

EXAMINATION MATERIAL OF ZUEB 2021-2022

GRADE: XI SUBJECT: CHEMISTRY

SECTION # BSHORT ANSWER QUESTION

CHAPTER # 01 FUNDAMENTAL CONCEPT OF CHEMISTRY

	1.5 Limiting reactant
TOPICS:	1.6 Empirical and molecular formula
//	1.8 Calculation on chemical equation based

- 1. Write down the differences between empirical and molecular formula.
- 2. Complete the combustion of CH₄ given in reaction, $CH_{4\omega} + 2O_{2\omega}$ -----> $CO_{2\omega} + 2H_2O_{\omega}$ Calculate volume of O_2 gas react at S.T.P with the combustion of **10.6** gm. of CH₄.
- **3.** What is the molecular formula of a compound that contains **80%** carbon **20%** hydrogen? Its molecular mass is **45g**.

CHAPTER # 02 STATES OF MATTER

	2.1 Kinetic Theory
	2.3 Gas laws
	2.4 Ideal Gas
TOPICS:	2.7 Viscosity
	2.8 Surface Tension
	2.12 Types of crystal
	2.13 Isomorphism
	2.14 Polymorphism

- 1. What is ideal gas? Derive the ideal gas equation.
- 2. Write down the differences between isomorphism & polymorphism.
- **3.** Define unit cell. Explain with sides and angles of seven crystal system.
- 4. Define viscosity. Explain the factor effecting on viscosity.
- **5.** Define surface tension. Explain the factor effecting on surface tension.
- **6.** Define the following gas laws with the help of Kinetic theory of gases.
 - i) Boyle's Law

- ii) Charles's Law
- **7.** At certain temperature and pressure NH diffuses **1.48** times more than HCL. If the density of NH is **0.66g/liter** find the density of HCL
- **8. 1.4dm³** of a gas measure at a temperature of **27C°** and a pressure of **900torr** was found to have mass **2.273g**. Calculate the molecular mass of the gas.
- 9. What is the density of methane gas (CH₄) at 127C° and 3.5 atm pressure?

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CHAPTER # 03 ATOMIC STRUCTURES

	3.4 Radioactivity
	3.5 Chadwick Experiment
	3.7 Plank's Quantum Theory
	3.8 Spectra
TOPICS:	3.12 Bohr's theory & Hydrogen atom
	3.15 Heisenberg's Uncertainty Principle
	3.16 Energy Level
	3.17 Orbitals & Quantum number
	3.18 Pauli's Exclusion Principle
	3.19 Shapes of Orbitals
	3.20 Electronic configuration

- 1. Define radioactivity. Describe the characteristics of alpha and beta radiation.
- 2. How neutron discovered by James Chadwick.
- 3. Write down the main postulates of plank's quantum theory.
- **4.** Write a short note on quantum number **or** quantum laws.
- 5. Write the electronic configuration of the following and describe the shape of last sub shell of b & c also give the number of proton and electron in each of the following:
 (a) Cu (Z=29)
 (b) Mg+2 (Z=12)
 (c) Cl- (Z=17)
- **6.** Calculate the radius and angular momentum of **3**rd **orbit** of a hydrogen atom.
- 7. Arrange the following orbitals according to increasing energy orbitals 3s, 1s, 3d, 5p, 2p, 2s, 4s, 3p, 4d, 4p

CHAPTER # 04 CHEMICAL BONDING

	4.5 Dipole Moment
TOPICS:	4.7 Bond Energy
TOPICS:	4.8 Sigma & Pi-Bond
	4.11 Hydrogen Bonding

- **1.** Define and explain dipole moment with its factors.
- **2.** Define Bond energy with its factors.
- **3.** Write down the differences between sigma bond and pi-bond.
- **4.** Write a short note on hydrogen bonding.

CHAPTER # 05 CHEMICAL ENERGETICS

	5.1 Thermodynamic system
TOPICS:	5.5 Hess's Law
	5.6 Heat of Formation

1. Calculate the heat of formation for the formation of propane.

$3C + 4H_2$		ΔH =?
$C + O_2$	\longrightarrow CO ₂	$\Delta H = -394 \text{KJ/mol}$
$H_2 + \frac{1}{2} O_2$	— H ₂ O	$\Delta H = -286 \text{KJ/mol}$
$C_3 H_8 + 5O_2$	\rightarrow 3CO ₂ + 4H ₂ O	$\Delta H = -2200 \text{KJ/mol}$

- 2. State and explain Hess's law of heat summation.
- 3. When **5000J** of heat is added to a system at constant pressure of **101300 N/m²**, its internal energy increased by **520J** calculates the change in volume.

CHAPTER # 06 CHEMICAL EQUILIBERIUM

11 15	6.2 Equilibrium state
11/2	6.3 The Law of Mass Action (Equilibrium Law)
1130	6.4 Determination of Equilibrium constant
TOPICS:	6.5 Application of The Law of Equilibrium
	6.6 Le-Chatelier's Principle
11.3	6.7 Industrial Application of Le-Chatelier's Principle
- 11	6.8 Solubility Product
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1. State the law of equilibrium. Derive the expression of K_{c} from the following reaction.

$$mA + nB \longleftrightarrow xC + yD$$

- 2. Write down the applications of equilibrium constant.
- **3.** State Le-Chatelier's principle? Explain the effect of increasing pressure and temperature on the following reactions.

$$N_2(g) + 3H_2(g) \implies 2NH_3(g)$$
 $\Delta H^{\bullet} = -92 \text{ kJ mol}^{-1}$
 $2SO_2(g) + O_2(g) \implies 2SO_3(g)$ $\Delta H = -196 \text{ kJ/mol}$

- 4. Define solubility product. Derive expression of solubility product by using example of AgCl.
- 5. Will PbCrO₄ precipitate out in the solution by mixing $100cm^3$ of $2.0 \times 10^{-6}M$ Pb(CH₃COO)₂ and $900cm^3$ of $1.5 \times 10^{-8}M$ Na₂CrO₄? (Ksp of PbCrO₄ is 1.8×10^{-14} mol³/dm⁶).
- **6.** The solubility of calcium oxalate (CaC_2O_4) is **0.0016 g/dm³** at 25°C. Find the solubility product CaC_2O_4 . (Molar mass of CaC_2O_4 is **128g/mol**).
- 7. How many moles of ester are formed at equilibrium when 3 moles of alcohol are mixed with 1 mole of acid initially? ($K_c = 4$). CH₃COOH + C₂H₅OH \Leftrightarrow CH₃COOC₂H₅ + H₂O

CHAPTER # 07 SOLUTION & ELECTROLYTES

	7.2 Hydration
	7.3 Hydrolysis
	7.7 Oxidation number
TOPICS:	7.8 Oxidation & Reduction Reactions
	7.10 Indicators
	7.12 PH

- **1.** Define the process of hydrolysis.
- 2. Write down the differences between hydration & hydrolysis.
- **3.** Write a short note on indicators.
- **4.** Define pH and pOH. Calculate the **[H+]** and **[OH-]** ion concentration of a solution having pH equal **7.86**?
- **5.** Calculate the pH of **2.5** \times **10**⁻²M NH₄OH solution. Which is **10%** ionize.
- **6.** Show that pH + pOH = 14.
- **7.** Give the oxidation number of:
 - (a) Cr in $K_2Cr_2O_7$
- **(b)** O in OF₂

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- (c) Mn in $MnO_{4^{-1}}$
- (d) N in NCl₃

CHAPTER # 08 CHEMICAL KINETICS

TODICS	8.2 Rate Constant & Rate Expression
TOPICS:	8.3 Types of Reaction
	8.4 Factors Affecting Rate of reaction

1. The rate constant for the decomposition of nitrogen dioxide is $1.8 \times 10^{-3} \, dm^3 M^{-1} S^{-1}$

 $2NO_2 \longrightarrow 2NO + O_2$

- a) Write down the rate expression
- b) Find the initial rate when the initial concentration of NO_2 is **0.75M.**
- c) Find the rate constant when the initial concentration of NO_2 doubled.
- **2.** Write the rate expression, find the value of rate constant and determine the order of reaction using the following data:

S. No.	[NO]	$[0_2]$	Rate
1.	0.1M	0.1M	2 x 10 ⁻³ M.s ⁻¹
2.	0.2M	0.1M	8 x 10 ⁻³ M.s ⁻¹
3.	0.1M	0.2M	4 x 10 ⁻³ M.s ⁻¹

- **3.** What is meant by the terms Rate of reaction & Rate constant? Explain the effects of surface area of reactants & temperature on the rate of reaction.
- **4.** Write down the different types of reaction on the basis of their rates.

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