

## Things to remember in the last hour before the exam: Level 2 Reactivity

(This is not a revision sheet – you've done that by now – it's a list of things you might want to remind yourself about ...)

1. Rates of reaction: rate is an amount/time so talk about more or less collisions/time or collisions/unit time or collisions/second. / means PER!
2. Rates of reaction: rates of reactions increase or decrease. they don't really get faster / quicker or slower (although you will see this written).
3. Rates of reaction: an increase in temperature means more collisions/time as the particles are moving faster (more  $E_k$ ) AND more of the collisions are effective collisions since now more particles have energy greater or equal to the activation energy. DON'T talk about "the particles having more activation energy" – this is WRONG!
4. When explaining the effect of concentration, talk about more (or less) particles/volume leading to more (or less) collisions/time.
5. When explaining surface area, there are more particles immediately exposed/available for collision.....try and avoid "more chance" of collision: there are just more collisions/time because.....
6. Catalysts don't effect equilibrium position. Catalysts lower  $E_a$  for a reaction so more of the collisions are effective collisions since now more particles have energy greater or equal to the activation energy.
7. pH: learn the equations  $\text{pH} = -\log [\text{H}_3\text{O}^+]$  and  $[\text{H}_3\text{O}^+] = 10^{-\text{pH}}$  and how to input these into your calculator.
8. pH has no units!!! Concentration has the units  $\text{mol L}^{-1}$ .
9. Take care entering numbers e.g.  $1.45 \times 10^{-3}$  is entered as 1 . 4 5 EXP (-) 3 in most calculators!
10. pH: remember  $K_w = 1 \times 10^{-14} = [\text{H}_3\text{O}^+][\text{OH}^-]$ . If you put it in a triangle  $1 \times 10^{-14}$  is always on top.
11. Significant figures – invariably 3 in Chemistry – but watch these! Zero before is NOT significant, zero in middle and after is e.g. 0.023 (2 sf) but 0.309 and 1.40 (3 sf)
12. Strong acid or base? Use a  $\rightarrow$ : Weak acid or base? Use a  $\rightleftharpoons$  symbol. in any equation you write.
13. Learn the common strong acids ( $\text{HCl}$ ,  $\text{HNO}_3$  and  $\text{H}_2\text{SO}_4$ ) and strong bases ( $\text{NaOH}$ ,  $\text{KOH}$ ).
14. For a strong acid  $[\text{H}_3\text{O}^+] = \text{conc. of the acid}$ : For a strong base  $[\text{OH}^-] = \text{conc. of the alkali}$ .
15. Write +  $\text{H}_2\text{O}$  in equations for strong and weak acids and weak bases BUT not for strong bases where you only need + aq. E.g.  $\text{NaOH(s)} + \text{aq} \rightarrow \text{Na}^+(\text{aq}) + \text{OH}^-(\text{aq})$ .
16. If  $-\log[\text{acid}]$  does NOT equal the pH it's because the acid was a weak acid and the reaction with water was incomplete. E.g. an acid, HA, of concentration  $0.100 \text{ mol L}^{-1}$  will only be pH 1.00 if it is strong i.e.  $\text{HA} + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+ + \text{A}^-$ .
17. When explaining the good or poor electrical conductivity of a strong acid/base compared to a weak acid/base, it is the total number of ions that is important (not just  $\text{H}_3\text{O}^+$  or  $\text{OH}^-$ ).
18. Equilibria: In a thermochemical: equation, to work out if the forward reaction is exothermic or endothermic, the forward reaction ( $\text{L} \rightarrow \text{R}$ ) matches the  $\Delta H$  term written after the equation.
19. Equilibrium expression: This means the equation that equals  $K_c$ . [ ] means concentration – make them [ ] and NOT ( ). Remember  $[\text{products}] / [\text{reactants}]$ , AND no "+" signs in it, and any balancing number in front becomes power e.g.  $2\text{NH}_3$  becomes  $[\text{NH}_3]^2$ .
20. In an equilibrium, an increase in temperature favours the endothermic reaction. (& so a dec. favours exo reaction).
21. In an equilibrium, an increase in volume = decrease in pressure and vice versa.