



ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

Secondary School Certificate (SSC)

Examination syllabus

CHEMISTRY X

**Based on Provincial revised curriculum
(Sindh)**

S. No.	Table of Contents	Page No.
1	Preface	03
2	Rationale for the reviewed Provincial Curriculum	04
3	Aims and Objectives of the subject of specific syllabus	5 - 6
4	Topics and Student Learning Outcomes of the Examination Syllabus Teaching-Learning Approaches and Classroom Activities Resource Material and e resources website Website: www.zueb.edu.pk	7 - 13
5	Scheme of Assessment	
6	Definition of Cognitive Levels and Command Words in the Student Learning Outcomes in Examination Papers	14 -18
7	SSC Scheme of Studies / Marks Breakup Grid	19

You can Approach us:

Address: Ziauddin University Examination Board
D / 20 Block 1 Clifton Karachi
Phone: 92 21 35148594
E-mail: info@zueb.edu.pk
Website: www.zueb.edu.pk

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.
- Curriculum for chemistry grades ix & x 2017 3
- 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:
 - 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:
 - Display respect for evidence, rationality and intellectual honesty given the number of
 - Emotive issues in the area of chemistry.
 - Showing capacities to communicate:
 - 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.
 - 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 member



EXAMINATION SYLLABUS WITH SCHEME OF ASSESSMENT

CHEMISTRY Syllabi Grade: X

UNITS	Students' learning outcomes: students should be able to :	Categorization			Marks Distribution			Total
		K	U	A	MCQs	CRQs	ERQs	
Unit: 1		Chemical Equilibrium Weightage 12%						
	Define chemical equilibrium in terms of a reversible reaction.		*		1			07
	Write both the forward and the reverse reactions and describe the macroscopic characteristics of each.			*				
	Define Law of mass action		*			3		
	Derive an expression for the equilibrium constant and its units			*		3		
	State the necessary conditions for equilibrium and the ways that equilibrium can be recognized		*					
	Describe the equilibrium constant expression of a reaction	*						
		Acid-Base & Salt Weightage 15 %						
Unit: 2	Define and give examples of Arrhenius acids and bases.		*		2			14
	Use the Bronsted-Lowry theory to classify substances			*		3		

	as acids or bases, or as proton donors or proton acceptors.							
	Classify substances as Lewis's acids or bases.			*				
	Write the equation for the self-ionization of water		*					
	Give the hydrogen ion or hydroxide ion concentration; classify a solution as neutral, acidic, or basic.			*		3		
	Compute and balance a neutralization reaction.			*				
	Define Buffers with examples		*					
	Define & Explain Salt its preparation & types		*				6	
Unit 3	Organic Chemistry Weightage 15%							
	Recognize structural, condensed, and molecular formulas of the straight chain hydrocarbons up to ten carbon atoms.	*			2			
	Identify some general characteristics of organic compounds.	*						14
	Explain the diversity and magnitude of organic compounds.		*					
	List some sources of organic compound	*						
	List the uses of organic compounds	*						
	Recognize and identify a molecule's functional groups	*				3		
	Distinguish between			*				

	saturated and unsaturated hydrocarbons.							
	Name the alkanes up to decane, alkenes up to decene and alkynes up to decynes	*						
	Differentiate, modify alkanes into alkyl radicals.			*			6	
	Define functional group.	*				3		
	Differentiate between different organic compounds on the basis of their functional groups.			*				
	Classify organic compounds into straight chain, branched chain and cyclic compounds.		*					

Unit 4

Weightage 11 % Biochemistry

	Describe the composition of carbohydrates		*		2			
	Distinguish between mono-, di- and tri-saccharides.		*					
	Describe the bonding in a protein molecule.		*					14
	Explain the sources and uses of carbohydrates, proteins, and lipids		*				6	
	Differentiate between fats and oil.			*		3		
	Describe the importance of nucleic acids.		*					
	Explain the types of nucleic acids (deoxyribonucleic acid (DNA) and ribonucleic acid (RNA)).		*					
	Describe the importance of nucleic acids.		*					

	Explain the types of nucleic acids (deoxyribonucleic acid (DNA) and ribonucleic acid (RNA)).		*					
	Define and explain vitamins and their importance.		*			3		

Unit 5

Environmental Chemistry I: The Atmosphere Weightage 10 %

	Define atmosphere		*					
	Explain composition of atmosphere		*		1	3		07
	Differentiate between stratosphere and troposphere			*				
	Summarize the components of stratosphere and troposphere.		*					
	Describe major air pollutants		*					
	Describe source and effects of air pollutants.		*					
	Explain ozone formation		*					
	Describe acid rain and its effects		*					
	Describe the ozone depletion and its effects		*				3	
	Describe global warming		*					

Unit 6

**Weightage 10 %
Environmental Chemistry II: Water**

	Describe the occurrence of water and its importance in the environment including Industry.		*		1			
	Review our dependence on water and the importance of maintaining its quality.			*				
	Describe the composition and properties of water.		*				3	

	Differentiate among soft, temporary and permanent hard water			*				07
	Describe methods for eliminating temporary and permanent hardness of water.			*				
	Identify water pollutants.			*				
	Describe the industrial wastes and household wastes as water pollutants		*					
	Describe the effects of water pollutants on life.		*				3	
	Describe the various types of water borne diseases		*					
<u>Analytical Chemistry Weightage 12 %</u>								
Unit 7								
	Explain the basic concepts of analytical chemistry.	*					1	10
	Define the qualitative and quantitative analysis.		*					
	To study the important parameters, errors, accuracy and precision.			*				
	Differentiate the classical and instrumental methods.			*				
	Define the spectroscopic methods such as ultra-violet and visible spectroscopy, infrared spectroscopy.		*					
	Define the chromatographic methods such as high-performance liquid chromatography and gas chromatography.		*				6	
	Define the electrochemical methods such as		*			3		

	potentiometry and conductometry.							
	Students will be able to understand the new methods, scientific investigation; they will also be able to communicate their findings using a variety of conventional and advanced technology in the field of analytical chemistry.			*				
<u>Unit 8 Chemical Industries Weightage 15 %</u>								
	Know different products prepared in industry.	*			2			11
	Know about saponification process (soap).	*					6	
	Explain different materials required for soap preparation.		*					
	Construct the flow chart diagram of full process of soap formation.			*				
	Describe the preparation of sugar from cane sugar.			*				
	Describe the various steps of sugar formation		*					
	Know about composition of different soft drinks such as Pepsi, dew, 7-up and coca cola.			*				
	Explain various components and differences in different soft drinks.			*				
	Explain about the importance of pharmaceutical industries.			*		3		
	Explain about various operations carried out in industry.			*				

	Account for quality control for medicines and their importance.			*				
	Generalize the relation between chemistry and carrier for various industries.	*						
	Define petroleum	*						
	Describe the formation of petroleum and natural gas.			*				
	Describe the composition of petroleum			*				
	Describe briefly the fractional distillation of petroleum.			*				

Unit no.	weightage	Knowledge	understanding	Application
1	12	1	3	2
2	15	1	2	4
3	15	7	2	3
4	11	-	9	1
5	10	1	8	1
6	10	-	5	4
7	12	1	6	3
8	15	4	5	7
Total	100	15	39	25

Unit no.	MCQs	CRQs	ERQs	Total
1	1	3+3	-----	07
2	2	3+3	6	14
3	2	3+3	6	14
4	2	3	6	11
5	1	3	3	07
6	1	3	3	07
7	1	3	6	10
8	2	3	6	11

DEFINITIONS OF COGNITIVE LEVELS

Remember

Remembering is the act of retrieving knowledge and can be used to produce things like definitions or lists. The student must be able to recall or recognise information and concepts. The teacher must present information about a subject to the student, ask questions that require the student to recall that information and provide written or verbal assessment that can be answered by remembering the information learnt.

Question Stems

- Can you name all the ...?
- Describe what happens when ...?
- How is (are) ...?
- How would you define ...?
- How would you identify ...?
- How would you outline ...?
- How would you recognise...?
- List the ... in order.
- What do you remember about ...?
- What does it mean?
- What happened after?
- What is (are) ...?
- What is the best one?
- What would you choose ...?
- When did ...?
- Where is (are) ...?
- Which one ...?
- Who spoke to ...?
- Who was ...?
- Why did ...?

Understand

The next level in the taxonomic structure is Understanding, which is defined as the construction of meaning and relationships. Here the student must understand the main idea of material heard, viewed, or read and interpret or summarise the ideas in their own words. The teacher must ask questions that the student can answer in their own words by identifying the main idea.

Question Stems

- Can you clarify...?
- Can you illustrate ...?
- Condense this paragraph.
- Contrast ...
- Does everyone think in the way that ... does?
- Elaborate on ...
- Explain why ...
- Give an example
- How can you describe
- How would you clarify the meaning
- How would you compare ...?
- How would you differentiate between ...?
- How would you describe...?
- How would you generalise...?
- How would you identify ...?
- Is it valid that ...?
- Is this the same as ...?
- Outline ...
- Select the best definition
- State in your own words
- This represents ...
- What are they saying?
- What can you infer from ...?
- What can you say about ...?
- What could have happened next?
- What did you observe?

	<ul style="list-style-type: none"> • What does this mean? • What expectations are there? • What information can you infer from...? • What is the main idea of ...? • What restrictions would you add? • What seems likely? • What seems to be ...? • What would happen if ...? • What would happen if ...? • Which are the facts? • Which statements support ...?
<p>Apply</p> <p>The third level in Bloom’s taxonomy, Applying, marks a fundamental shift from the pre-Bloom’s learning era because it involves remembering what has been learnt, having a good understanding of the knowledge, and applying it to real-world exercises, challenges or situations. Students must apply an abstract idea in a concrete case to solve a problem or relate it to prior experience. The teacher must provide opportunities for students to use theories and problem-solving techniques in new situations and review and check their work. Assessment questions should be provided that allow students to define and solve problems.</p> <p>Question Stems</p> <ul style="list-style-type: none"> • Can you group by characteristics such as ...? • Choose the best statements that apply • Clarify why ... • Do you know of another instance where ...? • Draw a story map • Explain why a character acted in the way that he did • From the information given, can you develop a set of instructions about ...? • How could you develop ...? • How would you change ...? • How would you demonstrate...? 	<p>Analyse</p> <p>Analysing is the cognitive level where students can take the knowledge they have remembered, understood and applied, then delve into that knowledge to make associations, discernments or comparisons. Students should break down a concept or idea into parts and show relationships between these parts. Teachers must give students time to examine concepts and their requisite elements. Students are required to explain why they chose a solution.</p> <p>Question Stems</p> <ul style="list-style-type: none"> • Can you distinguish between ...? • Can you explain what must have happened when ...? • Determine the point of view, bias, values, or intent underlying the presented material • Discuss the pros and cons of ... • How can you classify ... according to ...? • How can you compare the different parts? • How can you sort the different parts...? • How is ... connected to ...? • How is ... similar to ...? • How would you categorise...? • How would you explain ?

<ul style="list-style-type: none"> • How would you develop ... to present ? • How would you explain ...? • How would you modify ...? • How would you present...? • How would you solve ... ? • Identify the results of ... • Illustrate the ... • Judge the effects of ... What would result ...? • Predict what would happen if ... • Tell how much change there would be if ... • Tell what would happen if ... • What actions would you take to perform ...? • What do you think could have happened next? • What examples can you find that ? • What other way would you choose to ...? • What questions would you ask of ...? • What was the main idea ...? • What would the result be if ...? • Which factors would you change if ...? • Who do you think...? • Why does this work? • Write a brief outline ... • Write in your own words ... 	<ul style="list-style-type: none"> • If ... happened, what might the ending have been? • State the point of view of ... • What are some of the problems of ...? • What assumptions ...? • What can you infer about...? • What can you point out about ? • What conclusions ...? • What do you see as other possible outcomes? • What does the author assume? • What explanation do you have for ...? • What ideas justify the conclusion? • What ideas validate...? • What is the analysis of ...? • What is the function of ...? • What is the problem with ...? • What motive is there? • What persuasive technique is used? • What statement is relevant? • What was the turning point? • What were some of the motives behind ...? • What's fact? Opinion? • What's the main idea? • What's the relationship between? • Which events could not have happened? • Why did ... changes occur? • Why do you think ?
--	---

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				

**SSC PART II EXAMINATION
MARKS BREAKUP GRID FOR EXAMINATION 2023**

SCIENCE GROUP:

SUBJECT	THEORY	PRACTICAL	TOTAL
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	75	-	75
PAKISTAN STUDIES	75	-	75
PHYSICS	60	15	75
CHEMISTRY	60	15	75
BIOLOGY	60	15	75
MATHEMATICS	75	-	75
TOTAL	505	45	550

COMPUTER SCIENCE GROUP:

SUBJECT	THEORY	PRACTICAL	TOTAL
ENGLISH	100	-	100
URDU NORMAL/SINDHI NORMAL	75	-	75
PAKISTAN STUDIES	75	-	75
PHYSICS	60	15	75
CHEMISTRY	60	15	75
COMPUTER STUDIES	60	15	75
MATHEMATICS	75	-	75
TOTAL	505	45	550

GENERAL GROUP:

SUBJECT	THEORY	PRACTICAL	TOTAL
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	75	-	75
PAKISTAN STUDIES	75	-	75
GENERAL SCIENCE	75	-	75
GENERAL MATH	75	-	75
EDUCATION	75	-	75
ECONOMICS	75	-	75
CIVICS	75	-	75
ISLAMIC STUDIES	75	-	75
TOTAL	550	-	550