

This file is purely a demonstration of how I structured my Advice and Extra Content files. You won't learn much from this and don't bother trying. Everyone makes different mistakes when practising past papers. You should practise past papers yourself and try to come up with a similar file yourself. It's the process of making the file that's important, not the file itself.

## Destine Ogie - OCR B

### Overall Advice

- Always put an answer on the answer line for any qu it could be right free marks :)
- Stop being overconfident from doing all your FC's and remember to be specific
- REMEMBER for any enthalpy change calculation to check whether it needs a + for Endothermic or - for Exothermic from checking the initial and final temp or the question states the type of reaction
- When doing any Calculation where you have to use p table to FIND molar mass of a element/compound make sure to CHECK 2 OR 3 TIMES TO make sure you have put the RIGHT molar mass in and written the RIGHT one as well like NaHPO<sub>4</sub> checking you put P = 32.1 etc
- For any (or maybe majority) acid-base reaction the oxidation state of the elements don't change
- Look out for when a question is asking about reagents this INCLUDES REACTANTS too not just Conc H<sub>2</sub>SO<sub>4</sub> its methanol as well for e.g
- When answering ANY maths calculation question make sure to do AT LEAST 2 or more SIG FIGS unless a question says use an appropriate Number
- Type numbers on calculator slower I know it may be rushing for time but we lost 2 marks because of calc error for % yield qu like here
- When drawing mechanisms remember that charge need to be balanced so if NH<sub>3</sub><sup>+</sup> is made don't forget the + sign
- Look out for Circle all the atoms qu make sure you reasoning in ur head is right
- For state and explain qu state AND EXPLAIN DUDE
- Write all equations questions and calculations in pencil its easier to change if balancing eq is wrong

### U0 - Development of Practical Skills

#### Advice

- When calculating titres don't forget to not include the trial titre for the mean calculation

- When correcting sources of error in a student's method make sure to give alternate suggestions such as use a draft shield but not modifications to the method like use a measuring cylinder for water
- When doing an appropriate number of sig figs question and there are no numbers mentioned in the question but you use the periodic table use the sig figs from the PERIODIC table mass of element (therefore 3 sig fig)
- Linking onto previous point only consider significant figures of numbers you use
- Uncertainty on burette is 0.05cm<sup>3</sup> not 0.005cm<sup>3</sup> and for balance usually 2d.p so 0.01 not 0.005

## U1 - Elements of life

### Advice

- When drawing (you're good at describing) emissions spectrum and energy levels remember that the frequencies get closer together as you go further to the right and so the downwards arrows must be closer together and therefore also make sure to draw high energy levels with a smaller gap
- When testing group 2 hydroxides made from group 2 nitrates remember solubility increases as you go down group 2 hydroxides and so there would be a decreasing amount of white ppt
- When explaining bond angles e.g. H-N-H check if the N is bonded to a C as this needs to be included and so b angle is 109.5 not 120
- Compound e.g Hexane1,6diamine
  - Molecular formula:  $C_6N_2H_{16}$
  - Empirical formula:  $C_3H_8N$
  - Shortened structural formula:  $H_2N(CH_2)_6NH_2$
  - Full structural formula: draw it all out every bond
- Using the same mass for 2 compound e.g CaCO<sub>3</sub> and MgCO<sub>3</sub> doesn't mean you're using the same moles as Mr of CaCO<sub>3</sub> is more it has less moles for the same mass
- The reason why elements in the elements such as Sr and Ca can displace each other as they are in the same group it's not due to REACTIVITY

### Extra Content

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## U2 - Development of Fuels

### Advice

- Be specific when comparing bonds e.g C=O and C-O, and state that C=O has 4 electrons whilst C-O has 2 electrons not just 'more electrons'

- The transportation of crops **producing CO<sub>2</sub>** is why biofuels may not be carbon neutral not just transportation of crops
- Look to see in the volume of gas qu's if the temperature conditions are above or below the bp of water (if its in the equation) as it would be **steam not water** and so would be a gas [state symbols most likely won't be mentioned in the qu]
- Check mole ratio's for  $pV=nRT$  if required
- If 2 compounds are compared about why their enthalpy change of combustion values are similar e.g propan-1-ol and propan-2-ol then think average bond enthalpies as well as same number AND type of bonds for both compounds

## U3 Elements of the Sea

Advice

- When dealing with displacement of halides due to halogens don't forget to mention the 3 factors that effect ionisation energy
- When talking about using ammonia solution for silver halides it has to be **CONCENTRATED**
- Add starch indicator near the endpoint for iodine thiosulfate titration and add excess iodide ions to solution in conical flask
- When doing systematic nomenclature naming make sure to include numbers where possible most likely on the cation but the anion to maybe Ce<sub>2</sub>O<sub>4</sub> Cerium(IV) oxide

## U4 - Ozone

Advice

- If a question comes up about Group 15 hydrides/ Group 5 and is talking about boiling points remember that NH<sub>3</sub> has hydrogen bonding so would have a higher bp than PH<sub>3</sub> etc

## U5 - What's in a medicine

Advice

- Carboxylic acid has a higher boiling point than esters as C.A can do Hydrogen bonding so more energy is needed to break bonds and ESTER DONT HAVE HYDROGEN BONDS
- When making esters don't forget that the ALCOHOL or C.A is a reagent too not just conc H<sub>2</sub>SO<sub>4</sub> very common mistake
- If an ester is the organic liquid that is put in a separating funnel you need to add an organic solvent (e.g cyclohexane) so that it dissolves and forms an organic layer
- How valid is using

## U6 - Polymers & Life

### Advice

- Base-sugar-phosphate chain as phosphate sugar base chain is not allowed
- When naming ANY amines or amides say if its primary, secondary or tertiary
- When drawing the repeating unit of a condensation polymer make sure 2 hydrogens and 1 oxygen is removed from the structure NOT 2 oxygens or 0 oxygens
- When drawing pH graphs make sure to draw the intervals on the x-axis especially since enzymes only work over a small range of pH's e.g 5-9 and label the optimum pH
- When tackling Rate against substrate graph questions make sure to remember "no conclusions can be drawn about order w.r.t enzymes as concentration is not changed" its only the substrate concentration that is changed
- A dipeptide molecule only contains 1 peptide link/bond NOT 2 for an amino acid
- Its primary,secondary or tertiary structures not primary protein etc
- Check if an ester is being made under RTP as it will ALWAYS be an acyl chloride making it not a carboxylic acid
- When writing script for paper or TLC practical and ur drawing a diagram make sure to label spots on starting line

## U7 - Chemical Industry

### Advice

- When drawing arrhenius plots if the question is asking for the y intercept A the frequency factor make sure to scale the y axis and x axis from 0 to the lnk or 1/T value
- When explaining the effect of decreasing temp of kc make sure to say that rate is too slow and so takes long to reach equilibrium rather than talking about collisions per unit time

## U8 - Oceans

### Advice

- When referencing the hydration enthalpy where its both ions make sure to say 'sum of the hydration enthalpy of the cation and anion' not just 'sum of the hydration enthalpy'
- When referring to the temperature for which a reaction is feasible i.e  $\Delta S_{tot} = 0$  make sure to remember that its that temperature at  $\Delta S_{tot} = 0$  and any temperature above or below that (depending if  $\Delta S_{surr}$  is + or - )
- For qu where they give u a new random equation to find Ecell or Epotential (not standard) make sure to sub in the right values

## U9 - Developing Metals

Advice

- $\text{NH}_3(\text{aq}) + \text{H}_2\text{O} \rightleftharpoons \text{OH}^- (\text{aq}) + \text{NH}_4^+ (\text{aq})$  IS REVERSIBLE

## U10 - Colour By Design

Advice

- The units for the x axis of a chromatogram is SOME UNIT TIME... not retention time although is from F335 June 2016



# Ray Amjad - OCR A

## Overall Advice

- Check your calculations. Don't assume yours are right. They can cost you a lot of marks.
- Be very specific - ambiguity will not pass:
  - Rather than larger temperature rise, write 'double temperature rise'.
  - Rather than 'one dissociates more, say which one does.'
- Avoid abbreviations (eg, ppt or e<sup>-</sup>) for the SPaG questions.
- Follow the question through (eg, if CO<sub>2</sub> was released from a compound earlier than it won't effervesce if acid is added again).
- Go back at the end and ensure:
  - All equations are balanced (include [H]'s).
  - All carbons have 4 bonds.
- Always write 'more energy required to overcome' for the relevant questions.
- Remember the sign for enthalpy change.
- Try and draw a good tangent, get it in range.
- When asked to name groups, you must write the names (not -OH). Note that alcohol and phenol **ARE DIFFERENT** just like a -OH and a -COOH group.
- Careful when converting from molcm<sup>-3</sup> to moldm<sup>-3</sup>, think about which is smaller or bigger.
- When doing hydrolysis questions, work backwards, consider what things had to join together.
- Try and use comparative words like **stronger** and **weaker** throughout (eg, when comparing bonds).
- Be specific in groups, don't write that benzoic acid is e<sup>-</sup> withdrawing but rather the -COOH group.
- When listing ions, put charges on them.
- Be specific with what more attraction is to. Eg, more attraction **to water** for enthalpy changes of hydration.
- Make sure equations are balanced by listing elements either side, be careful with subscripts.
- Ensure that everything is counted from the M<sub>R</sub> of a skeletal formula - including <sup>12</sup>C's.
- Be on the lookout for limiting reagents (eg, under calorimetry.)

## U1 - Development of Practical Skills

### Advice

- Add units to the tables.

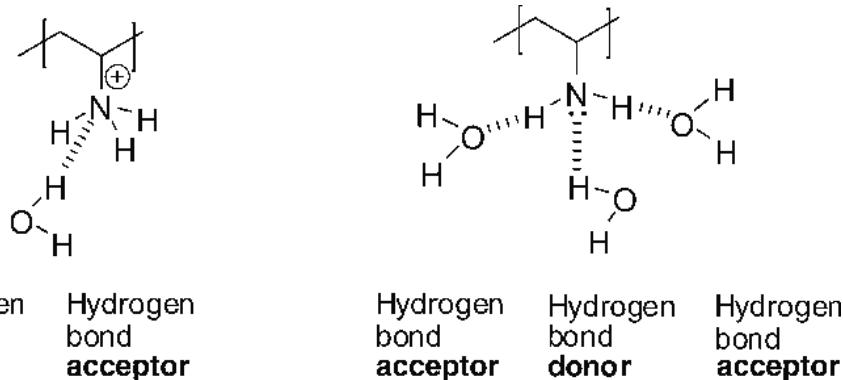
## Extra Content

- If you have a greater reactant then you'll have a smaller % error in mass. If this means greater temperature rise too, smaller % in temperature rise too. Yet, too much can lead to not all of it reacting.

## U2 - Foundations in chemistry

### Advice

- Be sure to remember that a substance that acts as a reducing agent is oxidised.
- Compare the strength of bonds when you deem it's relevant.
- **Label the  $^1\text{H}$  bond** when asked to draw it.
- Be specific, it forms more  $^1\text{H}$  bonds **with water**.
- Remember that you can have a  $^1\text{H}$  bond drawn with an amine group:



- Remember to consider lone pairs on molecules,  $\text{NH}_2^-$  is 104.5 degrees.
- Draw dotted lines in polymerisation.
- When comparing subshells, say which has the higher energy.
- Whenever you mention lone pairs, say **LONE PAIRS REPEL MORE THAN BONDING PAIRS**.

## Extra Content

- When needing to increase the rate of reaction, use test tubes in a water bath.
- The main force in  $\text{PH}_3$  would be permanent dipole-dipole interactions rather than London Forces as permanent dipole-dipole interactions are stronger.
- There is a drop in ionisation energy going from nitrogen to oxygen as the e<sup>-</sup>'s begin to pair.
- Remember that  $1 \text{ dm}^3 = 1000 \text{ g}$  so the concentration of water is approx.  $56 \text{ mol dm}^{-3}$  since  $1000 / 18 = 55.5$ .
- Systematic name for  $\text{KClO}_4$  is potassium chlorate (VII).
- Less surface area of contact so **WEAKER** London forces.
- Show a substance acts as a catalyst by saying it's reformed.

## U3 - Periodic table in chemistry

### Advice

- When writing an ionic equation, remember, it's literally just the most important things reacting.
- Mention when some property is the same across periods/groups (eg, shielding).
- Mention whenever something is **giant** covalent lattice, **giant** metallic lattice, or **simple** molecular.
- When a question says 'standard' then ensure every reactant/product is in its standard state, otherwise this is a problem: non-standard conditions can be a reason for experimental values being different from theoretical.
- For enthalpy change of neutralisation, you divide by the number of moles of water produced at the end (may not always be a 1:1 ratio).

### Extra Content

- A bottle of vinegar will contain other acids so, in reality, it's not good for a titration.
- Ensure you prepare a sufficient amount so you can take a sample and titrate it.
- If the volume used is doubled, the temperature rise would be the same as double the energy is released over the double the volume and thus the enthalpy change is the same as double energy for double moles.
- Percentage yield has no impact on the sustainability of a process - its merely a measure of how successful that particular reaction was.

## U4 - Core organic chemistry

### Advice

- When writing the formulae of aldehydes in a condensed way write CHO and not COH e.g.CH3CH2CHO.
- Always quote ranges for IR questions.
- Remember that everything under mass spectroscopy is an ion so write charges.
- If it says structural isomers then draw structural isomers, not stereoisomers.
- Treat each functional group separately, as long as you know what happens to each then you'll be fine for large molecules.
- Always mention **REPELLING ELECTRONS** for shapes of molecules.
- You can simply say '**more likely to form because more stable carbocation intermediate**'.
- You will have  $C_nH_{2n+2}$  for a compound with no rings and only single bonds yet if you have 2 rings then you will have  $C_nH_{2n-2}$ . Consider manipulating algebraic formulae carefully.
- There is no need to draw electrophilic substitution with geometry flipping.

- Draw a circle around the correct double bond for stereoisomerism (though there may be multiple C=C's)

## Extra Content

- Higher electron density so **more susceptible to attack**.
- Use fragment ions to differentiate between isomers.
- A secondary carbocation will have a +ve charge on a 2° carbon.
- You have two regions of an infrared spectrum, the right crazy-looking section is the fingerprint section which you should ignore. The left is the functional group identification region.
- Always add charges on molecular ion peaks - even largest peak.

## U5 - Physical chemistry and transition elements

### Advice

- Use the Gibbs free energy equation to make explanations easier.
- When forming a buffer solution, you may have to account for weak acid and strong base reacting. The concentration of the weak acid will decrease.
- Remember that atomisation is 1 mol formed so if you have  $\frac{1}{2} I_2 \rightarrow I$ , you have double the enthalpy change as 2 mols are formed.
- When explaining in terms of  $K_c$  be sure to mention that  **$K_c$  must remain constant**. You can mention the  $K_c$  ratio decreases before being restored if you wish. "Shifts to restore  $K_c$ ".
- Show a reaction is first order by measuring the half-life.
- Always look for when you may need to  $\times 2$  in a Born-Haber cycle.
- You don't need to know anything about cobalt, don't even mention it.
- Example of how a  $K_c$  question should be answered:

- (b) The experiment is repeated but the pressure in the container is doubled.

Explain in terms of  $K_c$  the effect on the concentrations of  $\text{NO}_2$  and  $\text{N}_2\text{O}_4$  when the mixture has reached equilibrium.

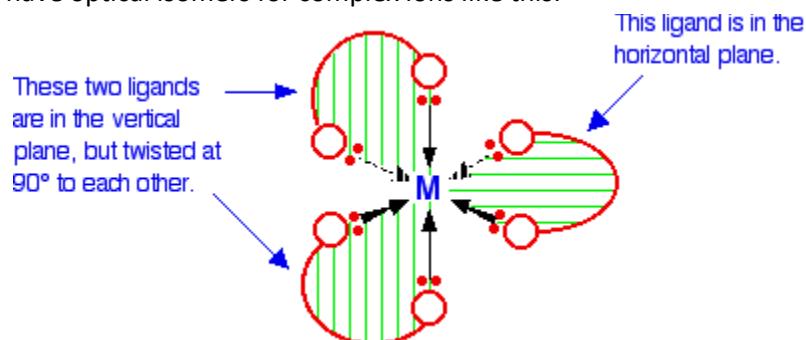
*K<sub>c</sub> does not change with pressure.  
 (conc after pressure increase):  $[\text{NO}_2]^2$  increases  
 more than  $[\text{N}_2\text{O}_4]$   
 (changes in conc linked to K<sub>c</sub>): to restore  
 K<sub>c</sub>,  $[\text{N}_2\text{O}_4]$  must increase and  $[\text{NO}_2]$   
 must decrease*

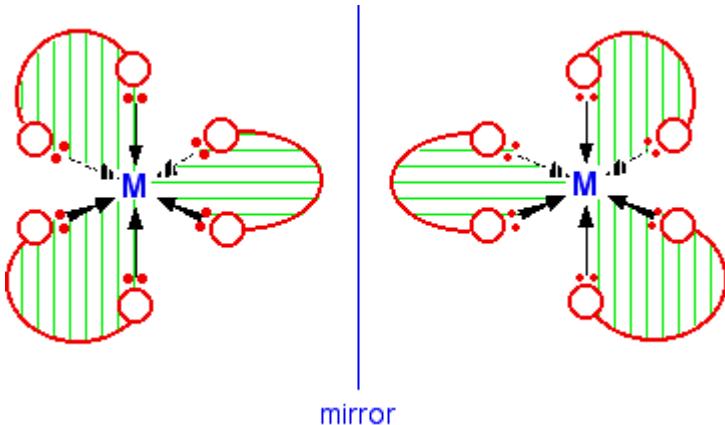
X [Total: 8]

- Oxidising agents for cell potentials go forwards, reducing agents go backwards. Always use the definitions.

## Extra Content

- Structures can bond to themselves to form cyclic structures (eg, -COOH and -NH<sub>2</sub> on the same molecule).
- When talking about entropy change, use words like **disorder**.
- There is a leeway in times with half-lives in 1st order reactions. Only a **major difference** would mean 2nd order.
- You have NH<sub>2</sub> in a bidentate ligand (not NH<sub>3</sub>) from like in C<sub>2</sub>H<sub>8</sub>N<sub>2</sub> is ethane-1,2-diamine.
- You only have optical isomers for complex ions like this:





- Buffers work best when  $pK_a = pH \pm 1$  (like in the 'magic tang' question).

## U6 - Organic chemistry and analysis

### Advice

- Look out for all the  $-NH_2$ 's during acid hydrolysis as they will turn to  $-NH_3^+Cl^-$ .
- Rather than saying phenol is more polarising, you can say  $Cl_2$  has become polarised too.
- Remember that the 4s empties first!
- Add catalysts to the reagents, like  $AlBr_3$  for  $Br_2$ .
- Phenol is weakly acidic so it doesn't appear on  $^{13}C$  spectrum.
- LABEL REGIONS ALWAYS. Eg, for 110 - 160 ppm on  $^{13}C$  indicates 4 aromatic environments.
- Remember that  $NaOH$  can react with both  $COOH$  and  $-OH$  phenol group.
- Mention  $\pi$ -bonds.
- Remember you can have a carboxylate salt forming instead of a carboxylic acid. Be on the lookout. Even those attached to benzene.
- Commenting on largest fragment ion useful for NMR too. Be sure to count the number of environments of isomers to ensure it matches.
- Join polymers properly, don't move some group from one end to the other.
- Remember DROPE (delocalised ring of pi electrons).
- Remember that the phenol group reacts with  $Na^+$  too.
- If it's polarising then draw the  $Br-Br$  being polar, even for cyclic molecules.
- Use CONCENTRATED HCl to convert from nitrobenzene to phenylamine (with Sn too).

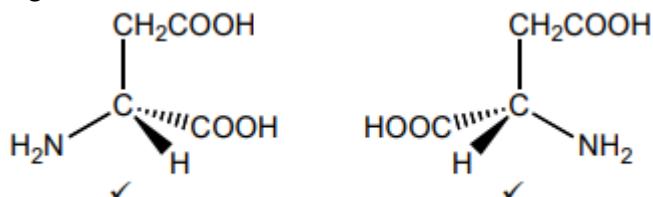
### NMR

- Remember that each  $^1H$  will show its most unique environment - this is vital.
- Try and refer to all pieces of evidence carefully.
- TMS is used because it's a standard and to calibrate.
- $CDCl_3$  or  $CCl_4$  is used because it doesn't cause interference or give a peak.

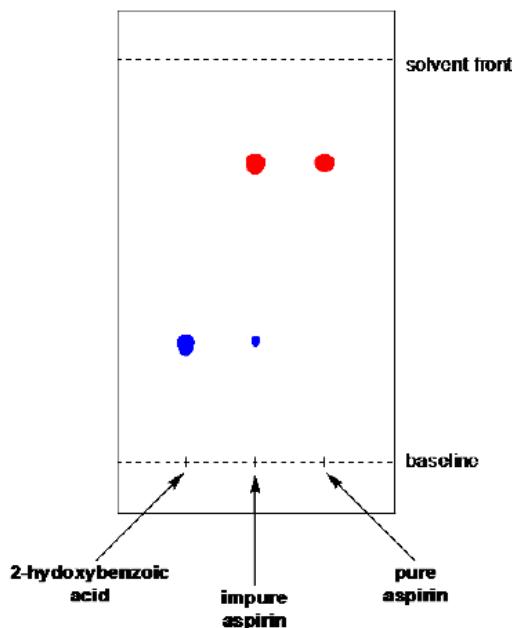
- Add possible parts of molecule to the NMR.
- Ignore the splitting of benzene in  $^1\text{H}$  NMR, it just makes things a lot more complicated.

## Content

- Draw mirror images like below:

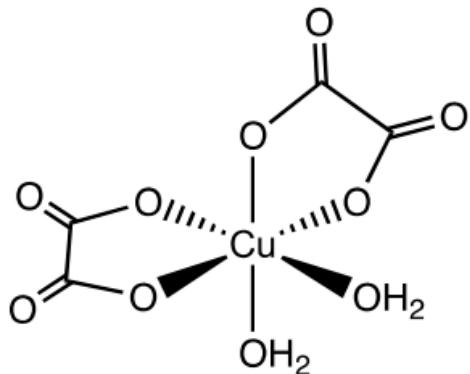


- By similar structures, it doesn't always mean the same chain length, one can be slightly longer but have the same functional group.
- Benzene is unsaturated.
- If the liquid in GC was an alkane then another alkane would have a long retention time whereas an alcohol would have a short retention time. Due to polar and nonpolar.
- Use naturally occurring compounds to ensure correct chirality.
- Geometry doesn't flip for cyclic compounds.
- Phenylbromide is less reactive than bromocyclohexane as it still has e<sup>-</sup>'s delocalised despite a slightly higher e<sup>-</sup> density from the -NO<sub>2</sub>.
- The impurity will appear smaller in TLC as shown below:

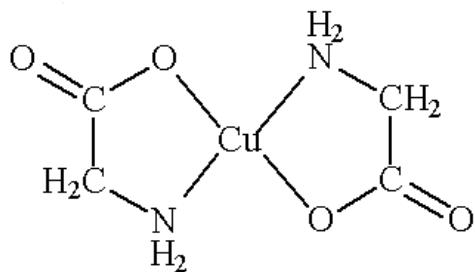


- The melting point of the impure sample is just under the normal, it is not in between as the impure sample only contains small impurity.
- Retention time is time from injection to detection.
- When explaining entropy changes, you can simply write more disorder (1).

- Note that you can have something clever which is both cis and optical, eg:



- Still have the  $-\text{NH}_2$  on ligands (eg, glycine acting as a ligand)



### ***Trans-***

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