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FBISE Chemistry Class 9
Topical workbook - Volume 1 of 3

140 questions arranged by official framework topic.
National Curriculum 2022-23; supported examinations from 2027.

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Nature of Science in Chemistry

Domain A: Nature of Science in Chemistry

FBISE model paper | Section A Q41 | 0.5 marks

Scenario for MCQ (41-44)	**A research centre has different laboratories. In one lab, scientists study how enzymes work in the human body. In another lab, researchers develop new medicines to treat diseases. In a third lab, radioactive isotopes are used to treat cancer patients**

41.	Scientists studying how enzymes function in the human body are working in which field?	Organic Chemistry	Biochemistry	Analytical Chemistry	Geochemistry

FBISE model paper | Section A Q42 | 0.5 marks

Scenario for MCQ (41-44)	**A research centre has different laboratories. In one lab, scientists study how enzymes work in the human body. In another lab, researchers develop new medicines to treat diseases. In a third lab, radioactive isotopes are used to treat cancer patients**

42.	The development of new medicines to treat diseases belongs to:	Environmental Chemistry	Organic Chemistry	Polymer Chemistry	Physical Chemistry

FBISE model paper | Section A Q43 | 0.5 marks

Scenario for MCQ (41-44)	**A research centre has different laboratories. In one lab, scientists study how enzymes work in the human body. In another lab, researchers develop new medicines to treat diseases. In a third lab, radioactive isotopes are used to treat cancer patients**

43.	The use of radioactive isotopes in cancer treatment is related to:	Nuclear Chemistry	Inorganic Chemistry	Astrochemistry	Analytical Chemistry

FBISE model paper | Section A Q44 | 0.5 marks

Scenario for MCQ (41-44)	**A research centre has different laboratories. In one lab, scientists study how enzymes work in the human body. In another lab, researchers develop new medicines to treat diseases. In a third lab, radioactive isotopes are used to treat cancer patients**

44.	Which of the following best explains why different laboratories are needed in the research center?	Each laboratory is designed exclusively to handle a specific state of matter (solids, liquids, or gases).	Different branches of chemistry focus on different types of problems and applications	Separate laboratories prevent different chemical elements from contaminating each other's equipment	Laboratories are separated randomly without any purpose

First Annual 2025 | Section B Q2(xi) OR | 3 marks

OR	Briefly describe the following: کیمیا کی درج شاخوں کو مختصراً بیان کریں:		03
	a)	Analytical chemistry تجزیاتی کیمیا	
	b)	Medicinal chemistry ادویاتی کیمیا	
	c)	Inorganic chemistry غیر نامیاتی کیمیا	

First Annual 2025 | Section B Q2(iv) OR | 3 marks

ɔ the following air pollutants cause harm? درج شدہ ہوائی آلودگیاں کیسے نقصان دہ ہیں؟			03	OR	Briefly describe the following: کیمیا کی درج شاخوں کو مختصراً بیان کریں:		03
a)	Carbon monoxide	کاربن مونو آکسائیڈ			a)	Nuclear chemistry نیوکلیئر کیمیا	
b)	Sulfur dioxide	سلفر ڈائی آکسائیڈ			b)	Environmental chemistry ماحولیاتی کیمیا	
					c)	Astro chemistry آسٹرو کیمیا	

Second Annual 2025 | Section A Q1 | 1 mark

Study of chemical changes that occur in living organisms is done in:	Biochemistry	Analytical Chemistry	Physical Chemistry	Inorganic Chemistry

Second Annual 2025 | Section B Q2(xi) OR | 3 marks

OR	Differentiate between 'Organic chemistry' and 'Inorganic chemistry'. 'آرگینک کیمسٹری' اور 'ان آرگینک کیمسٹری' میں فرق بیان کریں۔	03

First Annual 2026 | Section A Q1 | 1 mark

Chemistry mainly deals with the study of:	Living organisms	Matter and its interactions	Planets and stars	Historical events

First Annual 2026 | Section B Q2(i) | 3 marks

(i)	Identify the branch of Chemistry involved in the given statements: **a.** Large scale production of NH_3 by Haber's process. **b.** Breakdown of glucose gives energy to our body. c. Use of chloroflouro carbons (CFCs) in	1+1 +1	OR	Show the following conversions by drawing their electrons dot structures: **a.** $Na \rightarrow Na^+$ **b.** $Cl \rightarrow Cl^-$	1.5 + 1.5

First Annual 2026 | Section B Q2(i) | 3 marks

(i)	Identify the branch of chemistry that deals with given statements: **a.** According to Boyle's law when pressure on a gas is applied its volume reduces. **b.** Industries produce SO_2 which cause acid rain. **c.** Our hair has a protein called Keratin which is essential for hair growth.	1+1 +1	OR	Differentiate between suspension and colloidal with one suitable example each.	1.5 + 1.5
(ii)	How do the 'energy' and 'distance' from the nucleus	1.5		Which type of reaction has a positive sign of	

First Annual 2026 | Section B Q2(i) | 3 marks

(i)	Identify the branch of chemistry that deals with statements: **a.** Temperature of the earth is increasing gradually due to increase in concentration of CO_2. **b.** Contact process is used to manufacture sulphuric acid on large scale. **c.** When a gas is cooled to -273^oC it liquefies.	1+1 +1
(ii)	How do the paths of positive and negative charges	

FBISE model paper | Section B Q2(x) OR | 3 marks

OR	Define following branches of chemistry. a. Astrochemistry b. Geochemistry c. Physical chemistry	1+1+1

First Annual 2026 | Section B Q2(ii) OR | 3 marks

Briefly describe Nuclear chemistry, Biochemistry and Geochemistry.	1x3

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Matter

Domain B: Physical Chemistry

FBISE model paper | Section A Q1 | 0.5 marks

1.	Diamond is used in cutting tools. The reason for this use is:	It has a layered structure with weak van der Waals forces	It is a highly dense form of pure carbon	It has a strong three-dimensional network structure	It contains delocalized free electrons

FBISE model paper | Section A Q2 | 0.5 marks

2.	Which of the following is a compound?	Air	Iron	Carbon dioxide	Brass

FBISE model paper | Section A Q3 | 0.5 marks

3.	Which of the following combinations is correctly matched?	Sugar + Water → Suspension	Milk → Colloid	Sand + Water → Solution	Air → Suspension

FBISE model paper | Section A Q45 | 0.5 marks

Scenario for MCQ (45-48)	**Ali melts a piece of wax in a test tube by heating it in a water bath. After removing the heat source, he observes that the liquid wax slowly turns back into a solid.**

45.	What is the name of the process when liquid wax turns into a solid?	Condensation	Evaporation	Freezing	Melting

FBISE model paper | Section A Q46 | 0.5 marks

Scenario for MCQ (45-48)	**Ali melts a piece of wax in a test tube by heating it in a water bath. After removing the heat source, he observes that the liquid wax slowly turns back into a solid.**

46.	Why is this change considered a physical change?	A new substance is formed	The chemical composition changes	The change is reversible and no new substance is formed	Heat is released permanently

FBISE model paper | Section A Q47 | 0.5 marks

Scenario for MCQ (45-48)	**Ali melts a piece of wax in a test tube by heating it in a water bath. After removing the heat source, he observes that the liquid wax slowly turns back into a solid.**

47.	During this change, what happens to the particles of wax?	They break into new atoms	They become chemically different	They come closer together without changing identity	They disappear

FBISE model paper | Section A Q48 | 0.5 marks

Scenario for MCQ (45-48)	**Ali melts a piece of wax in a test tube by heating it in a water bath. After removing the heat source, he observes that the liquid wax slowly turns back into a solid.**

48.	Which property remains unchanged during this process?	State	Shape	Chemical composition	Volume

FBISE model paper | Section B Q1 | 3 marks

Q1	A student notices that elements in the Periodic Table follow clear patterns in their size and reactivity instead of changing randomly. Write the names of Group-VII elements. Also, describe the trend in physical state and density of the Group VII elements as you move down the group.	**3**

FBISE model paper | Section B Q1 OR | 3 marks

OR	State the difference between a compound and a mixture. In your answer, briefly describe the composition of each type of substance.	**3**

FBISE model paper | Section B Q2 | 3 marks

Q2	Compare the variation in reactivity of metals and non-metals using electron behavior.	**3**

FBISE model paper | Section B Q2 OR | 3 marks

OR	Give in detail the process of electroplating to prevent metals from corrosion	**3**

FBISE model paper | Section B Q3 OR | 3 marks

A young adult plans a balanced diet to maintain good health. Describe three main classes of biomolecules found in food by identifying their common sources along with the recommended daily intake for a young adult.	**3**

FBISE model paper | Section B Q3 | 3 marks

Q3	A city shows a sudden rise in respiratory diseases and reduced visibility. Which pollutant is most likely responsible for it, also explain the mechanism by which it affects human health and the environment.	**1+2**	**OR**

First Annual 2025 | Section B Q2(ii) OR | 3 marks

1.5 + 1.5	**OR**	Briefly describe the following properties of gas: گیس کی درج خصوصیات کی مختصر وضاحت کریں: **a)** Density کثافت **b)** Fluidity فلوئڈیٹی	**1.5 + 1.5**

First Annual 2025 | Section B Q2(iii) | 3 marks

(iii)	Briefly describe the following properties of solids: ٹھوس کی درج خصوصیات مختصراً بیان کریں: a) Compressibility کمپریسیبلیٹی b) Density کثافت	03	OR	Identify the oxidizing and reducing agents in the following reaction: درج ری ایکشن میں آکسیڈائزنگ اور ریڈیوسنگ ایجنٹ کی شناخت کریں: $2KI + Cl_2 \longrightarrow 2KCl + I_2$	03

First Annual 2025 | Section C Q6 | 4 marks

Q.6	Compare colloid and suspension. Give one example of each.	2+2

Second Annual 2025 | Section A Q12 | 1 mark

12.	Most compressible state of matter is: درج شدہ میں سے کون سی حالت سب سے زیادہ کمپریسیبل ہے؟	Gas گیس	Liquid مائع	Solid ٹھوس	Plasma پلازما

Second Annual 2025 | Section B Q2(iii) | 3 marks

(iii)	What is meant by BEC? How are BECs formed? BEC سے کیا مراد ہے؟ BECs کیسے بنائے جاتے ہیں؟	1+2

Second Annual 2025 | Section C Q6 | 4 marks

Q.6	Compare solutions and colloids. (Any three points) Give one example of each. سلوشن اور کولائیڈ کا موازنہ کریں۔ (کوئی سے تین نکات) ہر ایک کی ایک مثال بھی دیں۔	3+1

First Annual 2026 | Section B Q2(ii) | 3 marks

refrigerator linked to depletion of ozone layer.	
Why solids have high density and very low compressibility whereas gases have opposite behavior? Explain briefly.	1.5 + 1.5

First Annual 2026 | Section B Q2(iv) | 3 marks

element X			
Identify the given substances as solution, suspension or colloidal: **a.** Air **b.** Sand in water **c.** Jelly	1+1 +1	OR	Brie **a.** **b.**

First Annual 2026 | Section B Q2(v) | 3 marks

a. Air b. Sand in water c. Jelly			
What is meant by 'element'? State one distinguishing feature that separates it from mixtures.	2+1	OR	

First Annual 2026 | Section B Q2(vii) | 3 marks

KJ/mol				
How is solubility affected by increasing temperature for given solutions: **a.** KCl in water (endothermic solution) **b.** $Ca(OH)_2$ in water (exothermic solution)	1.5 + 1.5	OR	$CuSO_4.5H_2O_{(blue\ solid)} \rightleftharpoons CuSO_{4(white\ solid)} + 5H_2O$ How heating will affect the equilibrium in given reaction?	03
Briefly state the trend of metallic character along the			Write chemical reaction when an acid reacts with	

First Annual 2026 | Section A Q1 | 1 mark

Which state of matter is represented by air?	Solid	Liquid	Gas	Plasma

First Annual 2026 | Section A Q2 | 1 mark

Diamond and graphite are allotropic forms of:	Oxygen	Carbon	Silicon	Sulfur

Differentiate between suspension and colloidal with one suitable example each.	1.5 + 1.5

First Annual 2026 | Section C Q3 | 6 marks

Q.3	Differentiate between compounds, and mixtures with respect to: **a.** Composition **b.** Chemical bonding **c.** Separation methods	2+2 +2
Q.4	Show the ionic bond formation of following by using	

First Annual 2026 | Section B Q2(x) OR | 3 marks

1.5 + 1.5	OR	Briefly describe the compressibility of solids, liquids and gases with reason.	1+1 +1

First Annual 2026 | Section C Q3 | 6 marks

Q.3	Compare diamond and graphite in terms of their structure and properties.	3+3

FBISE model paper | Section A Q1(xii) | 1 mark

(xii)	Suggest which statement about solubility is **INCORRECT**?	It refers to the ability of a solute to dissolve in a solvent	It is measured in grams per liter of solvent	It is affected by temperature, pressure, and the nature of the solute and solvent.	It is independent of temperature.

(iii)	Compare following properties of liquid Crystals with liquids. a. Molecular arrangement b. Fluidity	1.5+1.5

Q.5	Define solubility. How can it be affected by the change in temperature? Explain with graph.	1+2+3	**OR**

First Annual 2025 | Section B Q2(iv) OR | 3 marks

How do following vary down the group? درج شدہ خصوصیات گروپ میں نیچے کی طرف کیسے تبدیل ہوتی ہیں؟ **a.** Atomic size اٹامک سائز **b.** Ionization energy آئیونائزیشن انرجی **c.** Electronegativity الیکٹرونیگیٹیویٹی	03	OR	Predict the solubility of following substances. درج شدہ مرکبات کی حل پذیری کی پیشین گوئی کریں۔ **a.** Methanol in water میتھنول پانی میں **b.** Oil in benzene تیل بینزین میں **c.** Sodium chloride in water سوڈیم کلورائیڈ پانی میں
Demarcate the modern periodic table into 's' and 'p'			A flask contains 0.25 M $NaOH$ solution. What mass	

First Annual 2025 | Section B Q2(ix) | 3 marks

(ix)	Briefly explain any two allotropic forms of carbon. کاربن کی کوئی سی دو آلوٹراپک فارمز مختصراً بیان کریں۔	03

First Annual 2025 | Section B Q2(viii) | 3 marks

(viii)	Describe colloids and suspension with one suitable example of each. کولائیڈز اور سسپنشن کو ایک ایک مناسب مثال کے ساتھ بیان کریں۔	03

Second Annual 2025 | Section B Q2(ii) | 3 marks

example each. نرم اور سخت دھاتوں میں فرق کریں اور ایک ایک مثال دیں۔	2+1	OR	Determine the oxidation number of nitrogen in NO_2^{-1} ? NO_2^{-1} میں نائٹروجن کی آکسیڈیشن اسٹیٹ معلوم کریں۔	03
Briefly explain any three crystalline allotropes of carbon. کاربن کی کوئی سی تین کرسٹلائن صورتوں کی مختصر وضاحت کریں۔	1x3	OR	Find by calculation, the compound in which Sulphur (S) has oxidation state of +7. معلوم کریں کہ کس مرکب میں سلفر کی آکسیڈیشن اسٹیٹ 7+ ہے۔ a. SO_3	03

Second Annual 2025 | Section B Q2(vii) | 3 marks

(vii)	Give at least two examples for the solutions of: a. Gases b. Liquids c. Solids	

Second Annual 2025 | Section C Q5 OR | 4 marks

Give at least two comparison points among solutions, colloids and suspensions. محلول، کولائیڈ اور سسپنشن (suspension) کے موازنہ کے کم از کم دو نکات بیان کریں۔	2+2

First Annual 2026 | Section B Q2(ii) | 3 marks

	Differentiate between Mixture and Compound. آمیزہ اور مرکب میں فرق بیان کریں۔	03

First Annual 2026 | Section B Q2(viii) OR | 3 marks

OR	What is fluidity? Why liquids and gases are considered fluids while solids are not? روانی (Fluidity) سے کیا مراد ہے؟ وضاحت کریں کہ مائعات اور گیسوں کو فلوئڈ کیوں کہا جاتا ہے	1+2

First Annual 2026 | Section C Q6 | 4 marks

Q.6	Give any four differences between colloids and suspensions.

First Annual 2026 | Section A Q3 | 1 mark

3.	Which solid has **no** regular arrangement of particles?	Crystalline	Metallic	Ionic	Amorphous

First Annual 2026 | Section C Q6 | 4 marks

Q.6	Differentiate between started and super saturate solution. Give one example each.	**2+2**	**OR**

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Atomic structure

Domain B: Physical Chemistry

FBISE model paper | Section A Q5 | 0.5 marks

5.	Identify no of electron, protons and neutrons in an element $^{26}_{58}X$	25,26,31	26, 26, 26	26, 26, 33	26,26,32

FBISE model paper | Section A Q6 | 0.5 marks

6.	An element contains two isotopes, mass=24, abundance (90%) and mass 25, abundance (10%). The relative atomic mass of the element is.	24.1	24.5	24.9	25.0

FBISE model paper | Section A Q15 | 0.5 marks

15.	The symbols of two atoms may be written as shown. $^{52}_{23}X$ $^{52}_{24}Y$ Which statement about these atoms is correct?	They are different elements because they have different numbers of neutrons.	They are different elements because they have different numbers of protons.	They are isotopes of the same element because they have the same nucleon number.	They are isotopes of the same element because they have the same proton number

FBISE model paper | Section A Q16 | 0.5 marks

16.	The atoms $^{64}_{29}Cu$ and $^{65}_{30}Zn$ have the same	nucleon number	number of electrons	number of neutrons	proton number

FBISE model paper | Section A Q49 | 0.5 marks

Scenario for MCQ (49-52)	**A scientist is analyzing an element X. She finds that its atom has 17 protons, 18 neutrons, and 17 electrons.**				
49.	What is the mass number of element X?	13	35	18	17

FBISE model paper | Section A Q52 | 0.5 marks

Scenario for MCQ (49-52)	**A scientist is analyzing an element X. She finds that its atom has 17 protons, 18 neutrons, and 17 electrons.**				
52.	What is the atomic number of element X?	18	35	17	19

FBISE model paper | Section B Q4 OR | 3 marks

OR	Differentiate between distilled water and tap water and how does the use of carbon improve the quality of drinking water beyond just removing visible impurities?	**1+2**

FBISE model paper | Section B Q4 | 3 marks

Q4	Describe what happens when HCl reacts with: (a) a sodium metal (b) Na_2CO_3 (c) NaOH	**1+1+1**	

FBISE model paper | Section B Q5 OR | 3 marks

OR	Define a reversible reaction and explain the conditions under which it reaches equilibrium.	**1+2**

FBISE model paper | Section B Q5 | 3 marks

Q5	Identify the functional groups in the following compounds: (a) CH_3COOH (b) CH_3CHO (c) CH_3CH_2OH	**1+1+1**	

Define Chemistry. How different states of matter (solids, liquids, gases, and plasma) are involved in chemical interactions.	**1+2**

Q6	An element has two atoms: one contains 17 protons and 18 neutrons, while the other contains 17 protons and 20 neutrons. (a) Can these two atoms be considered isotopes of the same element? (b) Predict whether their chemical properties will be similar or different, and justify your answer.	**1+2**	**OR**

First Annual 2025 | Section B Q2(x) OR | 3 marks

OR	What is meant by isotopes of an element? Give example of any element.	**2+1**

First Annual 2025 | Section B Q2(ii) OR | 3 marks

1.5 + 1.5	**OR**	Determine the number of protons and neutrons in the following: درج شدہ میں پروٹانز اور نیوٹرانز کی تعداد بتائیں: **a).** $^{24}_{12}Mg$ **b).** $^{25}_{12}Mg$ **c).** $^{26}_{12}Mg$	**03**
		Identify the oxidizing and reducing agents in the	

Second Annual 2025 | Section A Q6 | 1 mark

6.	Electrons in higher energy levels are:	Closer to nucleus	Less energetic	Stable	Far from nucleus

Second Annual 2025 | Section B Q2(ii) | 3 marks

(ii)	Write relative charge and relative mass of an electron, proton, and neutron. الیکٹران، پروٹون اور نیوٹرون کے ریلیٹو چارج اور ریلیٹو ماس تحریر کریں۔	03

Second Annual 2025 | Section B Q2(xi) | 3 marks

	b. 14 g of nitrogen gas (N_2)	
(xi)	Calculate the relative atomic mass of an element X having three isotopes. Relative abundances of each isotope are given: ایک عنصر X کا ریلیٹیو ایٹامک ماس معلوم کریں۔ اس کے تین آئسوٹوپس کی ریلیٹیو کثرت دی گئی ہے:	03

$^{12}_{6}A$ 98.8%	$^{13}_{6}B$ 1.1%	$^{14}_{6}C$ 0.009%

First Annual 2026 | Section B Q2(iii) OR | 3 marks

03	OR	Determine the number of Protons and Neutrons in given Isotopes: a. $^{23}_{11}Na$ b. $^{37}_{17}Cl$ c. $^{13}_{6}C$	1+1 +1

First Annual 2026 | Section B Q2(iii) | 3 marks

An element exists as two isotopes: • ^{64}X (abundance 30%) • ^{66}X (abundance 70%) Calculate the average relative atomic mass of element X	03	OR	Determine the number of Protons and Neutrons in given Isotopes: a. $^{23}_{11}Na$ b. $^{37}_{17}Cl$ c. $^{13}_{6}C$	1+1 +1
Identify the given substances as solution			Briefly describe:	

First Annual 2026 | Section A Q6 | 1 mark

The charge on an ion depends on the number of:	Neutrons	Protons	Valence electrons	Atomic mass

First Annual 2026 | Section B Q2(ii) | 3 marks

	essential for hair growth.	
(ii)	How do the 'energy' and 'distance' from the nucleus change as the shell number increases?	1.5 + 1.5

First Annual 2026 | Section B Q2(iii) | 3 marks

(iii)	Which sub-atomic particle determines the atomic number of an element? What is the significance of atomic number?	1+2

First Annual 2026 | Section B Q2(iv) | 3 marks

(iv)	Justify the following statements: **a.** An atom is electrically neutral. **b.** An atom can convert into positive ion when it loses electron.	1.5 + 1.5

First Annual 2026 | Section A Q1 | 1 mark

Which part of the atom contains protons and neutrons?	Electron cloud	Shells	Nucleus	Orbits

First Annual 2026 | Section B Q2(ii) | 3 marks

(ii)	How do the paths of positive and negative charges differ in the same uniform electric field? Make a sketch.	1+1 +1	OR	What is meant by reversible chemical reaction? Does it ever go to completion? Give reason.	1+1 +1

First Annual 2026 | Section B Q2(iii) | 3 marks

How is carbon-14 used to determine the age of ancient objects? Explain briefly.	03

FBISE model paper | Section A Q1(ix) | 1 mark

(ix)	Chlorine has two isotopes: • Cl-35 (abundance = 75%) • Cl-37 (abundance = 25%) What is the relative atomic mass of chlorine?	36.0	35.5	37.0	34.5

FBISE model paper | Section A Q1(vi) | 1 mark

(vi)	Why is the proton number unique to each element and used to arrange elements in the periodic table?	Protons determine the mass of the element	Protons define the atomic number of the element	Protons dictate the number of neutrons in the nucleus	Protons indicate the number of electrons in the atom

FBISE model paper | Section B Q2(ii) OR | 3 marks

OR	Determine neutron and proton number of following elements. a. $^{27}_{13}X$ b. $^{36}_{18}Y$ c. $^{64}_{30}Z$	1.5+1.5

FBISE model paper | Section B Q2(x) | 3 marks

(x)	Define isotopes of an element. Write isotopes of hydrogen, give their atomic and mass numbers.	1+2

Q. 2 Attempt the following parts. (11 x 3 =33)

(i)	Briefly describe the given terms: a. Atomic mass b. Atomic number c. Atomic mass unit	درج شدہ کو مختصراً بیان کریں۔ اٹامک ماس اٹامک نمبر اٹامک ماس یونٹ	03	OR
(ii)	Differentiate between empirical and molecular			

First Annual 2025 | Section C Q4 | 6 marks

Q.4	Draw the structure of following isotopes from their mass number and atomic number. درج شدہ کے ماس نمبر اور ایٹمی نمبر کے مطابق آئسوٹوپس کے سٹرکچرز بنائیں۔ $H_1^3\ C_6^{13}\ Cl_{17}^{35}\ U_{92}^{238}$	1.5x 4	OR	Enlist the possible uses of electrolytic cell. الیکٹرولیٹک سیل کے ممکنہ استعمالات تحریر کریں۔
Q.5	Analyze the bond formation between magnesium (*Mg*) and fluorine (*F*). میگنیشیم (Mg) اور فلورین (F) میں بانڈ کس طرح بنتا ہے؟ تجزیہ کریں۔	04	OR	Explain electroplating of following metals on steel. i ***Zinc (Zn)*** زنک ii ***Tin (Sn)*** ٹن درج شدہ میٹلز کی سٹیل پر الیکٹروپلیٹنگ بیان کریں۔
Q.6	Describe the formation of double and triple covalent bonds. ڈبل اور ٹرپل کوویلنٹ بانڈز کی فارمیشن بیان کریں۔	2+2	OR	Describe the manufacturing of sodium metal form fused $NaCl$. پگھلے ہوئے سوڈیم کلورائیڈ سے سوڈیم میٹل حاصل کرنے کا طریقہ بیان کریں۔

1SA-I 25005 (OLD)

$No.\ of molecules = No.\ of moles \times N_A$ $\quad No.\ of moles = \frac{mass}{Molar\ mass}$ $\quad Molarity = \frac{No.\ of\ mo}{Vol.\ of\ sol.}$

SUPPLEMENTARY TABLE

Atomic No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Symbol	H	He	Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca
Mass No	1	4	7	9	11	12	14	16	19	20	23	24	27	28	31	32	35.5	40	39	40

$N_A = 6.022 \times$

Second Annual 2025 | Section A Q4 | 1 mark

4.	Which atom will form an ion of charge −2? درج شدہ میں سے کون سا ایٹم 2− چارج کا آئن بنائے گا؟	$^{12}_{6}C$	$^{14}_{7}N$	$^{16}_{8}O$	$^{19}_{9}F$

Second Annual 2025 | Section A Q10 | 1 mark

10. What is formed by adding or removing electrons?	Free radical	Only Cation	Only Anion	Ion

Second Annual 2025 | Section A Q11 | 1 mark

11. Which statement about $^{35}_{17}X$ and $^{37}_{17}Y$ is **false**?	They are the same elements.	They have same no. of electrons.	They have same no. of protons.	They have same no. of neutrons.

Second Annual 2025 | Section B Q2(vi) OR | 3 marks

03	OR	Find out the number of protons, electrons and neutrons in the following elements: درج عناصر میں پروٹونز، نیوٹرونز اور الیکٹرانز کی تعداد معلوم کریں: a. $^{23}_{11}Na$ b. $^{238}_{92}U$	03

Second Annual 2025 | Section B Q2(x) OR | 3 marks

OR	Aluminium is represented as Al^{27}_{13}. Draw its structure and write its electronic configuration. ایلومینیم کو Al^{27}_{13} سے ظاہر کیا جاتا ہے۔ اس کی ساخت بنائیں اور الیکٹرانک کنفیگوریشن	03

First Annual 2026 | Section B Q2(xi) | 3 marks

(xi)	State the relative charge and relative mass of electron, proton and neutron	1x3

First Annual 2026 | Section B Q2(ii) OR | 3 marks

	An atom has atomic number 8 and mass number 18. Determine the number of neutrons and sketch this isotope. ایٹامک نمبر 8 اور ماس نمبر 18 پر مشتمل آئسوٹوپ میں نیوٹرون معلوم کریں اور اس کا سکیچ بنائیں۔	03

OR	What is meant by isotopes? Give one example. آئسوٹوپ سے کیا مراد ہے؟ ایک مثال دیں۔	03

APOLLO

Chemical Bonding

Domain B: Physical Chemistry

FBISE model paper | Section A Q14 | 0.5 marks

14.	Which two elements react together to form an ionic compound? element / Electronic configuration W — 2,4 X — 2,8 Y — 2,8,1 Z — 2.8.7	W and X	X and Y	Y and Z	Z and W

FBISE model paper | Section A Q17 | 0.5 marks

17.	Why does molten sodium chloride conduct electricity?	It has free mobile electrons	The ions move freely when bonds break	Heating makes electrons mobile	Sodium becomes a conductive metal

2x3	**OR**	Draw electron dot and cross structures for the following: درج شدہ کے الیکٹران ڈاٹ اور کراس سٹرکچر بنائیں۔ **a)** NH_3 **b)** N_2 **c)** CH_4	**2x3**

First Annual 2025 | Section C Q3 OR | 6 marks

3+3	OR	Draw electron dot and cross structures for the following: درج شدہ کے الیکٹران ڈاٹ اور کراس سٹرکچر بنائیں۔ **a)** HCN **b)** Cl_2 **c)** CO_2

Second Annual 2025 | Section A Q3 | 1 mark

3.	What type of bond is formed when two atoms share one or more pairs of electrons?	Ionic bond	Covalent bond	Metallic bond	Hydrogen bond

Draw dot and cross diagrams to show the formation of the following compounds. Also identify the type of bonding: (i) Sodium fluoride (NaF) (ii) Water molecule (H_2O) درج شدہ مرکبات کی فارمیشن کو ظاہر کرنے کے لیے ڈاٹ اور کراس ڈایاگرام بنائیں۔ نیز ہر ایک میں	3+3

First Annual 2026 | Section B Q2(i) OR | 3 marks

1+1 +1	OR	Show the following conversions by drawing their electrons dot structures: **a.** $Na \rightarrow Na^{+}$ **b.** $Cl \rightarrow Cl^{-}$	1.5 + 1.5

First Annual 2026 | Section B Q2(v) OR | 3 marks

2+1	OR	How is ionic bond formed? Give one example of a compound having Ionic bond.	2+1

e: Attempt the following questions. (3x6=18)

Show covalent bond formation in given molecules using dot-and-cross structures: **a.** CO_2 **b.** H_2O **c.** CH_4	**2+2 +2**	**OR**	What is meant by 'molecular formula' and 'structural formula'? Give one example each. Show that $C_3H_6O_2$ can have more than one structural formula.	**2+2 1+1**
Explain the terms 'Acid' and 'Base' according to the			Discuss the functions of carbohydrates and proteins	

First Annual 2026 | Section C Q4 | 6 marks

	c. Separation methods				
Q.4	Show the ionic bond formation of following by using electron dot-and-cross structures: **a.** NaF **b.** $CaCl_2$	**3+3**	**OR**	An element Z is located below Magnesium in Group II-A: **a.** Predict its relative reactivity in comparison to Magnesium	**2x3**

First Annual 2026 | Section A Q2 | 1 mark

Which type of compounds generally have low boiling points?	Ionic compounds	Network solids	Metallic compounds	Covalent compounds

First Annual 2026 | Section C Q3 OR | 6 marks

Q.3	Compare diamond and graphite in terms of their structure and properties.	3+3	OR	Describe metallic bond in terms of electrostatic attraction. Write any two properties of metals which makes them different from the non-metals.	4+2

FBISE model paper | Section A Q1(iii) | 1 mark

(iii)	Identify the covalent compound.	MgO	CaO	H_2O	KF

FBISE model paper | Section C Q3 OR | 6 marks

2+2+2	**OR**	Draw the dot-and- cross diagrams and Lewis dot structures for the following compounds. HCN, MgO, C_2H_4	2+2+2

First Annual 2025 | Section B Q2(ix) OR | 3 marks

(ix)	Briefly explain any two allotropic forms of carbon. کاربن کی کوئی سی دو آلوٹراپک فارمز مختصراً بیان کریں۔	**03**	**OR**	Draw electron cross–dot structures of: ***a.*** N_2 ***b.*** CH_4 ***c.*** O_2	**03**

First Annual 2025 | Section B Q2(x) OR | 3 marks

(x)	Illustrate the inertness of noble metals. نوبل میٹلز کی انرٹ نس پر روشنی ڈالیں۔	03	OR	How elements attain stability? Explain briefly. ایلیمنٹس کیسے سٹیبلیٹی حاصل کرتے ہیں؟ مختصراً لکھیں۔	03

First Annual 2025 | Section B Q2(xi) | 3 marks

(xi)	State 'duplet' and 'octet' rules. ڈوپلیٹ اور آکٹیٹ رُول تحریر کریں۔	03

First Annual 2025 | Section C Q5 | 4 marks

Q.5	Analyze the bond formation between magnesium (*Mg*) and fluorine (*F*). میگنیشیم (Mg) اور فلورین (F) میں بانڈ کی تشکیل کا تجزیہ کریں۔	04

First Annual 2025 | Section C Q6 | 4 marks

Q.6	Describe the formation of double and triple covalent bonds. دو اور تین کوویلنٹ بانڈز کی تشکیل بیان کریں۔	2+2

Second Annual 2025 | Section A Q2 | 1 mark

2.	Which of the following have ionic bonds? درج شدہ میں سے کیا آئیونک بانڈز رکھتا ہے؟	$H-C\equiv N$	$O=C=O$	$Cl-Mg-Cl$	$H-O-H$

Second Annual 2025 | Section B Q2(iv) OR | 3 marks

	Classify the following compounds as covalent or ionic: $CO_2, NaCl, H_2O, C_2H_4, CaCl_2, HCl$	03

Second Annual 2025 | Section B Q2(ix) | 3 marks

(ix)	Draw electron cross and dot structures for H_2O_2 Molecule.	03

Second Annual 2025 | Section B Q2(v) | 3 marks

Find the number of valence electrons in the following atoms: درج عناصر میں ویلنس الیکٹرانز کی تعداد معلوم کریں:			03	OR
a.	Sulphur (S)	سلفر (S)		
b.	Magnesium (Mg)	میگنیشیم (Mg)		
c.	Chlorine (Cl)	کلورین (Cl)		
Briefly explain the following:				

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a.	
b.	
c.	

Second Annual 2025 | Section B Q2(viii) | 3 marks

(viii)	What is covalent bond? Discuss the formation of triple covalent bond. کو ویلنٹ بانڈ کیا ہے؟ ٹرپل کوویلنٹ بانڈ کی تشکیل کی مختصر وضاحت کریں۔	1+2

OR	Discuss and show the formation of ionic bond between magnesium (Mg) and fluorine (F).	04

First Annual 2026 | Section C Q4 OR | 6 marks

Show the formation of NaF and NaBr using electron dot-and-cross structures.
Identify the positive and negative ions in those.

First Annual 2026 | Section A Q1 | 1 mark

pvalent bond is formed by:	Transfer of electrons	Transfer of protons	Sharing of electrons	Sharing of neutrons

First Annual 2026 | Section A Q5 | 1 mark

5. [redacted]hlorine reacts with sodium to form: کلورین سوڈیم کے ساتھ ری ایکشن کر کے کیا بناتی ہے؟	NaCl	Na_2O	NaOH	NaClO

First Annual 2026 | Section B Q2(iii) | 3 marks

(iii)	How is a covalent bond formed? Describe using the example of a hydrogen molecule.	2+1	OR	Differentiate between an empirical formula and a molecular formula. Give one example for each.	1.5 + 1.5

First Annual 2026 | Section B Q2(vi) | 3 marks

(vi)	State the importance of noble gas electronic configuration in formation of ion. Give one example.	03	OR	Draw the electron cross and dot structure of CO_2. How many shared electron pairs are there in it?	2+1

First Annual 2026 | Section B Q2(vi) OR | 3 marks

OR	Draw the electron cross and dot structure of CO_2. How many shared electron pairs are there in it? CO_2 کا الیکٹران کراس اینڈ ڈاٹ سٹرکچر بنائیں۔ اس میں اشتراکی الیکٹرانی جوڑے کتنے ہیں؟

First Annual 2026 | Section B Q2(viii) | 3 marks

(viii)	State the octet and duplet rules. Write one example of each.	1.5 + 1.5

APOLLO

Stoichiometry

Domain B: Physical Chemistry

FBISE model paper | Section A Q7 | 0.5 marks

7.	What is the formula of aluminium oxide formed from Al^{3+} and O^{2-}?	AlO	Al_2O_3	Al_3O_2	AlO_3

FBISE model paper | Section A Q21 | 0.5 marks

21.	The equation represents the action of dilute nitric acid on copper. $xCu + yHNO_3 \rightarrow xCu(NO_3)_2 + 4H_2O + 2NO$ What are the values of x and y?	x = 1, y = 4	x = 1, y = 8	x = 3, y = 4	x = 3, y = 8

FBISE model paper | Section A Q22 | 0.5 marks

22.	What is the empirical formula of the compound whose molecular formula is P_4O_{10}?	PO	PO_2	P_2O_5	P_8O_{20}

FBISE model paper | Section A Q23 | 0.5 marks

23.	What is the mass in grams of 3.0 x 10^{23} molecules of CO_2?	22 g	44 g	66 g	88 g

FBISE model paper | Section A Q24 | 0.5 marks

24.	Hydrogen and chlorine react as shown. 1 molecule of hydrogen + 1 molecule of chlorine $\rightarrow$ 2 molecule of hydrogen chloride What is the equation for this reaction?	2H + 2Cl $\rightarrow$ 2HCl	2H + 2Cl $\rightarrow H_2Cl_2$	$H_2 + Cl_2 \rightarrow$ 2HCl	$H_2 + Cl_2 \rightarrow H_2Cl_2$

FBISE model paper | Section A Q25 | 0.5 marks

25.	What is the total number of atoms contained in 2.00 moles of nickel?	3 x 10^{24}	2.4 x 10^{24}	6.02 x 10^{23}	1.2 x 10^{24}

OR	**Ethane is a saturated hydrocarbon obtained during cracking of larger hydrocarbons and can also be formed by hydrogenation of ethene. Explain why ethane is generally unreactive, yet undergoes combustion and substitution with chlorine, and write simple balanced equations for its preparation from hydrogenation of alkynes and alkyl halides.**	**2+ 2+ 2**

Q7	**An unknown solid substance is analysed, and the following properties are recorded:** **it is a hard crystalline solid with a very high melting point, does not conduct electricity in solid state, but conducts when melted.** **Using these observations, explain the type of chemical bonding present in the substance and describe how this bonding is formed. Also, relate its bonding and structure to its high melting point and electrical conductivity behaviour.**	**1 + 1 + 2 + 2**

First Annual 2025 | Section B Q2(x) | 3 marks

(x)	Find the molar mass of MgO. Also find the number of moles in its 80g sample. MgO کا مولر ماس معلوم کریں نیز اس کے 80g سیمپل میں مولز کی تعداد معلوم کریں۔	1+2

First Annual 2025 | Section C Q5 | 4 marks

Q.5	What is the relationship between Avogadro's number and mole? Also write symbol and value of Avogadro's number. ایووگیڈرو نمبر اور مول کے درمیان کیا تعلق ہے؟ ایووگیڈرو نمبر کی علامت اور قیمت لکھیں۔	2+1 +1	OR	What is corrosion? Write its chemical reaction. Describe any one method to prevent corrosion. کوروژن کیا ہے؟ اس کی کیمیائی مساوات لکھیں۔ نیز اس کی روک تھام کا کوئی ایک طریقہ بیان کریں۔	1+1 +2

(x)	Determine the molar mass of CO_2. Also determine mass of 0.25 moles of CO_2. CO_2 کا مولر ماس معلوم کریں نیز 0.25 مول CO_2 کا ماس بھی بتائیں۔	1+2