ZIAUDDIN UNIVERSITY EXAMINATION BOARD

Total Time 3.5 hours
Total Marks: 100

Class: XI **MODEL PAPER EXAMINATION 2025**
Time Allowed: 20minutes **SUBJECT: CHEMISTRY**
Q1: **(SECTION "A")** **Marks: 17**

Note: Attempt **ALL** questions from section 'A'. Each question carries **ONE** mark.

1. In an exothermic reaction, an increase in temperature favors:
   A. Forward reaction B. Reverse reaction C. Equilibrium state D. Irreversible reaction
2. The diffusion rates of C_3H_8 and CO_2 are identical because:
   A. Both are polyatomic gases B. Both are denser than air
   C. Both have the same molar mass D. Both contain carbon atoms
3. Which statement about gas molecules is incorrect?
   A. They have large intermolecular spaces B. They possess kinetic energy
   C. Their collisions are elastic D. Their molar mass depends on temperature
4. Cooling appliances like air conditioners and refrigerators work on the principle of:
   A. Common ion effect B. Joule-Thomson effect
   C. Pauli exclusion principle D. Le Chatelier's principle
5. Which molecule has the maximum bond angle?
   A. CS_2 B. H_2O C. NH_3 D. BF_3
6. The molecule with zero dipole moment is:
   A. NH_3 B. HCl C. H_2O D. CCl_4
7. The sum of the mole fractions of all components in a solution is equal to:
   A. 1 B. 10 C. 100 D. Zero
8. Under similar conditions, CH_4 gas diffuses faster by:
   A. 1.5 times B. 2 times C. 4 times D. 16 times
9. The outer body of a dry cell is made of:
   A. Copper B. Zinc C. Lead D. Iron
10. Cooking time is reduced in a pressure cooker because:
    A. The boiling point of water rises B. Heat is stored in the pressure cooker
    C. The vapor pressure of the liquid is reduced D. Heat is uniformly distributed
11. Pressure changes significantly affect the solubility of:
    A. Solids in liquids B. Liquids in liquids C. Gases in liquids D. All of the above
12. Which of the following is not a state function of a system?
    A. Pressure B. Enthalpy C. Internal energy D. Work done
13. KOH is used as an electrolyte in:
    A. Lead accumulator B. Fuel cell C. Alkaline battery D. Dry cell
14. The shape of the orbital where l = 0 is:
    A. Spherical B. Dumbbell C. Double dumbbell D. Complex
15. Under similar conditions, CH_4 gas diffuses ___ times faster than SO_2 gas.
    A. 1.5 times B. 2 times C. 4 times D. 16 times
16. The rate constant of a reaction is affected by:
    A. Concentration of reactants B. Concentration of products
    C. Temperature D. Reaction time
17. Which statement about Avogadro's number is incorrect?
    A. It is the number of particles in one mole of a substance B. Its numerical value is 6.02×10^{23}
    C. Its value changes with an increase in temperature D. Its value changes with an increase in the number of moles

Time Allowed: 30minutes **PRACTICAL BASED ASSESMENT** **Marks 15**

Note: Attempt **ALL** questions. **Q18** carries **ONE** mark, all others carry **TWO** marks each.

18. Which gas would exhibit the greatest ideal behavior at standard temperature and pressure?
    A. Hydrogen B. Oxygen C. Argon D. Methane
19. Which of the following gases would show the highest deviation from ideal gas behavior at room temperature?
    A. $N_2(g)$ B. $Cl_2(g)$ C. $H_2O(g)$ D. $CH_4(g)$
20. Addition of HNO_3 gas to an aqueous solution of $NaNO_3$ will suppress the dissociation of:
    A. Sodium ions B. Nitrate ions C. Hydroxide ions D. Hydronium ions
21. When a strong acid reacts with a strong base, the heat of neutralization is constant because:
    A. Only water molecules are formed B. Strong acids and bases completely ionize
    C. Heat is absorbed by water molecules D. Both the acid and base are weak electrolytes
22. During the standardization of $KMnO_4$ solution, dilute H_2SO_4 is added to:
    A. Increase the oxidation potential of $KMnO_4$ B. Act as a reducing agent
    C. Provide an acidic medium for the reaction D. React with the end product
23. The temperature of a sample of an inert gas is increased. What effect does this have on the number of molecules with the most probable energy and on the number of molecules with high energy?

	number of molecules with the most probable energy	number of molecules with high energy
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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24. When HCl is added to an aqueous solution of Cu^{2+} ions followed by H_2S gas, copper (II) precipitates out as:
    A. Cupric oxide B. Copper chloride C. Copper sulfide D. Copper hydroxide
25. A student titrates 10 cm³ of a 0.25 M NaOH solution against 0.5 M HCl using phenolphthalein as an indicator. The end point is reached at 5 cm³ of HCl. The amount of NaOH present in the 250 cm³ solution would be:
    A. 0.5 g B. 1.0 g C. 1.25 g D. 2.5 g

Class: XI **MODEL PAPER EXAMINATION 2025**
Time: 2 hours 40 minutes **SUBJECT: CHEMISTRY (SECTION "B" AND SECTION "C")** **Total Marks 68**
SECTION "B" (SHORT ANSWER QUESTIONS) **36 Marks**

Q2: Attempt any **NINE-PART** questions from this section. Each question carries **FOUR** marks.

i. Draw the molecular orbital diagram for the O_2 molecule. Calculate the bond order of O_2 and explain why the O_2 molecule is paramagnetic.
ii. What is meant by the rounding of data? Describe the various rules that govern the rounding process.
iii. Define lattice energy and explain how it is influenced by the size and charge of ions.
iv. State the postulates of Bohr's atomic theory and derive the formula for the radius of the nth orbit of a hydrogen atom.
v. Differentiate between continuous and line spectra.
vi. Calculate the mass in grams of 4.8×10^{24} atoms of sodium.
vii. What is a mole? Explain Avogadro's number and its significance.
viii. Provide explanations for the following:
    a) Why does water evaporate faster on the floor than in a container?
    b) Why is honey more viscous than water?
ix. How can a true solution be differentiated from a suspension? A solution is prepared by dissolving 45g of glucose in 72g of water. Calculate the mole fraction of glucose and water in the solution.
x. What are the advantages of Lewis's theory over the Bronsted-Lowry theory?
xi. Calculate the volume of carbon dioxide at STP produced by the complete combustion of 50 dm³ of butane (C_4H_{10}) in excess oxygen.
xii. Discuss how the surface area of reactants and temperature affect the rate of reaction.
xiii. Explain the following observations:
    a) Why does milk turn sour more rapidly in summer than in winter?
    b) Why do reactants in solution react faster at higher concentrations?
xiv. Calculate the volume occupied by 8g of methane gas at 40°C and 842 torr pressure.

SECTION"C"(DETAILED ANSWER QUESTIONS) **32 Marks**

Note: Attempt any **TWO-PART** question from this section each question carries **SIXTEEN** marks. draw diagram where necessary.

Q3.
a) What is an ideal gas? What are the causes of deviation of real gases from ideal behavior? Explain these deviations at low temperature and high pressure. (5)
b) Derive an expression for the radius of the hydrogen atom in the nth orbit using the Bohr model. (5)
c) Define Electrolytic Cell and balance any one of the following equations by ion electron method. (6)

i. $Cr(OH)_3 + SO_4^{2-} \longrightarrow CrO_4^{2-} + SO_3^{2-}\ (Basic\ Medium)$

ii. $MnO_4^- + Cl^- \longrightarrow Mn^2 + Cl_2\ (Acidic\ Medium)$

Q4.
a) Write down the Linde's method for the liquefaction of gases. (5)
b) What are X-rays? How are they produced? Discuss their properties and uses. (5)
c) What do you understand by the Van der Waals equation? Derive the Van der Waals equation for pressure correction. (6)

Q5.
a) Derive the expression for energy of electron (5)
b) Define radioactivity. Write down the uses of nuclear radiation. (5)
c) Derive the general gas equation. Also, deduce the value of the gas constant R in units of atm dm³/mol·K and J/mol·K. (6)

END OF PAPER