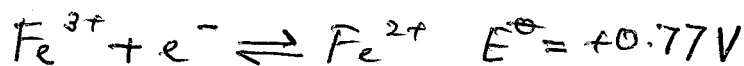
- Fluorine is the strongest oxidising agent.
- Order of oxidising ability:
$$\text{F}_2 > \text{Cl}_2 > \text{Br}_2 > \text{I}_2$$
- Each halide ion can be oxidised by the halogen before it.
- A more reactive halogen (on the left) will displace a less reactive one from its compounds.

◦ Eqs



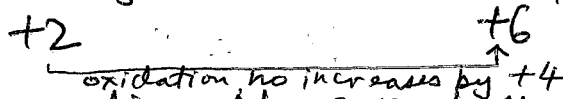
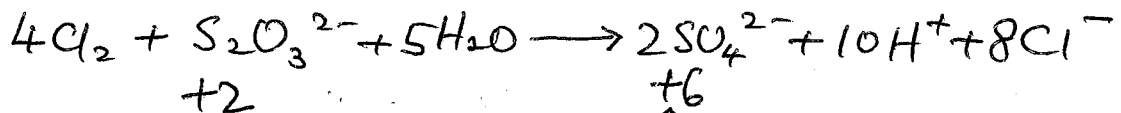
### Reaction with $\text{Fe}^{2+}$

◦  $\text{Cl}_2$  and  $\text{Br}_2$  can oxidise  $\text{Fe}^{2+}$  to  $\text{Fe}^{3+}$ , but not  $\text{I}_2$



### Reaction with $\text{Na}_2\text{S}_2\text{O}_3(\text{aq})$

◦  $\text{Cl}_2$  and  $\text{Br}_2$  oxidise  $\text{Na}_2\text{S}_2\text{O}_3$  to  $\text{Na}_2\text{SO}_4$  (sodium sulfate).



◦ But  $\text{I}_2$  oxidises  $\text{Na}_2\text{S}_2\text{O}_3$  to  $\text{Na}_2\text{S}_4\text{O}_6$  (sodium tetrathionate)

