

APOLLO

The covalent model

HL

Chemistry

First assessment 2025

28 questions | mark schemes

Mark-scheme answers

Chemistry HL | Paper 1A | May 2025 TZ1 | Q9 | 1 marks

9. B

Chemistry HL | Paper 1A | May 2025 TZ1 | Q10 | 1 marks

10. A

Chemistry HL | Paper 1A | May 2025 TZ1 | Q11 | 1 marks

11. C

Chemistry HL | Paper 1A | May 2025 TZ1 | Q13 | 1 marks

13. C

Chemistry HL | Paper 1A | May 2025 TZ2 | Q7 | 1 marks

7. C

Chemistry HL | Paper 1A | May 2025 TZ2 | Q9 | 1 marks

9. B

Chemistry HL | Paper 1A | May 2025 TZ2 | Q10 | 1 marks

10. B

Chemistry HL | Paper 1A | May 2025 TZ3 | Q8 | 1 marks

8. D

Chemistry HL | Paper 1A | May 2025 TZ3 | Q9 | 1 marks

9. C

Chemistry HL | Paper 1A | May 2025 TZ3 | Q10 | 1 marks

10. B

1.	(a)	elements contain only one type of atom / atoms with same atomic number/same number of protons OR cannot be chemically broken down «into simpler substances» ✓ compounds contain different types of atoms «chemically» bonded together OR consist of different elements «chemically» bonded together «in fixed ratios» ✓	Accept combined/joined for bonded in M2.	2
1.	(b)	<<electronegativity difference>> $\Delta X = 0.8$ AND average <<electronegativity >> $X = 2.2$ ✓		1
1.	(c)	Any one of: Fe is electrical/thermal conductor AND FeS is not ✓ Fe is malleable/ductile AND FeS is brittle/not malleable/ductile ✓ Fe is magnetic AND FeS is not ✓ Fe has higher melting point «than FeS» ✓ Fe is denser «than FeS» ✓	Do not accept atomic or molar mass. Do not accept any chemical properties. Accept colour or shininess Accept iron is sonorous	1
1.	(d)	«$IE(\text{Fe}) = 762 \text{ kJ mol}^{-1}$» E for 1 atom «$= \frac{762 \times 10^3 \text{ J mol}^{-1}}{6.02 \times 10^{23} \text{ mol}^{-1}}$» = 1.266×10^{-18} «J» ✓ f «$= \frac{E}{h} = \frac{1.266 \times 10^{-18} \text{ J}}{6.63 \times 10^{-34} \text{ J s}}$» = $1.91 \times 10^{15} \text{ s}^{-1}$ ✓ λ «$= \frac{c}{f} = \frac{3.0 \times 10^8 \text{ m s}^{-1}}{1.91 \times 10^{15} \text{ s}^{-1}}$» = $1.57 \times 10^{-7} \text{ m}$ ✓	Award [3] for correct final answer.	3

Question	Answers	Notes	Total
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7.	(a)		«$0.0104 \times 0.02 \times 10^{-3}$» → 0.24×10^{-3} «LITIONS» ✓ $\text{H}_2\text{N}(\text{CH}_2)_6\text{NH}_2$ ✓ $\text{HOOC}(\text{CH}_2)_4\text{COOH}$ / $\text{ClOC}(\text{CH}_2)_4\text{COCl}$ ✓	Accept any type of structural or skeletal formula. Penalize clear incorrect bond connections only once in the paper.	2
7.	(b)	(i)	O of C=O with H of H-N on opposite chain ✓	Do not penalize multiple correct H-bonds.	1

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Question			Answers	Notes	Total
7.	(b)	(ii)	H that is «covalently» bonded to a «highly» electronegative atom ✓ is attracted to the electronegative atom of neighbouring molecule ✓	Accept a labelled diagram for both marks. Accept “F, O or N” for “electronegative atom”.	2
7.	(c)		covalent bonds between silicon atoms ✓ London/dispersion forces between poly(ethene) «chains/molecules» ✓ covalent bonds «much» stronger than London/dispersion/intermolecular forces «because Si has higher melting points» ✓	M3: Do not accept “bonding in silicon is stronger than poly(ethene)” without named bonding/forces.	3

Mark-scheme answers

Chemistry HL | Paper 1A | Nov 2025 TZ1 | Q7 | 1 marks

7. A

Chemistry HL | Paper 1A | Nov 2025 TZ1 | Q8 | 1 marks

8. C

Chemistry HL | Paper 1A | Nov 2025 TZ1 | Q9 | 1 marks

9. B

Chemistry HL | Paper 1A | Nov 2025 TZ1 | Q10 | 1 marks

10. D

Chemistry HL | Paper 1A | Nov 2025 TZ1 | Q12 | 1 marks

12. B

Chemistry HL | Paper 1A | Nov 2025 TZ1 | Q39 | 1 marks

39. B

Chemistry HL | Paper 1A | Nov 2025 TZ3 | Q6 | 1 marks

6. B

Chemistry HL | Paper 1A | Nov 2025 TZ3 | Q7 | 1 marks

7. D

Chemistry HL | Paper 1A | Nov 2025 TZ3 | Q9 | 1 marks

9. D

Chemistry HL | Paper 1A | Nov 2025 TZ3 | Q11 | 1 marks

11. D

Chemistry HL | Paper 1A | Nov 2025 TZ3 | Q16 | 1 marks

16. B

Chemistry HL | Paper 1A | Specimen 2025 | Q7 | 1 marks

7. B

Chemistry HL | Paper 1A | Specimen 2025 | Q8 | 1 marks

8. D

Mark-scheme answers

Chemistry HL | Paper 1A | Specimen 2025 | Q9 | 1 marks

9. B

Chemistry HL | Paper 1A | Specimen 2025 | Q10 | 1 marks

10. D

Chemistry HL | Paper 1A | Specimen 2025 | Q17 | 1 marks

17. D