

AGA KHAN UNIVERSITY EXAMINATION BOARD

HIGHER SECONDARY SCHOOL CERTIFICATE

CLASS XI EXAMINATION

MAY 2012

Chemistry Paper I

Time allowed: 40 minutes Marks 30

INSTRUCTIONS

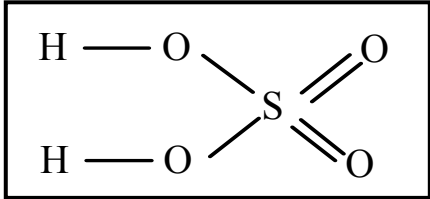
1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 30 only.
4. In each question there are four choices A, B, C, D. Choose ONE. On the answer grid black out the circle for your choice with a pencil as shown below.

Correct Way		Incorrect Ways	
1	(A) (B) ● (D)	1	(A) (B) (C) (D)
		2	(A) (B) (C) (D)
		3	(A) (B) (C) (D)
		4	(A) (B) (C) (D)

<p><u>Candidate's Signature</u></p>
--

5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.
7. You may use a scientific calculator if you wish.

- Which of the following contains the same number of molecules as 9 g of water?
 - 2 g of hydrogen gas
 - 14 g of nitrogen gas
 - 32 g of oxygen gas
 - 44 g of carbon dioxide gas
- If the molecular mass of an ideal gas is twice the molecular mass of carbon dioxide, the volume occupied by the ideal gas at STP is
 - 11.2 dm³.
 - 22.4 dm³.
 - 44.8 dm³.
 - 44 dm³.
- Which of the following is the molar mass of a gas having a mass of 0.36 g and a volume of 250 cm³ at STP?
 - 0.032 g mol⁻¹
 - 0.036 g mol⁻¹
 - 32 g mol⁻¹
 - 36 g mol⁻¹
- Transition of an electron from $n = 4$ to $n = 2$ level results in a/an
 - visible spectrum.
 - x-ray spectrum.
 - infra-red spectrum.
 - ultraviolet spectrum.
- Which of the following is the angular momentum of an electron revolving in the 2nd orbit?
 - $nh/2\pi$
 - h/π
 - $h/2\pi$
 - $h/3\pi$
- Which of the following molecules has a resonance structure?
 - CH₃Cl
 - C₂H₄
 - SO₃
 - CO₂

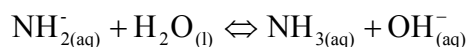
7. Which of the following represents the geometry of a water molecule based on VSEPR (valence shell electron pair repulsion) theory?
- Angular
 - Pyramidal
 - Tetrahedral
 - Trigonal planar
8. What is the total number of electrons in the covalent bonds surrounding the sulphur atoms?
- 4
 - 6
 - 8
 - 12
- 
9. What is the total kinetic energy of a molecule at absolute zero temperature?
- Zero
 - Maximum
 - Minimum
 - Unpredictable
10. Which of the following statements is CORRECT for a real gas at high pressure and low temperature?
- Volume of ideal gas > volume of real gas
 - Volume of ideal gas < volume of real gas
 - Volume of ideal gas = volume of real gas
 - Volume of ideal gas = volume of real gas = 22.4 dm³
11. Which of the following processes allows a person to smell the fragrance of an air freshener used in one corner of a room?
- Diffusion
 - Distillation
 - Displacement
 - Decomposition
12. Which of the following is the strongest intermolecular force found among liquids?
- London forces
 - Cohesive forces
 - Hydrogen bonding
 - Dipole-dipole interactions

13. Which of the following statements is CORRECT about two substances which are allotropes of carbon?
- A. They both reduce hot iron (III) oxide to iron.
 - B. They have different crystalline structures.
 - C. They require equal mass of oxygen for complete combustion.
 - D. They produce only CO₂ of equal mass when burnt completely.
14. Which of the following phenomena shows the existence of two different substances in the same crystalline form?
- A. Polymorphism
 - B. Isomorphism
 - C. Allotropy
 - D. Anisotropy
15. What would be the equilibrium constant for the given reaction, if A and D are solids?



- A. $\frac{[C]^c [D]^d}{[A]^a [B]^b}$
 - B. $\frac{[A]^a [B]^b}{[C]^c [D]^d}$
 - C. $\frac{[C]^c}{[B]^b}$
 - D. $\frac{[C]^c [D]^d}{[A]^a}$
16. The given reaction is exothermic in the direction in which it is written.
- $$X_{2(g)} + Y_{2(g)} \rightarrow X_2Y_{2(g)}$$
- The equilibrium could be shifted in the direction of x_2y_2 by
- A. decreased pressure.
 - B. increased temperature.
 - C. increased temperature and decreased pressure.
 - D. increased pressure and decreased temperature.
17. Which of the following would be the pH of sodium carbonate (Na₂CO₃) solution?
- A. 0
 - B. 7
 - C. < 7
 - D. > 7

18. In the given reaction, ammonia is a



- A. Bronsted acid.
 - B. conjugate acid.
 - C. Bronsted base.
 - D. conjugate base.
19. At 25°C the ionization constant of water is $K_w = 10^{-14} \text{ mol}^2 \text{ dm}^{-6}$. At 65°C, its value changes to $K_w = 2.29 \times 10^{-14} \text{ mol}^2 \text{ dm}^{-6}$. This shows that the dissociation of water into ions is
- A. an irreversible reaction.
 - B. an exothermic process.
 - C. an endothermic process.
 - D. a process where no heat change occurs.
20. Which of the following substances can neutralize a bee sting?
- A. Vinegar
 - B. Lemon juice
 - C. Damp common salt
 - D. Damp bicarbonate of soda
21. Which of the following is the elevation of boiling point constant for water?
- A. $0.52^\circ\text{C kg mol}^{-1}$
 - B. $0.86^\circ\text{C kg mol}^{-1}$
 - C. $1.04^\circ\text{C kg mol}^{-1}$
 - D. $1.15^\circ\text{C kg mol}^{-1}$
22. Which of the following colloids shows minimum Tyndall effect?
- A. Lyophilic
 - B. Lyophobic
 - C. Hydrophobic
 - D. Thixotropic
23. Which of the following is an example of immiscible solution in liquid phase?
- A. Phenol-water system
 - B. Nicotine-water system
 - C. Benzene-water system
 - D. Triethylamine-water system

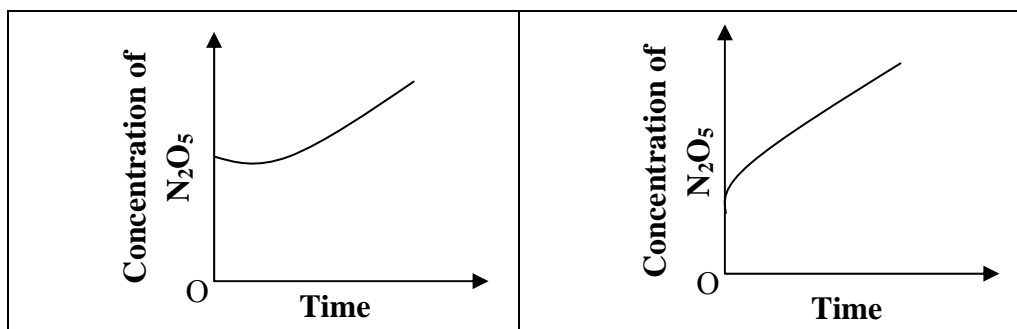
24. Which of the following represents the correct order for the reaction $A + 2B \rightarrow 2C + D$, when the rate equation is $\frac{dx}{dt} = K[A][B]^2$?

- A. Zero order
- B. 1st order
- C. 2nd order
- D. 3rd order

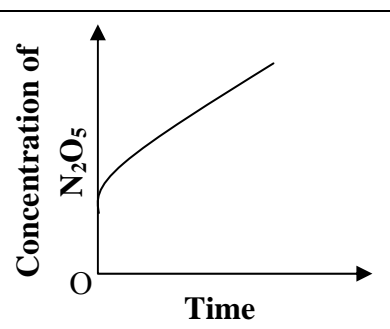
25. The chemical equation shows decomposition of nitrogen pentoxide.



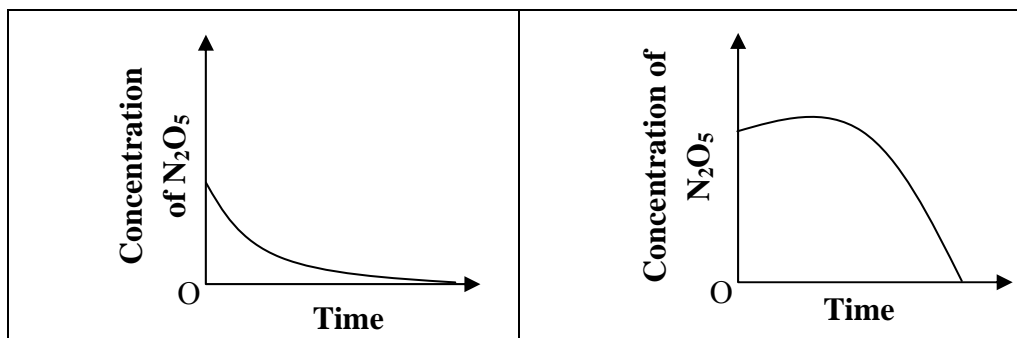
Which of the following graphs shows the change in concentration of nitrogen pentoxide as the decomposition occurs?



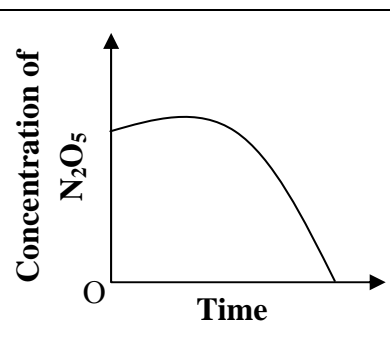
A.



B.

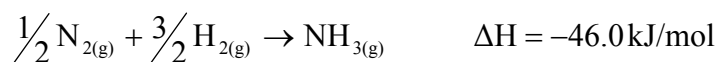


C.



D.

26. The standard enthalpy change ΔH for the production of ammonia is:

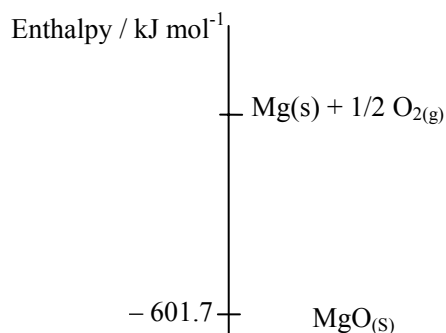


The value of ΔH for the given reaction will be



- A. 46.0 kJ/mol.
 B. 92.0 kJ/mol.
 C. -92.0 kJ/mol.
 D. -138.0 kJ/mol.
27. The diagram shows enthalpy of a reaction between magnesium and oxygen.

The enthalpy change in the given reaction is called



- A. standard heat of combustion.
 B. standard heat of formation.
 C. standard heat of sublimation.
 D. standard enthalpy change.

28. The enthalpy change is a heat change that takes place at constant

- A. pressure.
 B. volume.
 C. temperature.
 D. internal energy.

29. Which of the following reactions is an example of redox reaction?

- A. $\text{CuO} + \text{H}_2\text{SO}_4 \rightarrow \text{CuSO}_4 + \text{H}_2\text{O}$
 B. $2\text{SO}_2 + \text{O}_2 \rightarrow 2\text{SO}_3$
 C. $\text{Ag}^+ + \text{Cl}^- \rightarrow \text{AgCl}$
 D. $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$

30. Which of the following results in the production of electrical energy by a simple cell?

- A. Formation of negative ions of atoms
 B. Formation of covalent bond between atoms
 C. Attraction between positive and negative ions
 D. Transfer of electrons from a more reactive to less reactive element

Please use this page for rough work