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 …)

RATES

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! It's acceptable to write about particles colliding more frequently – but don't say colliding more or more often.
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 just so 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 <u>immediately exposed/available</u> for collision……try and avoid "more chance" of collision; there are just more collisions/time because……
6. Catalysts don't effect equilibrium position. Catalysts provide an alternative reaction pathway with a lower E_a for a reaction so more of the collisions/s are effective collisions since now more particles have energy greater or equal to the activation energy.

pH CALCULATIONS

7. pH: Equations in Resource booklet pH = -log $[H_3O^+]$ and $[H_3O^+] = 10^{-pH}$, Learn how to input these into your calculator.
8. pH has no units!!! Concentration has the units mol L^{-1}. Give answers to 3 s.f.
9. Take care entering numbers e.g. 1.45 x 10^{-3} is entered as 1 . 4 5 EXP (-) 3 in most calculators!
10. pH: K_W (ionic product for water) = 10^{-14} = $[H_3O^+][OH^-]$. If you put it in a triangle 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 (just 2 sf) but 0.309 and 1.40 (3 sf)

ACIDS & BASES

12. Strong acid or base? Use a →; Weak acid or base? Use a ⇌ symbol, in any equation you write.
13. Learn the common strong acids (HCl, HNO_3 and H_2SO_4) and strong bases (NaOH, KOH).

14. Learn the common weak acids (Any carboxylic acid RCOOH) and weak bases (NH_3, RNH_2 (amines)).
15. Any 'unfamiliar' weak acids or bases, you will be told. E.g."HCN is a weak acid…." Use + $H_2O \rightleftharpoons$ …
16. For a strong acid $[H_3O^+]$ = conc. of the acid; For a strong base $[OH^-]$ = conc. of the alkali.
17. Write + H_2O in equations for strong and weak acids and weak bases BUT not for strong bases where you only need $NaOH(s) \rightarrow Na^+(aq) + OH^-(aq)$
18. If -log[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 mol L^{-1} will only be pH 1.00 if it is strong i.e. $HA + H_2O \rightarrow H_3O^+ + A^-$. (Likewise for bases when considering $[OH^-]$ and pH).
19. pH of salt solutions e.g. RCOONa or NH_4Cl or Na_2CO_3. Write TWO equations. #1 = dissolving (break into the ions; use →, and don't include + H_2O, #2 = reaction with water (as proton donor or acceptor; use ….+ $H_2O \rightleftharpoons$. Explain final pH by $[H_3O^+]$ > or < $[OH^-]$ as appropriate. (Hint: Ion in #2 is NEVER Na^+ or Cl^-).
20. When explaining the good or poor electrical conductivity of a strong acid/base compared to a weak acid/base, it is the <u>total number</u> of ions that is important (not just H_3O^+ / OH^-).
21. Salt solutions are GOOD conductors always as there is high conc. of ions when the salts dissolve /fully dissociate in water. E.g. $NaCl(s) \rightarrow Na^+(aq) + Cl^-(aq)$

<u>EQUILIBRA</u>

22. When asked to use equilibrium principles…. "the equilibrium will shift/move to minimise / the reaction will be favoured that minimises…. the change (stress) placed on the system". This is Generic – good for A. For M/E relate it to the imposed change and the species in the equation.
23. In a thermochemical; equation, to work out if the forward reaction is exothermic or endothermic, the forward reaction (L → R) matches the ΔH term written after the equation.
24. Equilibrium expression: This means the equation that equals K_C. [ ] means concentration – make them [ ] and NOT ( ). Remember [products] / [reactants], AND no "+" signs in it, and any balancing number in front becomes power e.g. $2NH_3$ becomes $[NH_3]^2$.
25. Size of K_C. K_C >1 = more products. K_C <1 = more reactants.
26. In an equilibrium, an increase in temperature favours the endothermic reaction… because this reaction absorbs heat energy to counteract the imposed change (& so a dec. favours exo reaction as this reaction releases heat energy).
27. In an equilibrium, an increase in volume = decrease in pressure and vice versa. Talk about mol of GAS on each side of the $\rightleftharpoons$.