Diploma Programme
Programme du diplôme
Programa del Diploma

Chemistry
Standard level
Paper 1A

15 May 2026

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

1 hour 30 minutes [Paper 1A and Paper 1B]

Instructions to students

- Do not open this examination paper until instructed to do so.
- Answer all questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- A calculator is required for this paper.
- A clean copy of the **chemistry data booklet** is required for this paper.
- The maximum mark for paper 1A is **[30 marks]**.
- The maximum mark for paper 1A and paper 1B is **[55 marks]**.

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A00

Section A

1. What is correct about the species $^{108}Ag^{+}$?

	Number of protons	Number of neutrons	Number of electrons
A.	108	108	107
B.	47	61	46
C.	47	108	48
D.	108	61	46

2. What is the maximum number of electrons that can occupy the 4th main energy level in an atom?

A. 8

B. 16

C. 18

D. 32

3. What is the correct electron configuration of the bromine atom?

A. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^5$

B. $1s^2 1p^6 2s^2 2p^6 3s^2 3p^6 4s^2 4p^5$

C. $1s^2 2s^2 2p^6 2d^{10} 3s^2 3p^6 3d^{10} 4s^2 4p^5$

D. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^7$

4. How many ions are present in 100 g of $CaCO_3$?

$M(CaCO_3) = 100\,g\,mol^{-1}$

A. 1

B. 2

C. 6×10^{23}

D. 1.2×10^{24}

5. What is the empirical formula of an alcohol with 52% mass carbon and 13% mass hydrogen?

A. C_2H_5

B. C_5H_{13}

C. C_2H_6O

D. CH_4O

6. What is the correct formula of barium nitride?

A. Ba_3N_2

B. Ba_2N_3

C. $BaNO_3$

D. $Ba(NO_3)_2$

7. Which properties are expected for the compound potassium fluoride?

	Soluble in water?	Melting point	Conducts electricity when solid?	Conducts electricity when molten?
A.	No	Low	No	No
B.	No	Low	Yes	No
C.	Yes	High	Yes	Yes
D.	Yes	High	No	Yes

8. What is the correct electron domain geometry and molecular geometry of PF_3?

	Electron domain geometry	Molecular geometry
A.	trigonal planar	trigonal planar
B.	tetrahedral	trigonal pyramidal
C.	trigonal planar	trigonal pyramidal
D.	tetrahedral	

9. Which species contains a coordination bond?

A. BF_3

B. NH_3

C. $[H_3O]^+$

D. CH_3COO^-

10. Which molecules are polar?

I. CH_2Cl_2

II. CH_3Cl

III. CCl_4

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

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11. Which classification is correct?

	Alkali metal	Transition element	Halogen	Noble gas
A.	caesium	tungsten	krypton	iodine
B.	caesium	tungsten	iodine	krypton
C.	tungsten	caesium	iodine	krypton
D.	tungsten	caesium	krypton	iodine

A001

12. Which oxide will react with water to produce the most basic solution?

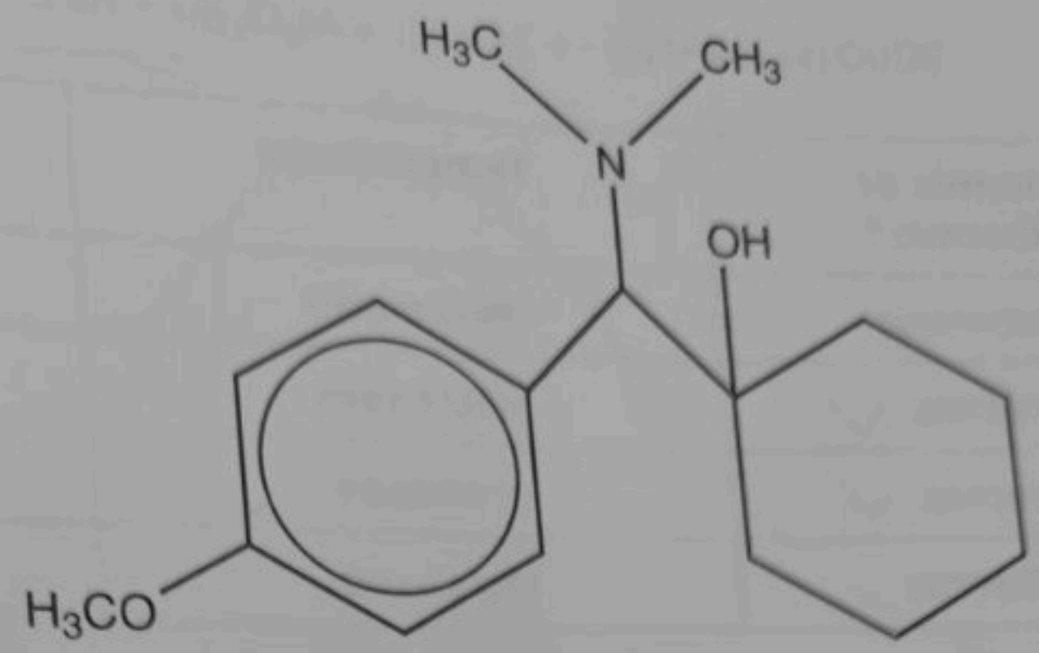
A. Sodium oxide

B. Magnesium oxide

C. Carbon dioxide

D. Sulfur dioxide

13. Which functional groups are present in this molecule?



A. Secondary amino, hydroxyl, alkoxy

B. Tertiary amino, alcohol, carbonyl

C. Tertiary amino, hydroxyl, alkoxy

D. Secondary amino, alcohol, carbonyl

14. Which of these molecules are isomers of each other?

I. Pentanal

II. 2,2-dimethylpropan-1-ol

III. Pentan-2-ol

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

15. Which classification is correct for this reaction?

$$3CuO(s) + 2Al(s) \rightarrow 3Cu(s) + Al_2O_3(s) + \text{heat}$$

	Exothermic or endothermic?	Temperature	Products or reactants more stable?
A.	endothermic	decreases	reactants
B.	exothermic	decreases	products
C.	exothermic	increases	products
D.	endothermic	increases	reactants

16. What is the sum of the coefficients when this equation is balanced with the smallest whole numbers?

$$\_\_CH_3CH(CH_3)CH_3 + \_\_O_2 \rightarrow \_\_CO_2 + \_\_H_2O$$

A. 10

B. 16

C. 26

D. 33

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17. Given the following data:

$$SrO(s) + CO_2(g) \rightarrow SrCO_3(s) \qquad \Delta H = -x \text{ kJ}$$

$$2SrO(s) \rightarrow 2Sr(s) + O_2(g) \qquad \Delta H = +y \text{ kJ}$$

$$2SrCO_3(s) \rightarrow 2Sr(s) + 2C(s) + 3O_2(g) \qquad \Delta H = +z \text{ kJ}$$

A001

What is the ΔH of the following reaction?

$$C(s) + O_2(g) \rightarrow CO_2(g)$$

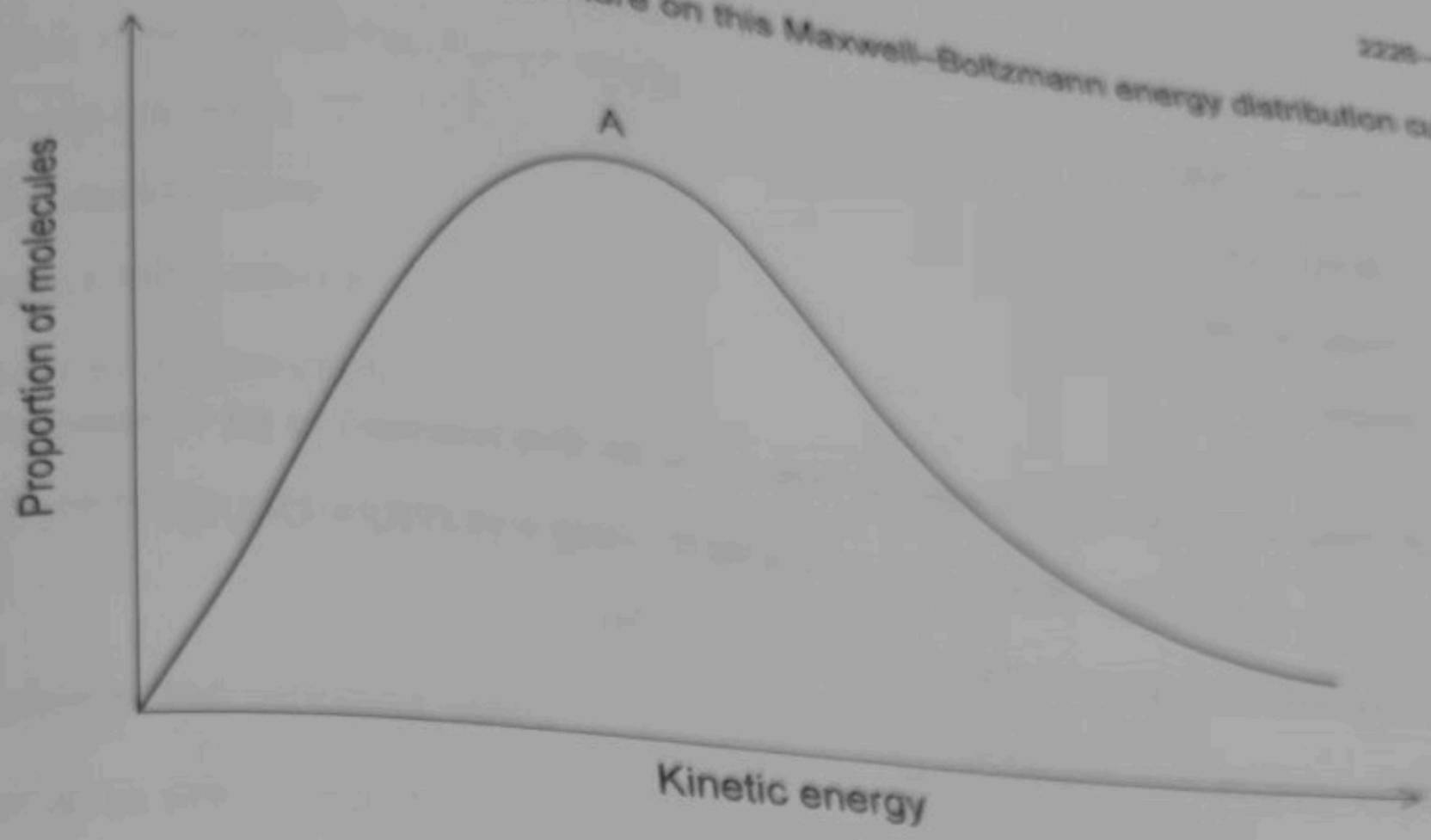
A. $+x + 0.5y - 0.5z$

B. $+x + 0.5y + 0.5z$

C. $+2x + y - z$

D. $+x - y - 2z$

18. What is the effect of increasing temperature on this Maxwell–Boltzmann energy distribution curve?



A. The curve maximum is higher and to the left of A.

B. The curve maximum is lower and to the right of A.

C. The curve maximum is higher and to the right of A.

D. The curve maximum is lower and to the left of A.

19. Which substances will be present in the reaction vessel at the end of the reaction between 1.2 g magnesium and 200 cm^3 of 1.0 $mol\,dm^{-3}$ hydrochloric acid?

$$Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$$

A. $HCl(aq)$, $MgCl(aq)$

B. $Mg(s)$, $HCl(aq)$

C. $Mg(s)$, $MgCl_2(aq)$

D. $Mg(s)$, $HCl(aq)$, $MgCl_2(aq)$

$n(Mg) = \frac{1.2}{24} = 0.05\,mol$

$n(HCl) = 0.2 \times 1 = 0.2\,mol$

20. What can be produced when butanoic acid is reduced?

A. Butan-1-one

B. Butan-1-ol

C. Butan-2-one

D. Butan-2-ol

21. Which of these changes will increase the time taken for this reaction to go to completion?

$$CaCO_3(s) + 2HNO_3(aq) \rightarrow Ca(NO_3)_2(aq) + H_2O(l) + CO_2(g)$$

A. Increase concentration of HNO_3

B. Increase particle size of $CaCO_3$

C. Decrease pressure in container

D. Decrease volume of container

22. What can be deduced about this equilibrium reaction from these data?

$$A(g) + B(g) \rightleftharpoons 2C(g)$$

Temperature	Value of equilibrium constant, K
290 K	100
350 K	300

A. It is an exothermic reaction and [products] < [reactants] at equilibrium.

B. It is an endothermic reaction and [products] < [reactants] at equilibrium.

C. It is an exothermic reaction and [products] > [reactants] at equilibrium.

D. It is an endothermic reaction and [products] > [reactants] at equilibrium.

23. Which change would shift the position of this equilibrium towards the products? 2226–4219

$$3Fe(s) + 4H_2O(g) \rightleftharpoons Fe_3O_4(s) + 4H_2(g) \qquad \Delta H = +320\,kJ\,mol^{-1}$$

A. Increase pressure

B. Decrease pressure

C. Increase temperature

D. Decrease temperature

24. Which statement about this reaction is correct?

$$2F_2 + O_2 \rightarrow 2OF_2$$

A. Fluorine is the reducing agent.

B. Fluorine is the oxidizing agent.

C. Oxygen is reduced.

D. Fluorine is oxidized.

25. Which of these reactions will occur spontaneously?

I. $NaCl + Br_2$

II. $NaI + Br_2$

III. $NaBr + Cl_2$

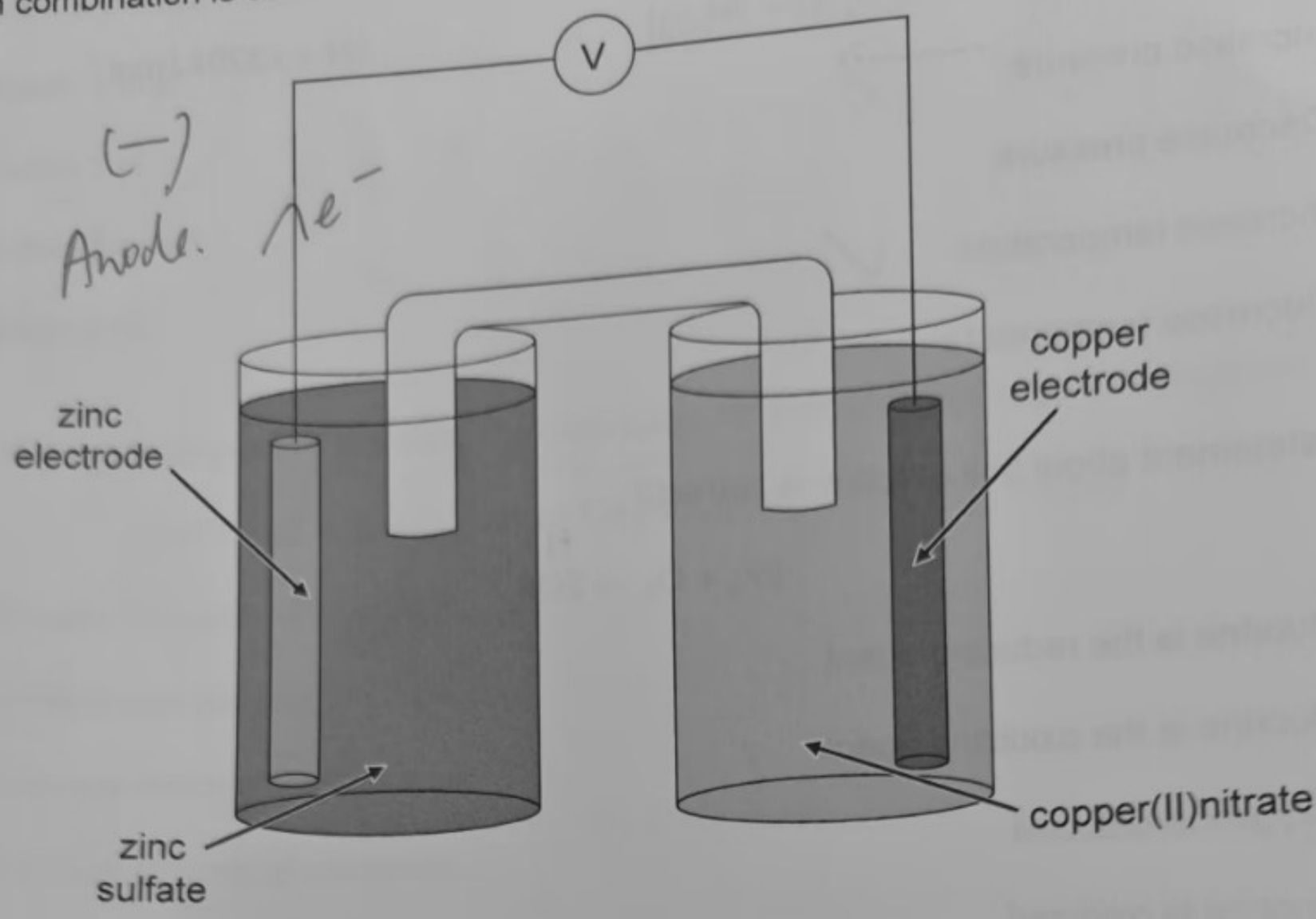
A. I and II only

B. I and III only

C. II and III only

D. I, II and III

26. Which combination is correct for this cell, when zinc is more reactive than copper?



	Cathode	Anode	Sign on cathode	Sign on anode
A.	copper	zinc	–	+
B.	zinc	copper	–	+
C.	zinc	copper	+	–
D.	copper	zinc	+	–

27. What are the products of the electrolysis of molten calcium bromide?

	Product at cathode	Product at anode
A.	calcium	bromine
B.	calcium	bromide
C.	bromine	calcium
D.	bromide	calcium

28. Which equation is correct?

A. $Cu(s) + 2HCl(aq) \rightarrow CuCl_2(aq) + H_2O(l)$

B. $Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$

C. $Zn(s) + 2HCl(aq) \rightarrow ZnCl(aq) + H_2O(l)$

D. $Fe(s) + 2HCl(aq) \rightarrow FeCl_3(aq) + H_2(l)$

29. Which equation shows the first species in **bold** acting as an **electrophile**?

A. $\mathbf{OH^-} + CH_3Br \rightarrow CH_3OH + Br^-$

B. $\mathbf{NH_3} + H^+ \rightarrow NH_4^+$

C. $\mathbf{Cl^-} + CH_3CH_2^+ \rightarrow CH_3CH_2Cl$

D. $\mathbf{BF_3} + NH_3 \rightarrow F_3BNH_3$

30. What is the product of the reaction between but-2-ene and steam, $H_2O(g)$?

A. Butan-2-ol

B. Butan-1-ol

C. Butanal

D. Butanone