



ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

**Higher Secondary School
Certificate (HSC)**

Examination Syllabus

&

Model Paper

Chemistry

XI

Based on Provincial revised curriculum (Sindh)

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PREFACE

Ziauddin University Examination Board (ZUEB) was established by the Sindh ACT XLI 2018, with the aim of improving the quality of education. The Board administers examinations for the Secondary School Certificate (SSC) and Higher Secondary School Certificate (HSSC) based on the latest Reviewed National Curriculum by Directorate Curriculum Assessment and Research (DCAR) Sindh. ZUEB has a mandate by Ordinance to offer such examination services to English /Urdu and Sindhi medium candidates for SSC and HSSC from private schools in Sindh. This examination syllabus exemplifies ZUEB's commitment to provincial educational goals

The Examination Board has prepared with the help of subject professors, subject wise syllabus. It is important to make the difference between syllabus and curriculum. The syllabus of a subject is considered as a guide for the subject teacher as well as the students. It helps the students understand the subject in detail. It also helps students to anticipate what is expected from them while preparing for the exams.

This examination syllabus brings together all those cognitive outcomes of the Provincial Curriculum statement which can be reliably and validly assessed. While the focus is on the cognitive domain, particular emphasis is given to the application of knowledge and understanding.

The examination syllabus is uploaded on the ZUEB website. This is done to help affiliated schools in planning their teaching. It is the syllabus, not the prescribed textbook which is the basis of the ZUEB examinations. In addition, the ZUEB examination syllabus is used to develop learning support materials for students and teachers. The examination board stand committed to all students who have embarked upon the SSC, and HSSC courses in facilitating their learning outcomes. Our examination syllabus document ensures all possible support.

On the Ziauddin University Examination Board website a tab e –resource is made available which provides resource material in all subjects both in text form in line with the curriculum and also videos on topics to give students access to learn at their own pace and own time. These 15 to 20 minutes videos are prepared around subject concept / topics. These videos are available to the students for revisiting a lesson taught by their teacher or watch it prior to the lesson and as a reinforcement strategy. The work on videos is in progress and new titles will be uploaded.

Please look out for the videos on the given website



Humbly Yours;

Shahbaz Nasim
Curriculum Coordinator

Rationale For The Reviewed Provincial Curriculum

The process of revising the National Curriculum 2006 was initiated in August 2004 when newly elected government of Pakistan decided to introduce education reform in the country. The education reform process included the announcement of new National Education Policy. National Education Census and changing the curricula (Ministry of Education, 2009)

In reality, change in secondary school curriculum was initiated in 2006 and as result, scheme of studies for classes I to XII was reviewed and curriculum of 25 compulsory subjects.

The 18th Amendment to the constitution of Pakistan has reconfigured the federal and provincial relationship by abolishing the “concurrent legislative list”. The Act (2010) provides the provinces with strong legislative and financial autonomy in education, health, and other social sectors. Major implication of the 18th Amendment for education is that the curriculum, syllabus, planning, policy, centres of excellence and standards of education will fall under the purview of the provinces. This was a big step forward for education.

In Sindh the Curriculum review team was assigned a task by the School Education Department, Government of Sindh to review the National Curriculum 2006 for all subjects and prepare a revised version that best suits the needs of the students teachers and meets the spirit of the 18th amendment. Subject wise curriculum review committees were formed. Curriculum review team critically examined the contextual and textual parts and aligned the different sections horizontally and vertically of the Curriculum. The Bureau of Curriculum (BOC) played vital role in organizing the workshops and meetings at Hyderabad for the completion of task. The positive support from a number of educationists, researchers and teachers helped in completing the mammoth task of curriculum revision.

On the DCAR website http://dcar.gos.pk/BoC_Other_Pages/curriculum_dev.html the national curriculum as well as the revised curriculums are all placed for easy reference.

The Ziauddin University Examination Board Examination syllabi for SSC and HSSC are prepared with the Sindh Revised curriculum. Up till now following subject text books have been developed as per the revised curriculum.

AIMS AND OBJECTIVES:

AIMS:

This two-year study of Chemistry aims to develop in all students:

- A scientific understanding of the physical world.
- Cognitive, affective, and psychomotor abilities appropriate to the acquisition and use of Chemical knowledge, understanding, attitude, and skills.
- An appreciation for the products and influences of science and technology, balanced by a Concern for their appropriate application.
- An understanding of the nature and limitations of scientific activity.
- An ability to apply the understanding of chemistry to relevant problems (including those From everyday real-life) and to approach those problems in rational ways.
- Respect for evidence, rationality and intellectual honesty.
- The capacities to express themselves coherently and logically, both orally and in writing, And to use appropriate modes of communication characteristic of scientific work.
- The ability to work effectively with others.

OBJECTIVES:

A statement of objectives relevant to each of the general aims is listed below. The sequence is in no particular order.

Understanding the physical world:

Students should understand the scientific concepts inherent in the theme for each chapter and be able to:

- state, exemplify, and interpret the concepts.
- use appropriately, fundamental terms and Classification related to the concepts.
- cite, explain or interpret, scientific evidence in support of the concepts.

Using appropriate cognitive, affective and psychomotor abilities:

Students should show ability to:

- Formulate questions that can be investigated by gathering first or second-hand data.
- Find relevant published background information.
- Formulate hypotheses and make predictions from them.
- Plan an investigation and carry out the planned procedure.
- Use appropriate and relevant motor skills in carrying out investigations.
- Observe phenomena and describe, measure and record these as data.
- Classify, collate and display data.
- Construct and/or interpret visual representations of phenomena and relationships (Diagrams, graphs, flowcharts, physical models).

- Analyze data and draw conclusions.
- Evaluate investigative procedures and the conclusions drawn from such investigations.

Understanding the nature and limitations of scientific activity:

For each facet of scientific activity selected for study, students should:

- Describe and exemplify it.
- Use appropriately any fundamental terms and classification related to it.
- Recognize that the problem-solving nature of science has limitations.
- Acknowledge that people engaged in science, a particularly human enterprise, have the Characteristics of people in general.

Appreciating influences of science and technology:

Students should:

- Recognize that the technology resulting from scientific activity influences the quality of Life and economic development through or by improvements in medical / health care, Nutrition and agricultural techniques.
- Explain that these influences may be the result of unforeseen consequences, rapid
- Exploitation or rapid cultural changes.
- Realize that advances in technology require judicious applications.

Respecting evidence, rationality and intellectual honesty:

Students should:

- Display respect for evidence, rationality and intellectual honesty given the number of emotive issues in the area of chemistry.

Showing capacities to communicate:

Students should:

- Comprehend the intention of a scientific communication, the relationship among its parts and its relationship to what they already know.
- Select and use the relevant parts of a communication.
- Translate information from communications in particular modes (spoken, written, tables, Graphs, flowcharts, diagrams) to other modes.
- Structure information using appropriate modes to communicate it.

Working with others:

Students should actively participate in group work and:

- Share the responsibility for achieving the group task.
- Show concern for the fullest possible involvement of each group.

ZIAUDDIN UNIVERSITY EXAMINATION BORD
SLOs CATEGORIZATION
XI-Chemistry
Detailed Syllabus

UNIT	Students' learning outcomes: Students should be able to:	Categorization		
		K	U	A
Unit 1	Weightage 8 %	Stoichiometry		
	Describe mole and Avogadro's Number with examples (Understanding)		*	
	Determine Avogadro's Number and give relationship between mole and Avogadro's Number (Applying)			*
	Define rounding off data, Exponential notation and their practical applications involving numerical. (Understanding)		*	
	Perform stoichiometric calculations with balanced equations using moles, representative particles, masses and volumes of gases (at STP) (Analyzing).			*
	Identify the limiting reactant in a reaction. (Analyzing)			*
	Knowing the limiting reactant in a reaction, calculate the maximum amount of product(s) produced and the amount of any unreacted excess reactant. (Analyzing)			*
	Given information from which any two of the following may be determined, calculate theoretical yield, actual yield, percentage yield. (Understanding)		*	
	Calculate theoretical yield and the percent yield by using the balanced equation, the amounts of reactants and the actual yield. (Applying)			*
Unit 2	Weightage 8 %	Atomic Structure		
	Describe properties of sub atomic particles (Understanding)		*	
	Summarize Bohr's atomic theory (Applying)			*
	Use Bohr's model for calculating radii of orbits. (Understanding)		*	
	Use Bohr's atomic model for calculating energy, frequency and wave Number of radiation emitted or absorbed by electron. (Applying)			*
	Describe spectrum and relate discrete line spectrum of hydrogen to energy levels of electrons in the hydrogen atom. (Applying)			*
	Explain production, properties, types and uses of X-rays. (Understanding)		*	
	Uses of nuclear radiation in health, agricultural etc. (Applying)			*
	Define photon as a unit of radiation energy. (Remembering)	*		
	Describe the concept of orbitals. (Understanding)		*	
	Explain the significance of quantized energies of electrons. (Applying)			*
	Distinguish among principal energy levels, energy sub levels, and		*	

	atomic orbitals.(Understanding)			
	Describe the general shapes of s, p, and d orbitals. (Understanding)		*	
	Describe the hydrogen atom using the Quantum Theory. (Understanding)		*	
	Use the Aufbau Principle, the Pauli Exclusion Principle, and Hund's Rule to writethe electronic configuration of the elements. (Applying)			*
	Describe the orbits of hydrogen atom in order of increasing energy. (Understanding)		*	
	Explain the sequence of filling of electrons in many electron atoms. (Applying)			*
	Describe radioactivity and uses of Nuclear radiation daily life. (Understanding)		*	
Unit3				
Weightage 10 % Theories of Covalent Bonding and Shapes of Molecules				
	Describe the features of sigma and pi bonds. (Understanding)		*	
	Use VSEPR and VBT theories to describe the shapes of simple covalent molecules.(Applying)			*
	Describe the shapes of simple molecules using orbital hybridization. (Applying)			*
	Determine the shapes of some molecules from the number of bonded pairs and lonpairs of electrons around the central atom. (Analyzing)			*
	Define bond energies and explain how they can be used to compare bond strengths of different chemical bonds. (Analyzing)			*
	Predict the molecular polarity from the shapes of molecules. (Applying)			*
	Describe how knowledge of molecular polarity can be used to explain some physicaland chemical properties of molecules. (Analyzing)			*
	Describe the change in bond lengths of hetero-nuclear molecules due to difference inElectronegativity values of bonded atoms. (Understanding)		*	
	Explain what is meant by the term ionic character of a covalent bond.(Understanding)		*	
Unit 4				
Weightage 11 % States of Matter I: Gases				
	List the postulates of Kinetic Molecular Theory. (Remembering)	*		
	Describe the motion of particles of a gas according to Kinetic Theory. (Applying)			*
	State the values of standard temperature and pressure (STP). (Remembering)			*
	Relate temperature to the average kinetic energy of the particles in a substance.(Applying)			*
	Use Kinetic Theory to explain gas pressure. (Applying)			*
	Describe the effect of change in atmospheric pressure on the weather.			

	(Applying)			*
	Describe the effect of change in temperature on the volume of gas. (Applying)			*
	Explain the significance of absolute zero, giving its value in degree Celsius and Kelvin. (Understanding)		*	
	State and explain the significance of Avogadro's Law. (Understanding)		*	
	Derive Ideal Gas Equation using Boyle's, Charles' and Avogadro's law. (Understanding)		*	
	Explain the significance and different units of ideal gas constant. (Understanding)		*	
	Distinguish between real and ideal gases. (Understanding)		*	
	Explain why real gases deviate from the gas laws. (Analyzing)			*
	Define and describe the properties of Plasma. (Applying)			*

Unit 5 Weightage 7 % States of Matter 2: Liquid

	Describe simple properties of liquids e.g., diffusion, compression, expansion, motion of molecules, spaces between them, intermolecular forces and kinetic energy based on Kinetic Molecular Theory. (Understanding)		*	
	Explain applications of dipole-dipole forces, hydrogen bonding and London forces. (Applying)			*
	Explain physical properties of liquids such as evaporation, vapour pressure, boiling point, viscosity and surface tension. (Understanding)	*		
	Use the concept of Hydrogen bonding to explain the following properties of water: high surface tension, high specific heat, low vapor pressure, high heat of vaporization, and high boiling point. And anomalous behaviour of water when its density shows maximum at 4 degrees centigrade (Applying)			*
	Define molar heat of fusion and molar heat of vaporization. (Remembering)	*		
	Describe how heat of fusion and heat of vaporization affect the particles that make up matter. (Understanding)		*	
	Relate energy changes with changes in intermolecular forces. (Applying)			*
	Define dynamic equilibrium between two physical states. (Remembering)	*		
	Describe liquid crystals and give their uses in daily life. (Applying)			*
	Differentiate liquid crystals from pure liquids and crystalline solids. (Applying)			*

Unit 6

Weightage 8 % States of Matter III: Solids

	Describe simple properties of solids e.g., diffusion, compression,			
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				*
	Define and explain solubility product. (Understanding)		*	
	Define and explain common ion effect giving suitable examples. (Applying)			*
Unit 8	Weightage 7 %	Acid Base & Salt		
	Define Bronsted and Lowery concepts for acids and bases (Remembering)	*		
	Identify conjugate acid-base pairs of Bronsted-Lowery acid and base (Analyzing)			*
	Explain ionization constant of water (Understanding)		*	
	Calculate pH, pOH in aqueous medium using Kw values. (Applying)			*
	Define and explain leveling effect. (Understanding)		*	
	Define Lewis acid and base with suitable examples (Remembering)	*		
	Define a buffer and make buffer solutions. (Applying)			*
	Show with equations how a buffer system works. (Applying)			*
	Applications of salts like NaCl, KCl, KI, NaHCO ₃ , MgSO ₄ , etc. (in tabular form)(Applying).			*
	Use the concept of hydrolysis to explain why aqueous solutions of some salts are acidic or basic. (Applying)			*
	Use concept of hydrolysis to explain why the solution of a salt is not necessarily neutral. (Understanding)		*	
Unit 9	Weightage 7 %	Chemical Kinetics		
	Define chemical kinetics. (Remembering)	*		
	Explain the terms rate of reaction, rate equation, order of reaction, rate constant and rate determining step. (Understanding)		*	
	Determine the order of reaction (Applying)			
	Calculate units of rate constant. (Applying)			
	Explain effects of concentration, temperature and surface area on reaction rates.(Applying)			*
	Explain why powdered zinc reacts faster. (Analyzing)			*
	Explain what is meant by the terms activation energy and activated complex.(Understanding)		*	
	Relate the ideas of activation energy and the activated complex to the rate of a reaction. (Applying)			*
	Illustrate the collision theory to explain how the rate of a chemical reaction is influenced by the temperature, concentration, size of molecules. (Applying)			*
	Illustrate a potential energy diagram for a reaction, discuss the reaction mechanism for the reaction. (Applying)			*
	Define terms catalyst, catalysis, homogeneous catalysis and heterogeneous catalysis.(Understanding)		*	
	Enlist examples of catalyst in tabular form (Understanding)		*	

	Explain that a catalyst provides a reaction pathway that has low activation energy.(Applying)			*
	Describe enzymes as biological catalysts. (Understanding)*		*	
Unit 10 Weightage 10 % Solutions and Colloids				
	List the characteristics of colloids and suspensions that distinguish them from solutions. (Understanding)		*	
	Define hydrophilic and hydrophobic molecules. (Remembering)	*		
	Explain the nature of solutions in liquid phase giving examples of completely miscible, partially miscible and immiscible liquid-liquid solutions. (Applying)			*
	Explain the effect of temperature on solubility. (Understanding)		*	
	Express solution concentration in terms of mass percent, molality, molarity, parts per million, billion and trillion and mole fraction. (Remembering)	*		
	Define Raoult's Law with suitable examples (Understanding)		*	
	Define the term colligative property. (Remembering)	*		
	List some colligative properties of liquids (Understanding)		*	
	Describe on a particle basis why a solution has a lower vapor pressure than the pure solvent. (Applying)			*
	Explain on a particle basis how the addition of a solute to a pure solvent causes an elevation of the boiling point and depression of the freezing point of the resultant solution. (Applying)			*
	Explain osmotic pressure, reverse osmosis and give their daily life applications. (Applying)			*
	Define thermodynamics. (Remembering)	*		
	Define the terms system, surrounding, boundary, state of system, state function, internal energy, enthalpy, entropy, heat of formation, standard heat of formation (Remembering)	*		
	Classify reactions as exothermic and endothermic. (Analyzing)			*
	Relate change in enthalpy to the heat of reaction and heat of combustion of a reaction.(Applying)			*
	Relate change in internal energy of a system with thermal energy at constant volume and constant pressure. (Applying)			*
	Explain Hess's Law with examples. (Understanding)		*	
	Apply Hess's Law to construct simple energy cycles. (Applying)			*
	Explain reaction pathway diagram in terms of enthalpy changes of the reaction. (BornHaber's Cycle) (Applying)			*
	Give the characteristics of a Redox reaction. (Understanding)		*	

	Determine oxidation and reduction in terms of a change in oxidation number.(Applying)			*
	Determine the oxidation number of an atom of any element in a pure substance.(Applying)			*
	Enlist the oxidizing and reducing agents. (Remembering)	*		
	Balance redox reactions that take place in acid solutions. (Applying)			*
	Break a redox reaction into oxidation and reduction half reactions. (Applying)			*
	Balance the redox equation by using half-cell reaction method. (Applying)			*
	Define cathode, anode, electrode potential and S.H.E. (Standard HydrogenElectrode). (Remembering)	*		
	Identify the substance oxidized and the substance reduced in batteries. (Applying)			*
	Describe the cell potential and how it is determined. (Understanding)		*	
	Describe the reaction that occurs when a lead storage battery is recharged. (Applying)			*
	Illustrate how a fuel cell produces electrical energy. (Applying)			*
	Explain the types and uses of batteries in daily life. (Applying)			*

Class- XI

Chapter	Weightage %
Chapter 1: Stoichiometry	8
Chapter 2: Atomic Structure	8
Chapter 3: Theories of Covalent Bonding and Shapes of Molecules	10
Chapter 4: State of Matter I: Gases	11
Chapter 5: State of Matter II: Liquids	7
Chapter 6: States of Matter III: Solids	8
Chapter 7: Chemical Equilibrium	7
Chapter 8: Acids, Bases and Salts	7
Chapter 9: Chemical Kinetics	7
Chapter 10: Solutions and Colloids	10
Chapter 11: Thermochemistry	9
Chapter 12: Electrochemistry	8
Total:	100

Ziauddin University Examination Board
Grade XI-Chemistry
Table of Specification (TOS)

S.No	Strand	Chapter Name	Weightage %	Marks Distribution	MCQs (Sec # A)	CRQs (Sec # B)	ERQs (Sec # C)
1.	Physical Chemistry	Stoichiometry	8	09	01	02	-----
2.		Atomic Structure	8	13	01	01	01
3.	Inorganic Chemistry	Theories of Covalent Bonding and Shapes of Molecules	10	14	02	01	01
4.	States of Matter	State of Matter I: Gases	11	14	02	01	01
5.		State of Matter II: Liquids	7	05	01	01	-----
6.		States of Matter III: Solids	8	05	01	01	-----
7.		Chemical Equilibrium	7	13	01	01	01
8.	Analytical Chemistry	Acids, Bases and Salts	7	06	02	01	-----
9.		Chemical Kinetics	7	05	01	01	-----
10.		Solutions and Colloids	10	10	02	02	-----
11.		Thermochemistry	9	14	02	01	01
12.		Electrochemistry	8	13	01	01	01
TOTAL QUESTIONS HAS TO BE GIVEN					17	14	03 (Two Parts of each question)
TOTAL MARKS DISTRIBUTION				85	17	36	32
TOTAL WEIGHTAGE			100 %	20 %	40 %	40 %	

Ziauddin University Examination Board

Grade: XI -Chemistry

Scheme of assessment

Maximum marks: 85

PAPER SETTING SCHEME FOR ANNUAL 2023 EXAMINATION

SECTION A (MULTIPLE CHOICE QUESTIONS) 20 %

OBJECTIVES

Total Marks: 17

It consists of

- Multiple choice questions ===== 17 MCQs
- Given MCQs will be = 17 MCQs
- All MCQs to be answered

SECTION "B" (SHORT ANSWER QUESTIONS) 40 %

SUBJECTIVE

Total Marks: 36

- It consists of **14** Questions.
- To attempt **09 (Nine)** questions (**9 x 4 = 36**)
- **Note:** Each question carry **04** marks.

SECTION "C" (DETAILED ANSWER QUESTIONS) 40 %

SUBJECTIVE

Total Marks: 32

- It consists of **Three** questions
- To attempt **02** questions (**2 x 16 = 32**)
- Each question consists of **Two** parts (a & b)
- **Note:** Each part carry **08** marks.

BLOOMS TAXONOMY WITH EXAMPLES

Conclusion

If you are a teacher looking for ways to engage your students in learning, this LIST of questions might be interesting for your classroom practice. Bloom's Taxonomy question stems can help elicit higher-order thinking skills and promote critical thinking among learners at different taxonomy levels. These question stems can also encourage students to think about their knowledge through reflection before answering questions.

ACTION WORDS FOR COGNITIVE LEVELS

Knowledge	Understand	Apply	Analyze	Evaluate	Create
	 <small>UNDERSTAND</small>				
define	explain	solve	analyze	reframe	design
identify	describe	apply	appraise	criticize	compose
describe	interpret	illustrate	judge	evaluate	create
label	paraphrase	modify	support	order	plan
list	summarize	use	compare	compare	combine
name	classify	calculate	decide	classify	formulate
state	compare	change	discriminate	contrast	invent
match	differentiate	choose	recommend	distinguish	hypothesize
recognize	discuss	demonstrate	summarize	infer	substitute
select	distinguish	discover	assess	separate	write
examine	extend	experiment	choose	explain	compile
locate	predict	relate	convince	select	construct
memorize	associate	show	defend	categorize	develop
quote	contrast	sketch	estimate	connect	generalize
recall	convert	complete	grade	differentiate	integrate
reproduce	demonstrate	construct	measure	divide	modify
tabulate	estimate	dramatize	predict	order	organize
tell	express	interpret	rank	prioritize	prepare

Copy	identify	manipulate	score	survey	produce
discover	indicate	paint	select	calculate	rearrange
duplicate	infer	prepare	test	conclude	rewrite
enumerate	relate	teach	argue	correlate	adapt
listen	restate	act	conclude	deduce	anticipate
observe	select	collect	consider	devise	arrange
omit	translate	compute	critique	diagram	assemble
read	ask	explain	debate	dissect	choose
recite	cite	list	distinguish	estimate	collaborate
record	discover	operate	editorialize	evaluate	facilitate
repeat	generalize	practice	justify	experiment	imagine
retell	group	simulate	persuade	focus	intervene
visualize	illustrate	transfer	rate	illustrate	make
	judge	write	weigh	organize	manage
	observe			outline	originate
	order			plan	propose
	report			question	simulate
	represent			test	solve
	research				support
	review				test
	rewrite				validate
	show				



MODEL PAPER 2023

GRADE: XI

SUBJECT: CHEMISTRY

Annual Examination 2023
PRE-ENGINEERING / PRE-MEDICAL

Total Time 3 hour.

Total Marks

85

Time: 30 min

Section 'A' M.C.Qs (Multiple Choice Question)

Marks: 17

Note: This section consists of 17 questions. Attempt all M.C.Qs. Each carries 1 marks.

Q 1: Choose the correct answers for each from the given options:

1. Rate of reaction depends upon:

- a. Concentration
- b. Temperature
- c. Catalyst
- d. All of these

2. What is the pOH of a solution if pH is 8?

- a. 6
- b. 7
- c. 8
- d. 9

3. The sp^3 hybrid orbital are:

- a. Non-polar
- b. Co-planer
- c. Linear
- d. None of these

4. Which of the following compound does not contain dipole moment?

- a. NH_3
- b. HCl
- c. CCl_4
- d. H_2O

5. The amount of heat required to convert one mole of solid directly into gaseous state is called:

- a. Heat of vaporization
- b. Heat of formation
- c. Heat of Sublimation
- d. Heat of Neutralization

6. 3.01×10^{23} molecules of oxygen gas at S.T.P occupy a volume of:

- a. 22.4 dm^3
- b. 224 dm^3
- c. 11.2 dm^3
- d. 2.24 dm^3

- 7. In electrolytic cell the cathode is the electrode where:**
- Oxidation occurs
 - Reduction occurs
 - Both Oxidation and Reduction
 - Neutralization occurs
- 8. When $\alpha = \beta = \gamma$, $\alpha = \beta = \gamma = 90^\circ$ the crystal structure is:**
- Tetragonal
 - Monoclinic
 - Triclinic
 - cubic
- 9. 1 calorie equal to _____ Joule.**
- 4.31
 - 0.04
 - 4.98
 - 4.0
- 10. The factor $E + PV$ is known as _____.**
- Heat content
 - Change in Enthalpy
 - Work done
 - None of these
- 11. A very high value of K_c indicates that product are _____.**
- very stable
 - very unstable
 - Moderately stable
 - None of these
- 12. During balancing the equation by ion electron method, charge is balanced by:**
- H^+
 - $-OH$
 - Ion
 - Electrons
- 13. Principal and azimuthal quantum number values for 3d orbital are:**
- $n=3, l=1$
 - $n=2, l=1$
 - $n=3, l=2$
 - $n=3, l=0$
- 14. The sum of mole fraction is always equal to:**
- one
 - Two
 - Three
 - Zero
- 15. Under similar condition CH_4 gas diffuse _____ times faster than SO_2 gas.**
- 1.5 times
 - 2 times
 - 4 times
 - 16 times
- 16. The properties of solution which depends upon the no. of particles of solute are called**
- Colligative properties
 - Intensive properties
 - Qualitative properties
 - Physical properties
- 17. Hydrogen bond is not found in:**
- H_2O
 - CH_4
 - NH_3
 - HF

X-----X-----X



MODEL PAPER 2023

GRADE: XI

SUBJECT: CHEMISTRY

Annual Examination 2023

PRE-ENGINEERING / PRE-MEDICAL

Time: 1 hour 30 min.

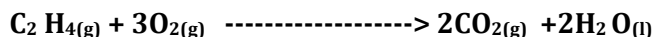
Max. Marks: 68

Section 'B' (Short Answer Questions)

Note: Attempt any Nine (09) questions from this section. All questions carry equal marks.

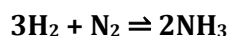
Max Marks: 36

1. Complete the combustion of C_2H_4 in the give reaction



Calculate the mass of CO_2 when **10g** of C_2H_4 burned completely with **24g** of oxygen.

2. Ammonia is manufactured from hydrogen & nitrogen by the Haber process.



If **23g** of ammonia is produced from **23g** of hydrogen then what is the percentage yield?

3. Calculate the wave number of an electron when it jump from 4^{th} orbit to P-fund series. ($R_H = 1.0967 \times 10^7 \text{ m}^{-1}$)
4. Write the main postulates of any **One (01)** of the following theories.
- Molecular orbital theory (MOT)
 - Valance bond theory (VBT)
 - Valance shell electron pair repulsion theory (VSEPR)
5. State Boyle's & Charle's law. Also derive the relation for general gas equation.

OR

1.40 dm³ volume of a gas collected over a hydrogen gas at a temperature of 27 °C and pressure of 900 torr. Calculate the mass of dry hydrogen gas at STP. (Vapour pressure of gas at 27 °C is 21 torr.)

6. Define hydrogen bonding. Also write any five (05) applications of hydrogen bonding.
7. Define any **four** of the following.
- Anisotropy
 - Isomorphism
 - Polymorphism
 - Crystalline solid
 - Amorphous solid

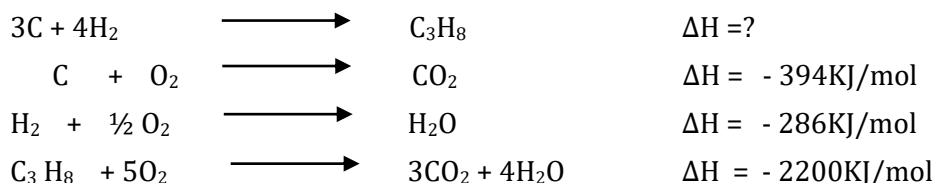
- Ionic radius
- State Le-Chatelier's principle. Explain the industrial application of Le-Chatelier's principle using Haber's Process or contact process.
 - Define buffer solution. Write any four application of buffer solution.
 - Find the Rate law, order of reaction and rate constant from the following data.



S. no	Conc [$\text{CH}_3\text{COOC}_2\text{H}_5$]	Conc [H_2O]	Rate (Ms^{-1})
1	0.1	0.1	4×10^{-3}
2	0.2	0.1	16×10^{-3}
3	0.1	0.2	4×10^{-3}

- A solution is prepared by mixing **46g** ethanol & **180g** water calculate the mole fraction of both components.
- What do ideal and non-ideal solution mean? State Raoult law and derive its Mathematical expression.
- Give the oxidation number of:
 - Cr in $\text{K}_2\text{Cr}_2\text{O}_7$
 - O in OF_2
 - Mn in MnO_4^{-1}
 - N in NCl_3

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



(Atomic masses: H = 1, N = 14, C = 12, , Na = 23, O = 16 $N_A = 6.02 \times 10^{23}$ R = 0.0821 atm.dm³/mol.K)

SECTION C

DETAILED-ANSWER QUESTIONS

NOTE: ATTEMPT ANY TWO (02) QUESTIONS FROM THIS SECTION.

M.Marks: 32

- (a) Write the main postulates of Bohr's atomic theory & Derive the relation for Radius **OR** Energy of **nth** orbit of a hydrogen atom.

$$r = \frac{n^2 h^2}{4\pi^2 m Z e^2}$$

- Draw the MOT diagram of N_2 molecule and also write its characteristics.

- (a) Define real & Ideal gas. Derive van der Waal equation for real gases by correcting volume & pressure.

- State the law of equilibrium. Derive the expression of K_c from the following reaction.



- (a) Define electrode potential. How can the electrode potential of **zinc (Zn)** electrode be determined by coupling it with S.H.E in the voltaic cell?

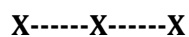
OR

Balance the following redox reaction by ion electron method.



(b) Define Born-Haber cycle. Explain the various step of Born- Haber cycle for the formation of CsF along with the graphical representation. Also find its lattice energy (ΔH_{LE})

$$\begin{aligned} \Delta H_f &= -553.3 \text{ KJ/mol} & \Delta H_s &= 76.5 \text{ KJ/mol} & \Delta H_{IE} &= 375.5 \text{ KJ/mol} & \Delta H_D &= 157 \text{ KJ/mol} \\ \Delta H_{EA} &= -328.2 \text{ KJ/mol} & \Delta H_{LE} &= ? \end{aligned}$$



**HSC PART I EXAMINATION
MARKS BREAKUP GRID FOR EXAMINATION 2023**

GROUP: PRE-MEDICAL

SUBJECT	THEORY	PRACTICAL	TOTAL
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	100	-	100
ISLAMIC EDUCATION /CIVICS	50	-	50
PHYSICS	85	15	100
CHEMISTRY	85	15	100
BIOLOGY	85	15	100
TOTAL	505	45	550

GROUP: PRE-ENGINEERING

SUBJECT	THEORY	PRACTICAL	TOTAL
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	100	-	100
ISLAMIC EDUCATION /CIVICS	50	-	50
PHYSICS	85	15	100
CHEMISTRY	85	15	100
MATHEMATICS	100	--	100
TOTAL	520	30	550

GROUP: COMPUTER SCIENCE/ GENERAL SCIENCE

SUBJECT	THEORY	PRACTICAL	TOTAL
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	100	-	100
ISLAMIC EDUCATION /CIVICS	50	-	50
PHYSICS	85	15	100
COMPUTER SCIENCE	75	25	100
MATHEMATICS	100	--	100
TOTAL	510	40	550

GROUP: COMMERCE (Private/Regular)

SUBJECT	THEORY	PRACTICAL	TOTAL
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	100	-	100
ISLAMIC EDUCATION /CIVICS	50	-	50
ECONOMICS	75	-	75
P.O.C	75	-	75
ACCOUNTING	100	--	100
BUSINESS MATHEMATICS	50		50
TOTAL	550	---	550

GROUP: HUMANITIES (Private/Regular)

(Any Three Elective)

SUBJECT	THEORY	PRACTICAL	TOTAL
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	100	-	100
ISLAMIC EDUCATION /CIVICS	50	-	50
COMPUTER STUDIES	75	25	100
ISLAMIC STUDIES	100		100
MATHEMATICS	100	-	100
SOCIOLOGY	100	--	100
ECONOMICS	100		100
EDUCATION	100		100
CIVICS	100		100
TOTAL	550	---	550