

## OUTSTANDING A-LEVEL TUTORION - A Level Biology and Chemistry

- Do you want to learn Bio and Chem **without the waffle?**
- Do you want to learn specific to the **mark scheme?**
- Learn with razor-sharp **clarity?**

I've had a heap of students currently tutoring with me, probably because they've recognised my outstanding teaching ability and that I ignore the waffle, am to the point and explain concepts in exceptional razor-sharp clarity.

**Below is an example A-Level Revision Schedule that I will be completing with one of my students, allowing us to go over every topic.**

Lina's A-LEVEL 2025 REVISION SCHEDULE

Week	Biology	Chemistry
<b>WEEK 1</b> 1) w/c 21st April	<u>Paper 2 Revision</u> <ul style="list-style-type: none"><li>• 4.1 Communicable Disease</li><li>• 4.2 Biodiversity and 4.3 Evolution</li></ul>	<u>Paper 2 Revision</u> <ul style="list-style-type: none"><li>• AS Chemistry Recap</li><li>• Core Organic Chemistry</li></ul>
<b>WEEK 2</b> 2) w/c 28th April	<u>Paper 2 Revision</u> <ul style="list-style-type: none"><li>• 6.1.1 Control and 6.1.2 Inheritance</li><li>• 6.1.3 Manipulating Genomes</li></ul>	<u>Paper 2 Revision</u> <ul style="list-style-type: none"><li>• 6.1.1 Aromatic Chemistry</li><li>• 6.1.2/3 Carbonyls and Carboxylic Acids</li></ul>
<b>WEEK 3</b> 3) w/c 5th May	<u>Paper 2 Revision</u> <ul style="list-style-type: none"><li>• 6.2.1 Cloning and Biotechnology</li><li>• 6.3 Ecosystems and Sustainability</li></ul>	<u>Paper 2 Revision</u> <ul style="list-style-type: none"><li>• 6.2.1/2 Amines and Polymers</li><li>• 6.3.1/2 Chromatography + Spectroscopy</li></ul>
	<b>*P2 MOCK EXAM*</b>	<b>*P2 MOCK EXAM*</b>
<b>WEEK 4</b> 4) w/c 12th May	<u>Paper 1 Revision</u> <ul style="list-style-type: none"><li>• 3.2 Animal Transport</li><li>• 3.3 Plant Transport</li></ul>	<u>Paper 1 Revision</u> <ul style="list-style-type: none"><li>• AS Module 3 Recap</li><li>• Periodic Table and Energy</li></ul>
<b>WEEK 5</b> 5) w/c 19th May	<u>Paper 1 Revision</u> <ul style="list-style-type: none"><li>• 5.1.2 Excretion and Homeostasis</li><li>• 5.1.3/4 Neuronal and Hormonal</li></ul>	<u>Paper 1 Revision</u> <ul style="list-style-type: none"><li>• 5.1.1 How Fast? - Rates</li><li>• 5.1.2 How Far? - Equilibrium</li></ul>
<b>WEEK 6</b> 6) w/c 26th May	<u>Paper 1 Revision</u> <ul style="list-style-type: none"><li>• 5.1.5 Plant and Animal Responses</li><li>• 5.2.1/2 Respiration &amp; Photosynthesis</li></ul>	<u>Paper 1 Revision</u> <ul style="list-style-type: none"><li>• 5.2.1 Redox and Electrode Potentials</li><li>• 5.3.1 Transition Elements</li></ul>
	<b>*P1 MOCK EXAM*</b>	<b>*P1 MOCK EXAM*</b>
<b>WEEK 7</b> 6) w/c 26th May	Revision	Revision

If you would like to book a session - contact me here:

[hamza.amin@outlook.com](mailto:hamza.amin@outlook.com)

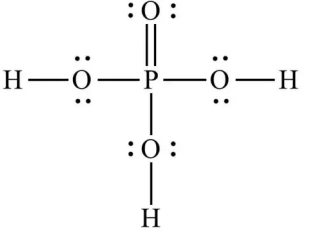
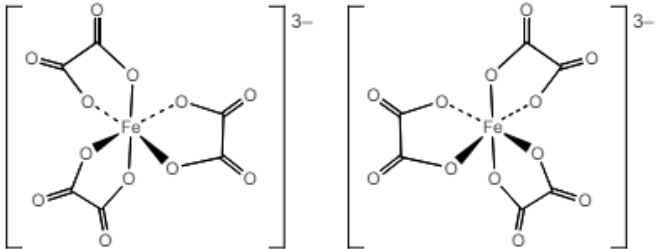
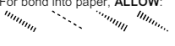


**\*I offer a free 20min trial session\***

Homework is provided after every session and you have 24/7 chat available to ask me any questions if you're struggling.

## OCR A LEVEL CHEMISTRY A (H432/03) - UNOFFICIAL MARK SCHEME - JUNE 2024

Question	Indicative Content	Guidance	Marks
Calculate pH of 1 dm <sup>3</sup> solution of 0.4 mol dm <sup>-3</sup> (NaOH?)	$K_w = [\text{OH}^-][\text{H}^+]$ $[\text{H}^+] = K_w/[\text{OH}^-]$ $[\text{H}^+] = 1 \times 10^{-14} / 0.4 = 2.5 \times 10^{-14}$ $\text{pH} = -\log_{10}(2.5 \times 10^{-14})$ = <b>13.6</b> (3 s.f.)	<b>Did they specify any sig figs or dp?</b> <b>pH always to 2 d.p no?</b> <b>Not specified for this part</b>	2
Water is added to 10 cm <sup>3</sup> of 0.750 mol dm <sup>-3</sup> HCl to make it up to 100cm <sup>3</sup> . Calculate the concentration of.	New concentration: 0.075 mol dm <sup>-3</sup> $\text{pH} = -\log_{10}(0.075)$ = <b>1.12</b> (2 d.p. required)		1
$K_a$ at 298K = $1.75 \times 10^{-5}$ $[\text{Ch}_3\text{COONa}] = 0.1 \text{ mol dm}^{-3}$ $[\text{Ch}_3\text{COOH}] = 0.3 \text{ mol dm}^{-3}$ Calculate the pH	$[\text{H}^+] = K_a * [\text{CH}_3\text{COOH}] / [\text{Ch}_3\text{COONa}]$ $= 1.75 \times 10^{-5} * 0.3 / 0.1 = 5.25 \times 10^{-5}$ $\text{pH} = -\log_{10}(5.25 \times 10^{-5})$ = <b>4.28</b> (3 s.f.)	Yes thats what it was	2
Method for 100 cm <sup>3</sup> standard of solution of 0.2 mol dm <sup>-3</sup> Cu(NO <sub>3</sub> ) <sub>2</sub> ·3H <sub>2</sub> O	<ol style="list-style-type: none"> <li><math>n(\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}) = 0.2 \times 100/1000 = 0.02 \text{ mol}</math></li> <li>Mass <math>\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O} = 0.02 * 241.5 = 4.83\text{g}</math></li> <li>Dissolve solid in water in beaker</li> <li>Transfer to 100cm<sup>3</sup> <b>volumetric</b> flask <b>AND</b> transfer washings to flask</li> <li>Make up to mark with water <b>AND</b> invert flask</li> </ol>		5
Write the molecular formula of shown compound B	C <sub>13</sub> H <sub>19</sub> N <sub>3</sub> O <sub>7</sub>		1
How many chiral carbons are there in compound B?	4	Is it not 3? Na it was the cyclic bit in middle.	1
Compound C - Replaced N with P Compound D - Replaced O with S Find the difference in Mr	$(31*3 - 14*3) = 51$ $(32.1*7 - 16*7) = 112.7$ $112.7 - 51$ = <b>61.7</b>	Would you get ECF if you got 18H for the molecular formula? Probably	2
Why are average bond enthalpies always positive?	Bond breaking is endothermic More energy required to break bonds then energy required to make bonds.	<b>I said an energy input is needed to break the bonds. Is that fine?</b> <b>Probably</b>	1
	$197 + 3(436) + 1077 - 2(464) = 4x (=1652)$	How is it not 315 KJ	3

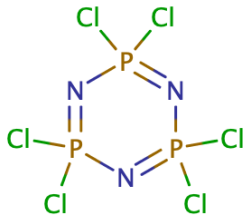
<p>Calculate bond enthalpy of C-H bond (<math>\text{CH}_4 + \text{H}_2\text{O} \rightarrow 3\text{H}_2 + \text{CO}</math>)</p> <p>Enthalpy change was +197 Bond enthalpy of <math>\text{C}\equiv\text{O}</math> was +1077 Bond enthalpy of H-H was +436 Bond enthalpy of O-H was +464</p>	$x = (+)413 \text{ kJ mol}^{-1}$ up p	<p>mol-1 cause if you do 2383 (1075 + 3*436) - 197 = 2186 then 2186 - 928 = 1258 then 1258/4 = 315? I just wanna know why??well its only one question To check you would do 2383 - 2186 = 197???</p> <p>I got 315.5, why is that wrong</p>	
<p>Enthalpy of formation of <math>\text{H}_2\text{O}</math> is 285.8. Find out how much energy is released from combustion of 60m<sup>3</sup> of <math>\text{H}_2</math> at RTP. Write in standard form.</p>	<p>60m<sup>3</sup> = 60,000 dm<sup>3</sup> n = 60,000/24 = 2500 mol 2500 * 285.8 = 714500  = <b>7.15 * 10<sup>5</sup></b> kJ (3 s.f.)</p>		2
<p>Compound A is a chloride from a Period 3 element Step 1: 5*10<sup>-4</sup> mol of compound A is dissolved in water to give a colourless solution Step 2: 60cm<sup>3</sup> of 2.50*10<sup>-2</sup> AgNO<sub>3</sub> is reacted exactly with the solution to give a white precipitate</p> <p>Write an ionic equation for the reaction in Step 2</p>	$\text{Ag}^+ (\text{aq}) + \text{Cl}^- (\text{aq}) \rightarrow \text{AgCl} (\text{s})$		1
<p>Find the formula of Compound Ay</p>	<p>Method: -n(Ag<sup>+</sup>) = 60/1000 * 2.50*10<sup>-2</sup> = 1.5x10<sup>-3</sup> -1:1 ratio with Cl<sup>-</sup> -1.5x10<sup>-3</sup> / 5.00x10<sup>-4</sup> = 3 -1:3 ratio</p> <p><b>AlCl<sub>3</sub></b></p>		3
<p>How does <math>\text{H}_2\text{PO}_4^-</math> act as both an acid and a base in the equilibria shown?</p> <p>Eq. 1: <math>\text{H}_3\text{PO}_4 \rightleftharpoons \text{H}^+ + \text{H}_2\text{PO}_4^-</math></p> <p>Eq. 2: <math>\text{H}_2\text{PO}_4^- \rightleftharpoons \text{H}^+ + \text{HPO}_4^{2-}</math></p> <p>Eq. 3: <math>\text{HPO}_4^{2-} \rightleftharpoons \text{H}^+ + \text{PO}_4^{3-}</math></p>	<p>Equilibrium 1.ctionBase - accepts <math>\text{H}^+</math> in the reverse dire Equilibrium 2.Acid - dissociates to give off <math>\text{H}^+</math> in the forward direction Equilibrium - based</p>	<p>What was e egg q 3 and was it relevant to answering this q?</p>	2

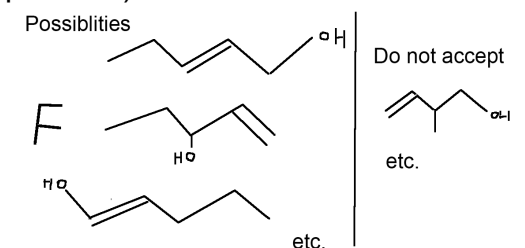
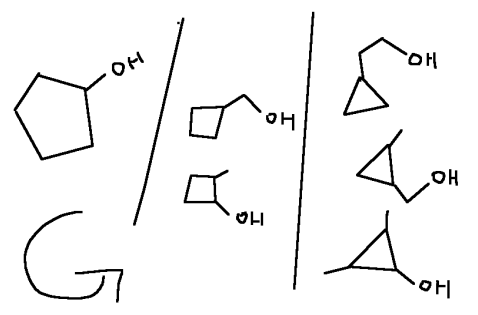
<p>Draw the shape of <math>\text{H}_3\text{PO}_3</math>, giving bond angles for O-P-O and P-O-H</p> <p>Ohiol was here</p>	 <p>(This is <math>\text{H}_3\text{PO}_4</math> but <b>replace the O at the top with a lone pair</b>)</p> <p>OPO - <math>107^\circ</math> POH - <math>104.5^\circ</math></p>	<p>If you had to draw shape would it not be 3d or no?</p> <p>I thought it would be 3d since it asked for the shape.....</p> <p>Shape doesn't mean 3D diag In the shape P has a charge of 3+ so it has lost a lone pair, wouldn't it be 120??</p>	3
<p>What is the systematic name for <math>\text{H}_3\text{PO}_3</math>?</p>	<p>Phosphoric (III) acid</p>		1
<p>Equation for Phosphorus oxide thing</p>	<p><math>2\text{PH}_3 + 4\text{O}_2 \rightarrow 3\text{H}_2\text{O} + \text{P}_2\text{O}_5</math></p>		1
<p>What is meant by a bidentate ligand?</p>	<p>Donates <b>two</b> electron (or lone) pairs (to a metal ion) Forms <b>two</b> coordinate (or dative covalent) bonds (to a metal ion)</p>		2
<p>Draw the optical isomers for <math>[\text{Fe}(\text{C}_2\text{O}_4)]^{3-}</math>, include overall charge</p>	<p>Overall 3- charge shown (outside brackets) for at least <b>ONE</b> isomer ✓ 3- must apply to the overall charge of structures</p>  <p>1 mark for each isomer ✓✓</p> <ul style="list-style-type: none"> <li>Bonds <b>must</b> go to O ligand atoms on <b>EACH</b> structure</li> <li><b>ALLOW</b> unambiguous structures; ethanedioate ions can include C atoms</li> </ul>	<p>ALLOW -3 for 3-</p> <p>IGNORE charges or dipoles on atoms within diagrams (even if wrong)</p> <p>Square brackets <b>NOT</b> required</p> <p>3D Must contain 2 'out wedges', 2 'in wedges' and 2 lines in plane of paper <b>OR</b> 4 lines, 1 'out wedge' and 1 'in wedge'</p> <p>For bond into paper. <b>ALLOW</b>:</p>  <p><b>ALLOW</b> following geometry throughout:</p>  <p><b>NOT ALLOW</b> structures showing a simplified loop for ethanedioate ligands e.g.</p> 	3
<p>Write equations for the oxidation of <math>\text{Fe}^{2+}</math> and <math>\text{C}_2\text{O}_4^{2-}</math></p>	<p>1. <math>\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + \text{e}^-</math> 2. <math>\text{C}_2\text{O}_4^{2-} \rightarrow 2\text{CO}_2 + 2\text{e}^-</math></p>	<p>Allow multiples</p>	2
<p>Find the percentage by mass of P in <math>\text{P}_3\text{N}_3\text{Cl}_6</math></p>	<p><math>((31.0 \times 3) / 31.0 \times 3 + 14.0 \times 3 + 35.5 \times 6) \times 100</math></p> <p><math>93/348 \times 100</math></p> <p>= <b>26.72%</b> (2 d.p.)  </p>	<p>Said to 2p i think. 26.72% Agreed Did you not need to times 31 by 3 as that made up some of the mass?</p>	2

## OCR A LEVEL CHEMISTRY A (H432/03) - UNOFFICIAL MARK SCHEME - JUNE 2024

Reading a burette	21.55cm <sup>3</sup> , 21.85m <sup>3</sup> , 21.65cm <sup>3</sup>	Fills in entire table correctly for full credit.  <b>2 dp required. Must be to nearest 0.05cm<sup>3</sup></b>  (1 mark for initial and final vol.s to 2 d.p. 1 mark for titres 1 mark for cm <sup>3</sup> ?)  Correct ← if you remember titre 2 more accurately (or indeed the whole table)	3
% uncertainty	±0.10cm <sup>3</sup> absolute uncertainty 0.1/21.55 *100% = <b>0.46%</b>	CAO (ECF from previous available)  2dp required	1
6 mark LOR on finding the water of crystallisation	<b>Level 3 (5–6 marks)</b> Fully correct. <b>x=2</b> . Relevant working shown in a clear and coherent way.  <b>Level 2 (3-4 marks)</b> Some relevant calculations.  <b>Level 1 (1-2 marks)</b> Major misunderstanding. Some relevant calculation  <b>0 marks</b> No response worthy of credit	FeC <sub>2</sub> O <sub>4</sub> ·2H <sub>2</sub> O  5:3 ratio Conc. of KMnO <sub>4</sub> was 0.02 mol dm <sup>-3</sup> .  Mass given as 1.295g  Mean titre of 21.60cm <sup>3</sup> . 0.0216 * 0.02 * 5/3 * 10 = 7.2 * 10 <sup>-3</sup> mol.  1.295/(7.2*10 <sup>-3</sup> ) = 179.9 g mol <sup>-1</sup> .  Result follows by subtraction of non water of crystallisation part and division by 18 (2.00556 ≈ 2).  for KMnO <sub>4</sub> . X = 2	6
Evidence of kekule thing	Br <sub>2</sub> decolourises in it.  <b>OR</b>  Average Bond Enthalpy is more exothermic than if it were delocalised.	-would this structure necessarily react with bromine - there are no carbons? Also for av. bond enthalpy they normally want you to say enthalpy of	1

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	<p><b>OR</b></p> <p>Bonds have different lengths (can be shown using x-ray diffraction).</p>	<p>hydrogenation and i also dont think that would necessarily happen here</p> <p>yeah thats what i was thinking asw</p>	
Equation to form P <sub>3</sub> N <sub>3</sub> Cl <sub>6</sub>	$3\text{PCl}_5 + 3\text{NH}_4\text{Cl} \rightarrow \text{P}_3\text{N}_3\text{Cl}_6 + 12\text{HCl}$	<p>this was the hardest question on the whole paper</p> <p>Took me forever to balance lmao. Bro i started doing simultaneous equations</p>	1
Suggest a structure for P <sub>3</sub> N <sub>3</sub> Cl <sub>6</sub>		<p>Who actually got this right bro who acc got that i messed it up drew a benzene ring and called it a day lmao</p> <p>Me by complete luck 🤪</p> <p>Me by luck also</p>	2
Balance equation and explain why it is a redox reaction	$6\text{AgNO}_3 + \text{PH}_3 + 3\text{H}_2\text{O} \rightarrow 6\text{Ag} + \text{H}_3\text{PO}_3 + 6\text{HNO}_3$ <p>Ag reduced from +1 in AgNO<sub>3</sub> to 0 in Ag P oxidised from -3 in PH<sub>3</sub> to +3 in H<sub>3</sub>PO<sub>3</sub></p>	<p><b>ALLOW</b> +/- symbols after number (Allowed in previous mark schemes)</p>	3
Calculate the R <sub>f</sub> value of propan-1-ol	$1.4/9.1 = \mathbf{0.154}$ (3 d.p)	Range 0.12-0.18	1
Write an equation for the alkaline hydrolysis of 1-bromopropane. Show structures.	$\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} + \text{OH}^- \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{Br}^-$ <p>OR</p> $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br} + \text{KOH} \rightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{KBr}$ <p>Can you do X + NaOH -&gt; X + NaBr? Didnt even think it said K+</p> <ul style="list-style-type: none"> <li>- Was part of the context of the q but this one in itself only said alkaline hydrolysis so hoping that it's fine</li> </ul>	<p>Yes but do you need that isnt it scientifically still correct otherwise?</p> <p>Both answers will be acceptable in my view, they always put an ionic and put the actual equation as well.</p> <p>Would you get the mark if you did displayed structure to show structure?? <i>I did that. Should probs be fine. It said to show the structure of the organic compounds &amp; that's the most showing you could do lmao</i></p>	1
Suggest how the spot after 20 minutes would be different with 1-chloropropane and why. Suggest why propan-1-ol is used.	<p>C-Cl bond enthalpy is greater than C-Br bond enthalpy, takes longer to hydrolyse up Spot will be larger</p> <p>Propan-1-ol used as control / comparison / show</p>	<p>Is it the spot at the top that would be larger as less of the reactant (chloropropane) has been used up??</p>	3

	propan-1-ol is final product of hydrolysis etc.		
What species cause the orange and green colours when refluxing with dichromate	Green - $\text{Cr}^{3+}$ Orange - $\text{Cr}_2\text{O}_7^{2-}$	$\text{H}^+$ doesn't give the colour, only $\text{Cr}_2\text{O}_7$ does	2
Find the functional groups and structures for F, G, H, I All have molecular formula $\text{C}_5\text{H}_{10}\text{O}$ and one is alicyclic.	<p><b>Level 3 (5-6 marks)</b> Almost all structures are fully correct with relevant reasoning from chemical test results.</p> <p><b>Level 2 (3-4 marks)</b> At least half of structures are fully correct backed up by relevant reasoning from chemical tests.</p> <p><b>Level 1 (1-2 marks)</b> Correct deductions from chemical tests <b>OR</b> some correct deductions and at least 1 correct structure.</p> <p><b>0 marks</b> No response worthy of credit.</p> <p><b>F</b> - unbranched alkene + alcohol (several structures possible)</p> <p>Possibilities</p>  <p>Do not accept etc.</p> <p><b>G</b> - cyclopentanol</p>  <p><b>H</b> - 5-carbon ketone (several structures possible) <b>I</b> - pentanal</p>	<p>Had to be unbranched</p> <ul style="list-style-type: none"> <li>2,4-DNP - orange precipitate indicates carbonyl.</li> <li>Tollen's - silver mirror indicates aldehyde.</li> <li>With acidified <math>\text{Cr}_2\text{O}_7^{2-}</math>, green indicates oxidation (<math>1^\circ</math> or <math>2^\circ</math> alcohol or aldehyde) and vice versa for ketone.</li> <li>Only F decolourises <math>\text{Br}_2</math> (aq). Therefore it is unsaturated (alkene).</li> </ul> <p><b>G:</b> Several cyclic structures possible</p> <p><b>I:</b> <math>\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CHO}</math></p> <p><b>F: (others possible)</b> <math>\text{CH}_2\text{CH}=\text{CHCH}_2\text{CH}_2\text{OH}</math></p> <p><b>H: (others possible)</b> <math>\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_3</math></p>	6

70 marks UMS. COMPLETE.

GREAT JOB EVERYONE!!!  
FAREWELL CHEMISTRY.

Grade	A*	A	B	C	D	E	U
2024?	59	48	37	28	18	10	0
2023	61	50	40	30	20	10	0

PRAYING THESE BOUNDARIES ARE REAL

Helpful links:

Chem paper 1: [OCR \(H432/01\) A-LEVEL CHEMISTRY A \(PAPER 1\) - UNOFFICIAL MARK SCHEME](#)

Chem paper 2: [OCR \(H432/02\) A-Level Chemistry A \(Paper 2\) - UNOFFICIAL MARK SCHEME](#)

[A Level Chem OCR A Paper 3 UOMS](#)