ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

Secondary School Certificate (SSC)

Examination syllabus

CHEMISTRY
IX

Based on Provincial Revised Curriculum (Sindh)

You can approach us:

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PREFACE

The Ziauddin University Examination Board (ZUEB) was established under **Sindh ACT XLI 2018**, with the primary objective of enhancing the quality of education in Sindh. ZUEB is responsible for administering examinations for the **Secondary School Certificate (SSC)** and **Higher Secondary School Certificate (HSSC)** in alignment with the most recent revisions to the **National Curriculum**, as outlined by the **Directorate of Curriculum Assessment and Research (DCAR), Sindh**. Through its ordinance, ZUEB is mandated to provide examination services for both English, Urdu, and Sindhi medium candidates from private schools across Sindh. This examination syllabus reflects ZUEB's dedication to achieving the educational goals set by the provincial authorities.

In collaboration with subject professors, ZUEB has developed a comprehensive syllabus for each subject. It is important to distinguish between the syllabus and the curriculum. The syllabus serves as a guide for both teachers and students, outlining the key areas of focus within the subject. It provides students with a clear understanding of what is expected of them in their studies and helps them prepare effectively for their exams.

This examination syllabus incorporates all cognitive outcomes derived from the **Provincial Curriculum Statement**, ensuring that assessments are both valid and reliable. While the focus is primarily on the cognitive domain, significant emphasis is placed on the application of knowledge and understanding.

The syllabus is made available to all stakeholders via the ZUEB website to assist affiliated schools in planning their teaching. It is crucial to note that the syllabus, rather than the prescribed textbook, forms the foundation of ZUEB examinations. Additionally, this syllabus supports the development of learning materials for both students and teachers. ZUEB remains committed to supporting students undertaking the SSC and HSSC courses by facilitating their learning outcomes through this detailed syllabus document.

To further assist in the learning process, ZUEB provides a dedicated **e-resource tab** on its website, offering both text-based and video content on various subjects. These 15-20 minute instructional videos, created around key subject concepts, allow students to learn at their own pace and convenience. The videos can be used as a reinforcement tool to revisit lessons already taught or as pre-lesson material. This initiative is an ongoing effort, and new videos will continue to be uploaded.

We encourage all students and educators to make the most of these resources for a more enriched and flexible learning experience.

Sincerely,

Shahbaz Nasim
Head – Measurement & Testing
Ziauddin University Examination Board

Reviewed by Sana Anwer Ali
Manager Sciences
Ziauddin University Examination Board
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Rationale For The Reviewed Provincial Curriculum

The process of revising the National Curriculum 2006 began in August 2004, when the newly elected government of Pakistan initiated education reforms across the country. These reforms included the introduction of a new National Education Policy, a National Education Census, and a revision of curricula (Ministry of Education, 2009).

In practice, the overhaul of the secondary school curriculum began in 2006, leading to a review of the scheme of studies for classes I to XII and the revision of curricula for 25 compulsory subjects.

The 18th Amendment to the Constitution of Pakistan, enacted in 2010, significantly altered the federal-provincial relationship by abolishing the "concurrent legislative list." This amendment granted provinces greater legislative and financial autonomy in sectors such as education and health. The most notable implication of the 18th Amendment for education was the transfer of responsibility for curriculum development, syllabus planning, policy formation, and educational standards to the provinces, marking a significant step forward for education.

In Sindh, the School Education Department tasked a Curriculum Review Team with revising the National Curriculum 2006 for all subjects. The goal was to create a curriculum better suited to the needs of students and teachers while aligning with the principles of the 18th Amendment. Subject-specific curriculum review committees were established to critically examine and align the curriculum's content, both contextually and textually, ensuring coherence across various subjects. The Bureau of Curriculum (BoC) played a crucial role in organizing workshops and meetings in Hyderabad to facilitate the completion of this task. The support of numerous educationists, researchers, and teachers was invaluable in successfully revising the curriculum.

The revised National Curriculum, along with the original version, is available on the DCAR website at https://dcar.gos.pk/Sindh-Curriculum/Chemistry%20Curriculum%20Grade%20IX-X%20Revised%202017.pdf for easy access.

The Ziauddin University Examination Board (ZUEB) SSC and HSSC syllabi are developed in accordance with the Sindh Revised Curriculum. To date, textbooks for various subjects have been developed based on 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:

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.
- share the responsibility for achieving the group task.
- show concern for the fullest possible involvement of each group member.

DETAILED SYLLABUS

	SLOs	Categorization		
	Students should be able to:	**K**	**U**	**A**
UNIT 1 Fundamentals Of Chemistry	• Know the historical background of chemistry.	*		
	• Explain the contribution of Muslim scientists in the development of chemistry.		*	
	• Define chemistry and explain its importance in daily life.			*
	• Identify and explain different branches of chemistry with the help of examples.			*
	• Differentiate between main branches of chemistry.		*	
	• Distinguish between matter and a substance.			*
	• Define ions, molecular ions, formula units and free radicals.	*		
	• Define atomic number, atomic mass and atomic mass unit.	*		
	• Differentiate among element, compound and mixture.			*
	• Define relative atomic mass based on C-12.	*		
	• Differentiate between empirical and molecular formula.		*	
	• Classify the chemical species from the given examples.		*	
	• Distinguish between atoms and ions, molecule and molecular ions, ions and free radicals.			*
	• Describe molecules and types of molecules		*	
	• Relate gram atomic mass, gram molecular mass and gram formula mass to mole.			*
	• Describe how Avogadro's number is related to the mole of any substance.		*	
	• Identify the chemical equation in terms of moles.		*	
	• Calculation with balance equation using mole representative particles masses.			*
	• Distinguish the terms gram atomic mass, gram molecular mass and gram formula mass.			*
	• Change atomic mass, molecular mass and formula mass into gram mass, gram molecular mass and gram formula mass.			*

	Students will be able to:	K	U	A
UNIT 2 Atomic Structure	• Describe the discovery of electron, proton and neutron.		*	
	• Define atomic number (Z), mass number (A) in term of number of proton and/or neutron and how they are related.	*		
	• Describe the contributions Rutherford made to the development of the atomic theory.			*
	• Explain how Bohr's atomic model is different.			*
	• Define modern theories of atomic structure (De Broglie Hypothesis and Schrodinger atomic model)	*		
	• Describe the presence of sub shells in a shell.		*	
	• Distinguish between shells and sub shells.		*	
	• Write the electronic configuration of the first 18 elements in the Periodic Table.	*		
	• Define and compare isotopes of an atom.			*
	• Discuss the properties and examples of the isotopes of the H, C, Cl and U.		*	
	• Draw the structure of different isotopes from mass number and atomic number.			*
	• State the importance and uses of the isotopes in various fields of life.	*		

	Students will be able to:	K	U	A
UNIT 3 Periodic Table& Periodicity Of Properties	• State the periodic law.	*		
	• Distinguish between a period and a group in the periodic table.		*	
	• Classify the elements (into two categories: groups and periods) according to the configuration of their outer most electrons.			*
	• Determine the demarcation of the periodic table into an s-block, p- block, d-block and f-block.	*		
	• Construct the shape of the periodic table.			*
	• Determine the location of families on the Periodic table		*	
	• Describe and explain periodicity of properties.		*	

	• Recognize the atomic size and atomic radius of different elements.			*
	• Define ionization potential and the factor it depends on.		*	
	• Define electron affinity.	*		
	• Explain how the shielding effect influences periodic trends.		*	
	• Describe electronegativity, what is its trend within a group and within a period in the periodic table.		*	

	Students will be able to:	**K**	**U**	**A**
UNIT 4 Chemical bonding	• Explain why do atoms form chemical bonds.		*	
	• Describe how formation of bond take place.		*	
	• Define and describe the different types of bonds.		*	
	• Explain how ionic bonds form.		*	
	• Define covalent bond and its types.	*		
	• Explain dative covalent bonds (coordinate covalent bonds).		*	
	• Differentiate between polar and non-polar bonds.		*	
	• Explain with the help of diagram how metallic bonds are formed.			*
	• Explain intermolecular forces.		*	
	• Describe with the e.g. of HCl how Dipole-Dipole interactions takes place.		*	
	• Define hydrogen bonding and explain it with the help of HF.		*	
	• Understand that the properties of compound depend upon the nature of its bonding.		*	
	• Understand ionic compounds and their properties.		*	
	• Understand covalent compounds and their properties.		*	
	• Compare covalent and coordinate covalent compounds.		*	
	• Differentiate between polar and non-polar compounds.		* *	
	• Explain metals with their properties.		*	

	Students will be able to:	K	U	A
Unit 5 Physical States of Matter	• Compare the physical states of matter with reference to intermolecular forces present between them. • Understand the characteristics Boltzmann, Maxwell and Kelvin observed on the gaseous state. • Differentiate between diffusion and effusion. • Explain the behavior of gases in terms of pressure, compressibility, mobility and density. • Explain why the density of gas increase on cooling. • State the unit of density in gas. • State Boyle's Law and express the relationship Boyle`s establishes between pressure-volume changes in a gas at constant temperature. • Calculate volume, temperature and pressure numerically. • Account for temperature volume changes in a gas using Charles's Law. • Understand the characteristics of liquid according to kinetic molecular theory. • Explain the properties of liquids in detail (evaporation, vapor pressure, freezing and boiling point, diffusion, mobility and density). • Understand the characteristics of solids according to kinetic molecular theory. • Explain the properties of solids in detail (melting point, rigidity and density) • Differentiate between amorphous and crystalline solids. • Explain the allotropic forms of solids. • Define the plasma state with help of examples. • Define Bose Einstein Condensate with help of example.	* * *	* * * * * * * * * * * * *	* * *

	Students will be able to:	K	U	A
UNIT 6 Solution	• Define the following terms: solution, aqueous solution, solute and solvent and give an example of each. • Explain the difference between saturated, unsaturated and supersaturated solutions. • Understand dilution of solution and prepare dilute solution numerically. • Calculate Percentage; mass by mass, volume by mass, by mass and by volume. • Understand molarity		* * * *	* *

	• Solve mathematical problems based on molarity of solutions • Describe how to prepare a solution of given molarity. • Convert between the Molarity of a solution and its concentration in g/dm^3. • Define solubility and understand the general principles of solubility. • Understand the connection between solute-solvent interaction and solubility. • Differentiate between solutions, suspensions and colloids.		* * * * * *	

	Students will be able to:	**K**	**U**	**A**
<u>Unit 7</u> Electrochemistry	• Define oxidation and reduction • Explain oxidation and reduction in terms of loss or gain of electrons. • Define Electrochemical cell and its application. • Explain the concept of electrolyte and electrolysis with example. • Sketch an electrolytic cell, label the cathode and the anode. • Describe Faraday's law of Electrolysis and solve its numerical. • List the possible uses of an electrolytic cell. • Sketch a Danniell cell, labeling the cathode, the anode, and the direction of flow of the electrons. • Distinguish between electrolytic and galvanic cells. • Define corrosion. • Describe rusting of iron as an example of corrosion. • Summarize the methods used to prevent corrosion. • Explain electroplating of metals on steel (using examples of zinc, tin, silver and chromium plating). • Describe how a battery produces electrical energy.	* * * * * * *	* * * * * * * *	* *

	Students will be able to:	K	U	A
UNIT 8 Chemical Reactivity	• Classify elements into metals, non-metals and metalloids.		*	
	• Draw flow chart diagram of classification of metals, non-metals and metalloids.			*
	• Show how cations and anions are related to the terms metals and non-metals.		*	
	• Identify elements as an alkali metal or an alkaline earth metal.		*	
	• Analyze why alkali metals are not found in the free state in nature.			*
	• Explain the differences in ionization energies of alkali and alkaline earth metals.		*	
	• Describe the position of sodium in Periodic table, its simple properties and uses.			*
	• Describe the position of calcium and magnesium in periodic table, their properties and uses.		*	
	• Differentiate between soft and hard metals (Iron and Sodium).		*	
	• Describe the inertness of noble metal.		*	
	• Identify the commercial value silver, gold and platinum.			*
	• Compile some important reactions of halogens.			*
	• Name some elements, which are found in uncombined state in nature.	*		

GRADE 9 CHEMISTRY
PBA Sample Questions

1. Matter exists as compound, mixture and elements.
   Which row correctly identifies an element, a compound, and a mixture?

	Element	Compound	Mixture
A	Calcium is an element because it is in the periodic table	Potassium chloride is a compound formed by the chemical combination of potassium and chlorine	Sodium chloride is a mixture formed by the chemical combination of Sodium and Chlorine
B	Brass is an element because it is made up of Copper and Zinc	Sodium chloride is a compound formed by the chemical combination of Sodium and Chlorine	Air is a mixture formed by the physical combination of Nitrogen, Oxygen and other gases
C	Calcium is an element because it is in the periodic table	Sodium chloride is a compound formed by the chemical combination of Sodium and Chlorine	Brass is a mixture because it is made up of Copper and Zinc
D	Sodium chloride is an element because it is chemically made of Sodium and Chlorine	Water is a compound formed by the chemical combination of Hydrogen and Oxygen	Potassium Chloride is a mixture formed by the chemical combination of Potassium and Chlorine

Correct answer: C

2. X and Y are atoms.
   - X and Y have the same number of electron shells.
   - X and Y have the same number of outer electrons.
   - X and Y have different mass numbers.

   Which statements about X and Y are correct?

1	X and Y are isotopes.
2	X and Y have the same total number of electrons.
3	X and Y have the same chemical properties.

A. 1, 2 and 3 B. 1 and 2 only C. 1 and 3 only D. 2 and 3 only

Correct answer: A

3. What is the percentage, by mass of nitrogen in the fertilizer $(NH_4)_3P0_4$?

Element	M_R
H	1
N	14
O	16
P	31

A. 149 B. 41 C. 28 D. 120

Correct answer: C

4. The equation for the burning of hydrogen in oxygen is shown.

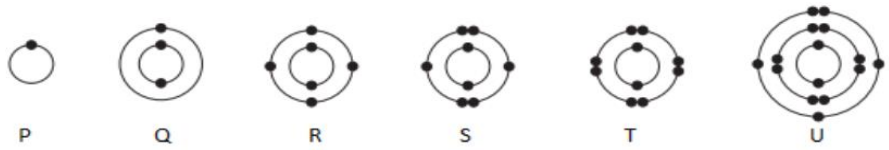
$$2H_2 + O_2 \rightarrow 2H_2O$$

What does this equation indicate?

A	2 atoms of hydrogen combine with 2 atoms of oxygen.
B	2g of hydrogen combines with 1 g of oxygen.
C	2 moles of steam can be obtained from 0.5 mole of oxygen.
D	2 moles of steam can be obtained from 1 mole of oxygen.

Correct answer: D

5. The diagram shows the electronic structures of six different atoms.

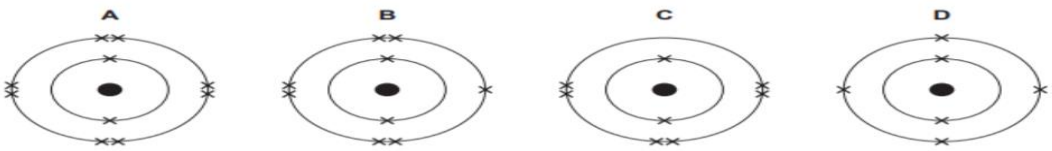


Which one of the following is Hydrogen and Phosphorus?

A. P and U B. Q and S C. T and U D. P and Q

Correct answer: A

6. Which diagram shows the electronic structure that makes 4 bonds with Hydrogen?



Correct answer: D

7. The symbols for the three isotopes of hydrogen are: H^1 H^2 H^3

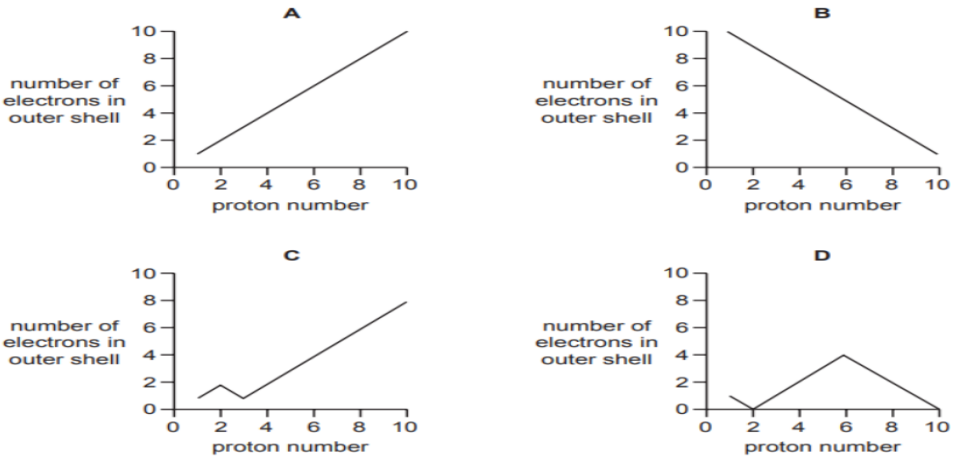
	Isotope		
	^1H	^2H	^3H
number of protons	1	P	1
number of neutrons	0	1	Q
number of electrons	R	1	1

What is the value of P, Q and R?

A. 1, 2 and 1 B. 0, 1 and 1 C. 1, 1 and 1 D. 2,1 and 0

Correct answer: A

8. Which graph shows electrons in the outer shell of an atom, plotted against proton (atomic) number for the first 10 elements of the periodic table?



Correct answer: C

9. The table shows some properties of some of the elements in Group I of the Periodic Table.

element	melting point / °C	reaction with water
lithium	181	fizzes steadily
sodium	98	fizzes vigorously
potassium	64	fizzes very vigorously

Rubidium is also an element in Group I of the Periodic Table. Which row describes the properties of rubidium?

	melting point / °C	reaction with water
A	39	fizzes slowly
B	39	fizzes explosively
C	81	fizzes very vigorously
D	81	fizzes explosively

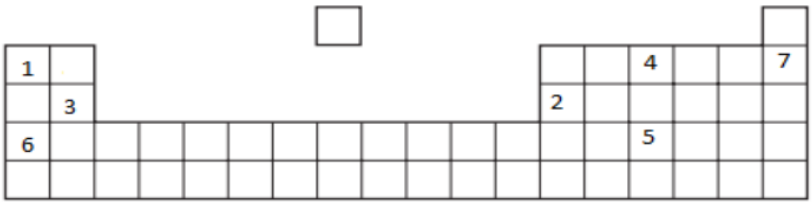
Correct answer: B

10. Element X forms ions with the formula X^{2-}
Which row describes element X?

	group number	type of element
A	II	metal
B	II	non-metal
C	VI	metal
D	VI	non-metal

Correct answer: D

11. Part of the periodic table is shown.
Which element has two electrons in its outermost shell and three electron shells?



A. 1 only B. 3 only C. 4 and 5 D. 2,6 and 7

Correct answer: B

12. Three properties of element X are listed.

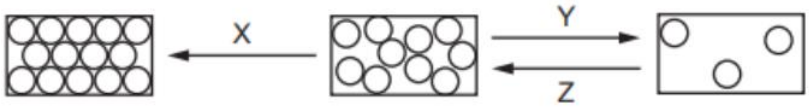
- It contains atoms with a full outer shell of electrons.
- It is monoatomic.
- It is unreactive

In which part of the Periodic Table is the element placed?

A	Group I
B	Group VII
C	Group VIII
D	Transition Elements

Correct answer: C

13. The three rectangles show the arrangements of the particles in each of the three states of matter.
X, Y and Z represent the processes needed to change from one state to another.

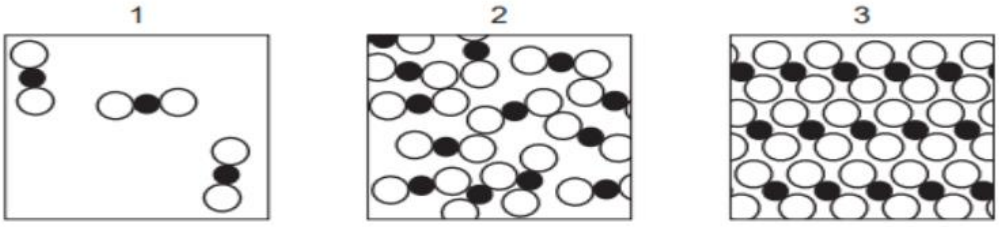


What are the processes X, Y and Z?

	X	Y	Z
A	melting	condensing	evaporating
B	evaporating	melting	freezing
C	melting	freezing	condensing
D	freezing	evaporating	condensing

Correct answer: D

14. Diagrams of the three states of matter for carbon dioxide are shown.



Which two diagrams show the states of matter before and after the sublimation of carbon dioxide?

A. 2 to 1 B. 2 to 3 C. 3 to 1 D. 3 to 2

Correct answer: C

15. The melting points and boiling points of three elements, at 1 atm pressure, are shown.

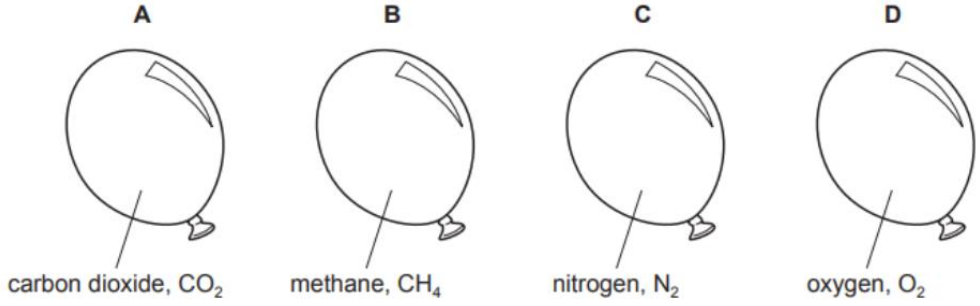
	melting point / °C	boiling point / °C
argon	–189	–186
nitrogen	–210	–196
oxygen	–218	–183

Separate samples of argon, nitrogen and oxygen are stored at –200 °C and at 1 atm pressure. How many samples are liquids?

A. 0 B. 1 C. 2 D. 3

Correct answer: C

16. An inflated balloon goes down because gas molecules diffuse through rubber. Four balloons are filled with different gases at the same temperature and pressure. Which balloon would go down quickest?



Correct answer: B

17. Tyndall Effect is the scattering of light through a solution whose particle size is between 1nm to 1 μm. Which of the following shows the Tyndall Effect?

A	Milk because it is colloidal solution
B	Sugar Solution because it is a viscous solution
C	Aqueous Sodium Chlorine because it is a true solution
D	Sand in water because it is suspension

Correct answer: A

18. What are the **Moles & Molarity** of a 49 g/dm³ solution of H_2SO_4?

M_r of H_2SO_4 = 98 g/mol

A	0.5 mole and 0.25 M
B	1 mole and 0.5 M
C	1 mole and 1 M
D	0.5 mole and 0.5 molar

Correct answer: D

19. Which of the following solutions has the highest **% by volume** of ethanol?

	Volume of ethanol	**Volume of Solvent**
A	10 cm³ ethanol	90 cm³ water
B	25 cm³ ethanol	75 cm³ water
C	40 cm³ ethanol	60 cm³ water
D	50 cm³ ethanol	150 cm³ water

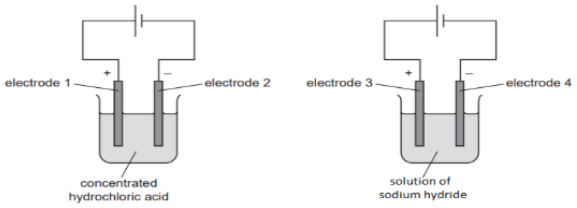
Correct answer: C

20. Solution is made up of solute and solvent. Which type of solution is Butter?

	Solute	**Solvent**
A	Liquid	Liquid
B	Solid	Gas
C	Solid	Liquid
D	Liquid	Solid

Correct answer: D

21. The diagram shows the electrolysis of concentrated hydrochloric acid and concentrated aqueous sodium hydride using carbon electrodes.



At which electrodes is hydrogen produced?

A. electrode 1 only
B. electrodes 1 and 3
C. electrode 2 only
D. electrodes 2 and 3

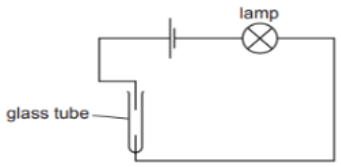
Correct answer: D

22. What are the products at the electrodes when dilute sulfuric acid is electrolyzed using inert electrodes?

	anode	cathode
A	hydrogen	oxygen
B	oxygen	hydrogen
C	sulfur	oxygen
D	sulfur dioxide	hydrogen

Correct answer: D

23. The diagram shows an incomplete circuit.



Which substance causes the lamp to light when added to the glass tube?

A	Aqueous Sodium chloride
B	Aqueous Sugar
C	Solid Sodium Chloride
D	Solid Sugar

Correct answer: A

24. What are the electrode products when molten silver iodide is electrolyzed between inert electrodes?

	Cathode	**Anode**
A	hydrogen	iodine
B	iodine	silver
C	silver	iodine
D	silver	oxygen

Correct answer: C

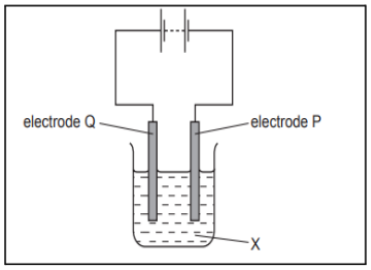
25. A student wishes to electroplate an object with copper. Which row is correct?

	Object is made the	**A suitable electrolyte is**
A	anode	CuO(s)
B	anode	$CuSO_4$(aq)
C	cathode	CuO(s)
D	cathode	$CuSO_4$(aq)

Correct answer: D

26. The diagram shows an electrolysis experiment.

During the electrolysis, sodium was formed at electrode P and chlorine at electrode Q.
Which row correctly identifies P, Q and X?



	P	Q	X
A	anode	cathode	concentrated solution of sodium chloride in water
B	anode	cathode	molten sodium chloride
C	cathode	anode	concentrated solution of sodium chloride in water
D	cathode	anode	molten sodium chloride

Correct answer: C

27. Metalloids are those elements which have both metallic and nonmetallic properties.
Which of the following sets contains a **Metal, a Non-metal and a Metalloid**?

	Metal	Non-metal	Metalloid
A	Carbon	Boron	Silicon
B	Sodium	Magnesium	Aluminum
C	Nitrogen	Oxygen	Tin
D	Copper	Fluorine	Arsenic

Correct answer: D

28. Which of the statements about Sodium and Iron is correct?

	Sodium	Iron
A	Hard, malleable, corrosive and reacts vigorously	Soft, high melting point, non-corrosive and reacts vigorously
B	Hard, ductile, non-corrosive and reacts at normal speed	Soft low melting point, non-corrosive and reacts at normal speed
C	Soft, low melting point, non-corrosive and reacts vigorously	Hard, malleable, corrosive and reacts at normal speed
D	Soft, high melting point, non-corrosive and reacts at normal speed	Hard, malleable, corrosive and reacts vigorously

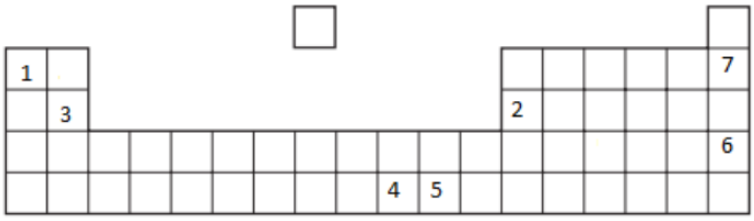
Correct answer: C

29. Halogens are very reactive among non-metals. Which halogen reaction is correct?

	Halogen	Reaction
A	Fluorine	$F_2 + Na \rightarrow$ No reaction
B	Chlorine	$Cl_2 + H_2 \rightarrow 2HCl$ (in presence of light)
C	Bromine	$Br_2 + H_2O \rightarrow$ No products
D	Iodine	$I_2 + Fe \rightarrow FeI_3$ (in absence of heat)

Correct answer: B

30. Elements that are not reactive in transition elements are called noble metals. Identify the elements that are noble metals.



A. 1 and 3 B. 4 and 5 C. 7 and 6 D. 2 and 3

Correct answer: B

Chemistry Grade IX
Scheme of Assessment

Maximum marks: 75

Section "A"

Multiple Choice Questions (MCQs) **(12 x 1 = 12)**

- Attempt 12 MCQs. Each MCQ carries equal marks.

Practical based assessments (PBAs) **(15 x 1 = 15)**

- Attempt 15 MCQs. Each MCQ carries equal marks.

Section "B"

Short Answer Questions **(8 x 3 = 24)**

- Attempt any 8 out of 12 questions. Each questions carries equal marks.

Section "C"

Detailed Answer Questions **(4 x 6 = 24)**

- Attempt any 4 out of 6 questions. Each question carries equal marks.

Chemistry Grade IX
Table of Specification (TOS)

S.No	Units	Weightage in evaluation 100%	MCQs 1 mark each	PBAs 1 mark each	Short Answers 3 marks each	Detailed Answers 6 marks each
1	Fundamentals of Chemistry	6	1	2	1	0
2	Atomic Structure	8	2	0	2	0
3	Periodic Table and Periodicity of Properties	11	2	0	1	1
4	Chemical Bonding	14	2	0	2	1
5	Physical States of Matter	13	1	3	1	1
6	Solution	18	1	4	2	1
7	Electrochemistry	12	1	2	1	1
8	Chemical Reactivity	12	1	2	1	1
9	Fundamentals of Chemistry	6	1	2	1	0
Total # of Questions asked			**12**	**15**	**12**	**6**
Total # of Questions to be attempted			**12**	**15**	**8**	**4**
Maximum marks attainable			**12 marks**	**15 marks**	**24 marks**	**24 marks**

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?

	• 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 might happen if …? • Which are the facts? • Which statements support …?
Apply 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. **Question Stems** • 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 would you develop …? • How would you change …? • How would you demonstrate…?	**Analyse** 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. **Question Stems** • 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...?

• How would you develop? • 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 …	• What could the ending have been if ... had taken place? • 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 ?

BLOOM'S 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
					
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 I EXAMINATION
MARKS BREAKUP GRID FOR EXAMINATION 2025

SCIENCE GROUP:

SUBJECT	THEORY	PBA	TOTAL
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	75	-	75
ISLAMIYAT/ETHICS	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	PBA	TOTAL
ENGLISH	100	-	100
URDU NORMAL/SINDHI NORMAL	75	-	75
ISLAMIYAT/ETHICS	75	-	75
PHYSICS	60	15	75
CHEMISTRY	60	15	75
COMPUTER SCIENCE	60	15	75
MATHEMATICS	75	-	75
TOTAL	505	45	550

GENERAL GROUP:

SUBJECT	THEORY	PBA	TOTAL
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	75	-	75
ISLAMIYAT/ETHICS	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