

HSC CHEMISTRY REVISION MAP

Built from every 2019–2025 HSC paper and NESA's marker feedback

HOW TO USE THIS SHEET

Work through the four steps. Tick a box when you can do it under exam conditions, not when you've read about it. Side 2 tracks every dot point.

1.8 minutes per mark in Section II

~25 marks per module on average: skip none

68% of written marks are in 1–4 mark parts

~4 parts worth 5+ marks in a typical paper

STEP

1

FIX THESE HABITS *the mistakes markers flag year after year*

- | | |
|---|---|
| ☐ Equations that aren't exam-ready 7/7 yrs
Balance them, include states and charges; use $\rightleftharpoons$ only for equilibria. | ☐ Calculations that drop method marks 7/7 yrs
Label each step, don't round early, finish with units and sig figs. |
| ☐ Ignoring the stimulus 7/7 yrs
Use the given data and context; generic lines ('wear PPE') score little. | ☐ Le Chatelier without the 'why' 7/7 yrs
Explain with rates and collisions; equilibrium $\neq$ equal concentrations. |
| ☐ Spectra described, not linked 7/7 yrs
Parent ion $\neq$ base peak; tie every IR/NMR/MS feature to the structure. | ☐ Incomplete organic structures 6/7 yrs
Draw every hydrogen; each carbon makes exactly four bonds. |
| ☐ Faulty K expressions 6/7 yrs
Leave out solids and water; check indices; K_{sp} is not K_{eq} . | |

Also flagged most years: graphs without a ruler or line of best fit · intermolecular vs intramolecular forces · the wrong mass in $q = mc\Delta T$.

STEP

2

DRILL THESE CALCULATIONS *tick when you can do one cold*

CALCULATION	PARTS	TRY THESE PAST QUESTIONS
☐ K_{sp}: solubility & will it precipitate? Q vs K_{sp} , molar solubility, common ion	16	25 Q32 · 24 Q32 · 23 Q34
☐ K_{eq} with ICE tables Find K or an amount; Q vs K for direction	14	24 Q30 · 24 Q39 · 23 Q31
☐ pH, pOH, $[H^+]$, $[OH^-]$ Including after mixing or diluting	14	25 Q34b · 24 Q28 · 24 Q29
☐ K_a, K_b & pK_a From pH or a curve; $K_a \cdot K_b = K_w$	11	25 Q31b · 25 Q34a · 24 Q39
☐ Titration & back titration Concordant titres, mole ratios, aliquots	11	25 Q33 · 24 Q35 · 23 Q32
☐ Stoichiometry & % yield Masses, gas volumes, limiting reagent	10	25 Q24b · 25 Q25 · 25 Q31a
☐ Calibration curves Colourimetry, UV-Vis, AAS, with dilution factors	7	24 Q25 · 23 Q31 · 20 Q35
☐ Calorimetry: $q = mc\Delta T \rightarrow \Delta H$ Neutralisation and combustion of alcohols	7	24 Q36 · 23 Q25a · 22 Q26a

STEP

3

MASTER THESE THREE CONCEPTS *where the most high-value marks sit*

ORGANIC STRUCTURE DETERMINATION

99 marks · every paper · 8 parts worth 5+

- IR: broad O–H vs sharp C=O ($\sim 1700\text{ cm}^{-1}$)
- MS: molecular ion, M–15, m/z 43 fragments
- ^{13}C environments; ^1H shift, integration, n+1 splitting
- Back it up with Br_2 , Na_2CO_3 and $\text{Cr}_2\text{O}_7^{2-}/\text{H}^+$ results

EQUILIBRIUM-CONSTANT CALCULATIONS

123 marks · every paper · 50 parts

- ICE tables; Q vs K to predict direction
- Solubility $\leftrightarrow K_{sp}$ (watch the stoichiometric powers)
- Precipitate? Dilute on mixing, then compare Q to K_{sp}
- K_a from pH; $K_a \cdot K_b = K_w$; multiply K's for summed equations

QUANTITATIVE ACID-BASE ANALYSIS

69 marks · every paper · 6 parts worth 5+

- Drop the rough titre; average concordant results
- Back titration: excess – leftover = reacted
- Track every dilution and aliquot factor
- Curves: equivalence point, $\text{pH} = \text{p}K_a$ at half-equivalence

STEP

4

PRACTISE THESE BIG QUESTIONS *likely 5+ mark questions; tick each past question once done*

- | | |
|--|--|
| 1 Identify an unknown organic compound from spectra
~7 marks: IR, MS, ^1H and ^{13}C NMR, often with a reaction pathway. Tip: Link each spectral feature to part of the structure.
☐ 19 Q26 ☐ 20 Q30 ☐ 21 Q29 ☐ 22 Q30 ☐ 23 Q36 ☐ 24 Q38 ☐ 25 Q36 | 2 Titration analysis of a real-world sample
5–7 marks: back titration or multi-step dilution, compared with a claim. Tip: Equation, concordant titres, clear final comparison.
☐ 19 Q24 ☐ 20 Q25 ☐ 21 Q35 ☐ 22 Q32 ☐ 23 Q32 ☐ 24 Q35 ☐ 25 Q33 |
| 3 Equilibrium disturbed: collision theory + Le Chatelier
5–6 marks: sketch conc./rate vs time or use an energy profile. Tip: Explain the rates first, then the position and K.
☐ 19 Q25 ☐ 22 Q23 ☐ 23 Q33 ☐ 25 Q35 | 4 Calculate K from experimental data
5–7 marks: K_{sp} after mixing, or K_{eq} from a calibration curve. Tip: Dilute on mixing; plot the calibration line carefully.
☐ 22 Q35 ☐ 23 Q31 ☐ 23 Q34 ☐ 25 Q32 |
| 5 Plan a multi-step organic synthesis
5–8 marks: reagents and conditions per step, yield, purity, safety. Tip: Name catalysts and conditions (reflux, conc. H_2SO_4).
☐ 19 Q34 ☐ 20 Q29 ☐ 21 Q26 ☐ 22 Q33 ☐ 24 Q38 | + Wildcard: Calorimetry: $q = mc\Delta T \rightarrow \Delta H$
Use the total solution mass, get the sign right, justify heat losses.
☐ 20 Q25 ☐ 20 Q36 ☐ 24 Q36 |

DOT-POINT TRACKER

DOT POINT	MC	1-4	5-6	7+	MKS	YEARS	✓	?	×
MODULE 5 · EQUILIBRIUM & ACID REACTIONS									
about 24 marks a paper									
Static & dynamic equilibrium									
5.1.1 Reversibility pracs (CoCl ₂ , FeSCN ²⁺)	-	-	-	-	•	□□□□□□	□	□	□
5.1.2 Static vs dynamic; open vs closed	4	3	-	-	12	□□□□□□	□	□	□
5.1.3 Non-equilibrium systems & ΔG	1	6	-	-	20	□□□□□□	□	□	□
5.1.4 Collision theory & equilibrium	2	1	-	-	5	□□□□□□	□	□	□
Factors that affect equilibrium									
5.2.1 Le Chatelier: T, conc., pressure	9	10	1	-	40	□□□□□□	□	□	□
5.2.2 Explaining shifts with collision theory	-	4	1	-	18	□□□□□□	□	□	□
5.2.3 E _a , ΔH & catalysts vs position	2	2	1	-	13	□□□□□□	□	□	□
Calculating K _{eq}									
5.3.1 Writing K _{eq} expressions	3	-	-	-	3	□□□□□□	□	□	□
5.3.2 K _{eq} calculations (ICE), Q vs K	7	8	-	1	43	□□□□□□	□	□	□
5.3.3 Effect of temperature on K _{eq}	2	2	-	-	9	□□□□□□	□	□	□
5.3.4 Investigation to determine K _{eq}	-	-	-	1	7	□□□□□□	□	□	□
5.3.5 K for dissociation of salts, acids, bases	1	3	1	-	17	□□□□□□	□	□	□
Solution equilibria									
5.4.1 Dissolution of ionic compounds	-	1	-	-	3	□□□□□□	□	□	□
5.4.2 First Nations food detoxification	1	-	-	-	1	□□□□□□	□	□	□
5.4.3 Solubility rules & mixing solutions	1	1	-	-	3	□□□□□□	□	□	□
5.4.4 K _{sp} expressions & solubility	10	2	2	-	28	□□□□□□	□	□	□
5.4.5 Predicting precipitates (Q vs K _{sp})	3	2	2	-	19	□□□□□□	□	□	□
MODULE 6 · ACID/BASE REACTIONS									
about 26 marks a paper									
Properties of acids & bases									
6.1.1 Naming inorganic acids & bases	-	-	-	-	•	□□□□□□	□	□	□
6.1.2 Indicators: preparation, choice & use	4	1	-	-	7	□□□□□□	□	□	□
6.1.3 Acids + bases, carbonates, metals	-	4	-	-	10	□□□□□□	□	□	□
6.1.4 Everyday & industrial neutralisation	-	-	-	-	•	□□□□□□	□	□	□
6.1.5 Enthalpy of neutralisation	-	3	2	1	25	□□□□□□	□	□	□
6.1.6 Arrhenius vs Brønsted–Lowry	3	1	1	-	12	□□□□□□	□	□	□
Using Brønsted–Lowry theory									
6.2.1 Measuring pH of acids & bases	-	-	-	-	•	□□□□□□	□	□	□
6.2.2 pH, pOH, [H ⁺], [OH ⁻] calculations	6	5	-	-	24	□□□□□□	□	□	□
6.2.3 Using pH to compare acid strength	-	3	-	-	10	□□□□□□	□	□	□
6.2.4 Conjugates & amphiprotic species	4	6	1	-	25	□□□□□□	□	□	□
6.2.5 Strong/weak vs concentrated/dilute	3	3	-	-	14	□□□□□□	□	□	□
6.2.6 pH after dilution or mixing	2	3	-	-	12	□□□□□□	□	□	□
Quantitative analysis									
6.3.1 Titration for unknown concentration	4	2	2	3	43	□□□□□□	□	□	□
6.3.2 Titration & conductivity curves	7	3	-	-	17	□□□□□□	□	□	□
6.3.3 Modelling neutralisation	-	-	-	-	•	□□□□□□	□	□	□
6.3.4 K _a & pK _a calculations	3	9	1	-	35	□□□□□□	□	□	□
6.3.5 Industry, First Nations, probes	-	-	-	-	•	□□□□□□	□	□	□
6.3.6 Household substances, back titration	-	1	2	2	27	□□□□□□	□	□	□
6.3.7 Buffers: preparation & properties	3	2	1	-	15	□□□□□□	□	□	□
6.3.8 Buffers in natural systems	-	-	-	-	•	□□□□□□	□	□	□

MOST EXAMINED

8.2.2 Spectroscopy (78) · 7.4.6 Oxidation of 1° and 2° alcohols (48) · 5.3.2 K_{eq} calculations (43) · 6.3.1 Titration for unknown concentration (43) · 5.2.1 Le Chatelier (40)

HOW TO READ IT

Each row is a syllabus dot point. The four columns count how many question parts tested it, by type. Highlighted marks = 25+ marks examined since 2019. The year strip shows when it appeared ('19 to '25). Tick ✓ confident, ? shaky or × not yet, and start with the highlighted rows you can't tick.

DOT POINT	MC	1-4	5-6	7+	MKS	YEARS	✓	?	×
MODULE 7 · ORGANIC CHEMISTRY									
about 25 marks a paper									
Nomenclature									
7.1.1 IUPAC naming (organic)	11	2	-	-	17	□□□□□□	□	□	□
7.1.2 Chain, position & FG isomers	2	5	-	-	14	□□□□□□	□	□	□
Hydrocarbons									
7.2.1 Homologous series formulae	1	1	-	-	3	□□□□□□	□	□	□
7.2.2 Properties within a series (prac)	-	-	-	-	•	□□□□□□	□	□	□
7.2.3 Molecular shape around C=C, C≡C	1	2	-	-	5	□□□□□□	□	□	□
7.2.4 Alkane properties & IMFs	-	1	-	-	3	□□□□□□	□	□	□
7.2.5 Safe handling & disposal of organics	1	1	-	-	3	□□□□□□	□	□	□
7.2.6 Implications of hydrocarbon use	-	1	-	-	2	□□□□□□	□	□	□
Reactions of hydrocarbons									
7.3.1 Addition reactions (H ₂ , X ₂ , HX, H ₂ O)	2	4	1	2	34	□□□□□□	□	□	□
7.3.2 Halogen substitution of alkanes	-	1	-	-	2	□□□□□□	□	□	□
Alcohols									
7.4.1 1°, 2° & 3° alcohols	-	2	-	-	4	□□□□□□	□	□	□
7.4.2 Alcohol properties & IMFs	-	5	-	-	18	□□□□□□	□	□	□
7.4.3 Enthalpy of combustion (prac)	2	5	-	-	16	□□□□□□	□	□	□
7.4.4 Dehydration, HX, combustion	4	1	1	1	22	□□□□□□	□	□	□
7.4.5 Producing alcohols, fermentation	-	3	-	2	25	□□□□□□	□	□	□
7.4.6 Oxidation of 1° and 2° alcohols	3	3	1	4	48	□□□□□□	□	□	□
7.4.7 Biofuels vs fossil fuels	-	4	-	-	11	□□□□□□	□	□	□
Organic acids & bases									
7.5.1 Aldehydes, ketones, amines, amides	-	1	-	-	1	□□□□□□	□	□	□
7.5.2 IMFs of acids, amines & amides	3	3	-	-	14	□□□□□□	□	□	□
7.5.3 Esterification & reflux	2	2	-	3	29	□□□□□□	□	□	□
7.5.4 Organic acids vs organic bases	3	1	-	-	5	□□□□□□	□	□	□
7.5.5 Soaps & detergents	2	-	-	-	2	□□□□□□	□	□	□
7.5.6 Multi-step reaction pathways	1	2	-	1	16	□□□□□□	□	□	□
Polymers									
7.6.1 Addition polymers	2	2	-	-	7	□□□□□□	□	□	□
7.6.2 Condensation polymers	5	2	-	-	9	□□□□□□	□	□	□
MODULE 8 · APPLYING CHEMICAL IDEAS									
about 25 marks a paper									
Analysis of inorganic substances									
8.1.1 Need for environmental monitoring	-	2	-	1	11	□□□□□□	□	□	□
8.1.2 Qualitative tests for cations & anions	5	3	2	-	24	□□□□□□	□	□	□
8.1.3 Gravimetric & precipitation titrations	3	5	-	-	21	□□□□□□	□	□	□
8.1.4 Colourimetry, UV-Vis & AAS	9	3	-	2	33	□□□□□□	□	□	□
Analysis of organic substances									
8.2.1 Chemical tests for functional groups	1	5	1	1	26	□□□□□□	□	□	□
8.2.2 Spectroscopy: ¹ H & ¹³ C NMR, MS, IR	16	5	1	6	78	□□□□□□	□	□	□
Chemical synthesis & design									
8.3.1 Designing a synthesis process	1	6	-	1	27	□□□□□□	□	□	□
Outside Year 12 content									
Y11 Year 11 stoichiometry & gas laws	-	1	-	-	2	□□□□□□	□	□	□

NOT DIRECTLY EXAMINED 2019-2025

5.1.1, 6.1.1, 6.1.4, 6.2.1, 6.3.3, 6.3.5, 6.3.8, 7.2.2. Still examinable, and often the setting for a question on another dot point.