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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]**.

Section A

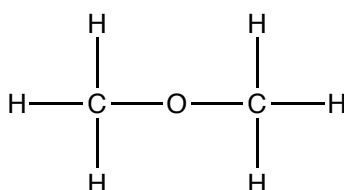
1. What is the change of state from gas to solid?
 - A. Freezing
 - B. Deposition
 - C. Condensation
 - D. Sublimation

2. Boron ($A_r = 10.81$) consists of two isotopes, B-10 and B-11. What is the relative abundance of B-11?
 - A. 19%
 - B. 29%
 - C. 71%
 - D. 81%

3. Which species has a ground state electron configuration of $[\text{Ar}]4s^13d^{10}$?
 - A. Zn^{2+}
 - B. Cu^+
 - C. Zn
 - D. Cu

4. What is the maximum number of electrons that can be held at an energy level with $n = 3$?
 - A. 2
 - B. 8
 - C. 18
 - D. 32

5. What is the reason a balloon containing a real gas would have a smaller volume than one containing the same number of moles of ideal gas, when both balloons are held at 100 K and 100 kPa?
- Real gases experience attractions due to intermolecular forces.
 - Ideal gases experience repulsions due to intermolecular forces.
 - Molecules of real gases have greater kinetic energy.
 - Molecules of ideal gases have greater kinetic energy.
6. Which compounds contain ionic bonds?
- NH_4NO_3
 - CaCl_2
 - CH_3OH
- I and II only
 - I and III only
 - II and III only
 - I, II and III
7. The formula for methoxymethane is shown.



What is the molecular geometry for the C and O atoms?

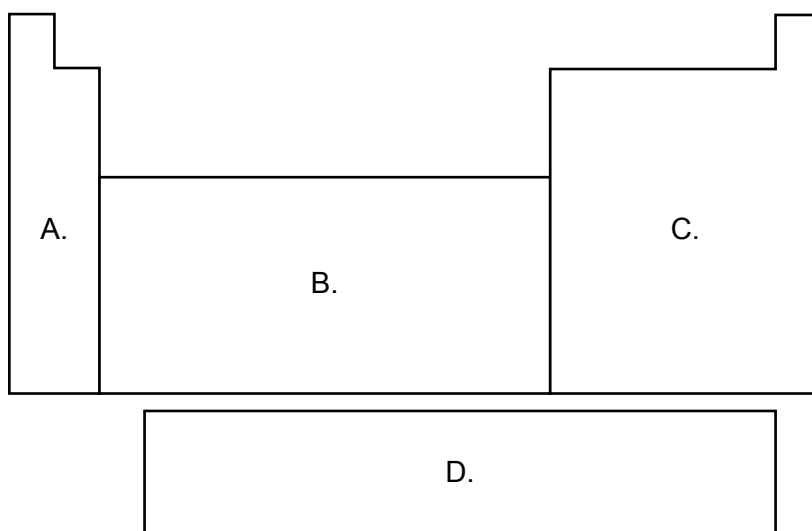
	Molecular geometry of C	Molecular geometry of O
A.	Trigonal pyramidal	Bent
B.	Tetrahedral	Linear
C.	Trigonal planar	Linear
D.	Tetrahedral	Bent

8. These isomers have a molar mass of 72 g mol^{-1} . What is the reason for the increase in boiling points?

Isomer	Structure	Boiling point ($^{\circ}\text{C}$)
3-methoxyprop-1-ene	$\text{H}_2\text{C}=\text{CH}-\text{CH}_2-\text{O}-\text{CH}_3$	43
Butanal	$\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CHO}$	75
But-3-en-2-ol	$\text{H}_2\text{C}=\text{CH}-\text{CH}(\text{OH})-\text{CH}_3$	97

- A. Increase in strength of intermolecular forces
- B. Decrease in strength of intermolecular forces
- C. Increase in number of electrons
- D. Change in types of intramolecular bonding
9. Which electrostatic attraction describes the formation of covalent bonds?
- A. Between polar molecules
- B. Between oppositely charged ions
- C. Between a lattice of cations and delocalized electrons
- D. Between a shared pair of electrons and the positively charged nuclei
10. What is the formula of the compound formed from aluminium ions and sulfate ions?
- A. AlSO_3
- B. $\text{Al}_2(\text{SO}_3)_3$
- C. AlSO_4
- D. $\text{Al}_2(\text{SO}_4)_3$

11. Which element is in the d-block?



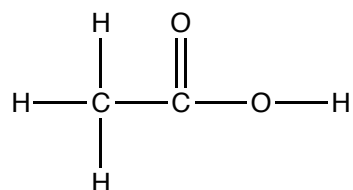
12. Which factor causes first ionization energy to decrease down a group?

- A. Increasing shielding effect
- B. Decreasing shielding effect
- C. Increasing number of protons
- D. Decreasing number of protons

13. Why do alkali metals form 1+ ions?

- A. Low ionization energy causing the atoms to lose one electron
- B. Low electron affinity causing the atoms to gain one electron
- C. High ionization energy causing the atoms to gain one electron
- D. High electron affinity causing the atoms to lose one electron

14. What is the correct classification of the following molecule?

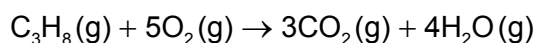


- A. Aldehyde
 - B. Ketone
 - C. Alcohol
 - D. Carboxylic acid
15. How is the overall enthalpy change affected by the presence of a catalyst?
- A. $\Delta H^\ominus$ increases
 - B. $\Delta H^\ominus$ proportional to catalyst concentration
 - C. $\Delta H^\ominus$ decreases
 - D. $\Delta H^\ominus$ does not change
16. Which of the following reactions are exothermic?
- I. $\text{Cl(g)} + \text{e}^- \rightarrow \text{Cl}^-(\text{g})$
 - II. $\text{H}_2\text{O(s)} \rightarrow \text{H}_2\text{O(l)}$
 - III. $\text{NH}_3(\text{g}) \rightarrow \text{NH}_3(\text{l})$
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

17. Which compounds could form if methane (CH_4) undergoes incomplete combustion?

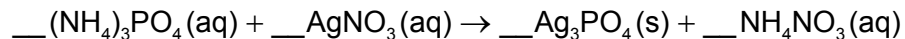
- A. CO_2 only
- B. CO_2 and H_2O only
- C. CO , CO_2 and H_2O
- D. C and H_2 only

18. What is the limiting reactant when 2 mol of propane and 1 mol of oxygen react?



- A. C_3H_8
- B. O_2
- C. C_3H_8 and O_2 are consumed completely
- D. C_3H_8 and O_2 are both in excess

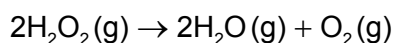
19. Ammonium phosphate, $(\text{NH}_4)_3\text{PO}_4$, reacts with silver nitrate, AgNO_3 , to produce a precipitate of silver phosphate, Ag_3PO_4 , and an aqueous solution of ammonium nitrate, NH_4NO_3 .



What is the ratio of coefficients of silver nitrate to silver phosphate in the balanced equation?

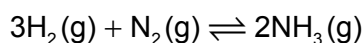
- A. 1:1
- B. 3:1
- C. 1:3
- D. 3:3

20. Hydrogen peroxide, H_2O_2 ($M_r = 34 \text{ g mol}^{-1}$), decomposes to form water vapour and oxygen gas.



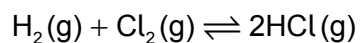
What volume (dm^3) of oxygen is produced from 68 g of hydrogen peroxide at STP?

- A. 22.7 dm^3
 B. 24.1 dm^3
 C. 27.6 dm^3
 D. 34.1 dm^3
21. What is activation energy?
- I. Difference between the energy of the transition state and the products
 II. Energy required for a successful collision
 III. Difference between the energy of the reactants and transition state
- A. I and II only
 B. I and III only
 C. II and III only
 D. I, II, and III
22. What is the equilibrium constant expression for the forward reaction?



- A. $K = \frac{[\text{NH}_3]^2}{[\text{H}_2]^3[\text{N}_2]}$
 B. $K = \frac{2[\text{NH}_3]}{3[\text{H}_2][\text{N}_2]}$
 C. $K = \frac{2[\text{NH}_3]}{3[\text{H}_2] + [\text{N}_2]}$
 D. $K = \frac{[\text{H}_2]^3[\text{N}_2]}{[\text{NH}_3]^2}$

23. How would an increase in pressure affect the equilibrium below?



	Equilibrium shift	Increase production of
A.	right	HCl
B.	left	H ₂
C.	left	Cl ₂
D.	no change	no change

24. Which products are formed when HBr(aq) reacts with Na₂CO₃(aq)?

- A. H₂CO₃(s) and NaBr(aq)
- B. H₂O(l), CO₂(g) and NaBr(s)
- C. H₂O(l), CO₂(g), Na⁺(aq), and Br[–](aq)
- D. H₂O(l), CO₂(g), and H₂CO₃(s)

25. Which salt is formed when hydrochloric acid, HCl, reacts with magnesium oxide, MgO?

- A. H₂O
- B. MgCl₂
- C. Mg(OH)₂
- D. MgH₂

26. What is the conjugate base of methanoic acid (HCOOH)?

- A. H₂COOH⁺
- B. HCOO[–]
- C. HCOOH₂⁺
- D. OH[–]

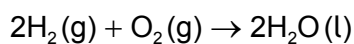
27. How is HCO_3^- classified?

- A. Brønsted–Lowry acid only
- B. Brønsted–Lowry base only
- C. Both Brønsted–Lowry acid and base
- D. Neither Brønsted–Lowry acid nor base

28. How does the acidity of a solution change when the pH increases from 1 to 3?

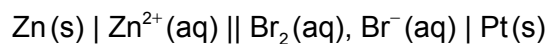
- A. Increases 3 times
- B. Increases 100 times
- C. Decreases 3 times
- D. Decreases 100 times

29. What happens to hydrogen in this reaction?



	Hydrogen	Change in oxidation state
A.	oxidized	From +1 to 0
B.	oxidized	From 0 to +1
C.	reduced	From +1 to 0
D.	reduced	From 0 to +1

30. Which species is produced at the anode in the voltaic cell?



- A. Br_2
 - B. Br^-
 - C. Zn^{2+}
 - D. Zn
-