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FBISE Chemistry Class 12
Topical workbook - Volume 2 of 3

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

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Halogenoalkanes

Domain E: Organic Chemistry

Second Annual 2025 | Section A Q9 | 1 mark

9.	In SN1 reaction, the rate depends on:	Pressure	Concentration of nucleophile	Concentration of substrate	Concentration of catalyst
	Which compound shows ...				

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

(xi)	Give three differences between SN1 and SN2 reactions.
(xii)	Which ...

	iii. Lead (II) oxide is amphoteric in nature.	
Q.6	Explain the following methods for the preparation of ethers. i. Williamson synthesis ii. Reactions of alkyl halides with Ag_2O	**3+3**
	SUPPLEMENTARY TABLE	

Explain the SN1 mechanism of nucleophilic substitution for tert-butyl bromide ($(CH_3)_3CBr$) reacting with water. Your answer should:

- Show the formation of the carbocation intermediate
- Include the role of the inductive effect of alkyl groups in stabilizing the carbocation.

Write rate equation for given reaction

State two factors that affect the basic strength of

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

(ix)	Compare the stability of primary, secondary, and tertiary carbocations, state the order of stability, and explain the reason for their relative stabilities.	**1+1 +1**
(x)	Write chemical equations to prepare phenol from	**1.5**

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

Using retro-synthesis, deduce the starting halogenoalkane for the formation of 2-butanol.	**03**

FBISE model paper | Section C Q4 OR | 6 marks

OR	Describe the SN_1 and SN_2 mechanisms of nucleophilic substitution in halogenoalkanes. Explain the step-by-step mechanism of each reaction with suitable examples.	**06**

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

	chemical equations to support your answer.	
(vii)	Why tertiary alkyl halides favor SN1 mechanism, whereas primary alkyl halides favor SN2 mechanism?	**1.5 + 1.5**
(viii)	Why phenol forms 2,4,6-tribromophenol with	

FBISE model paper | Section A Q11 | 1 mark

11. Which one of the following is not a nucleophile?

A. H_2O B. H_2S

C. BF_3 D. NH_3

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

xii. Give stereo chemical evidences of Nucleophilic Substitution reactions of alkyl halides. (1+2)

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Hydroxy Compounds

Domain E: Organic Chemistry

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

xi.	Which of the following best explains why phenol is more acidic than alcohols?	Phenol has a hydroxyl group	The phenoxide ion is stabilized by resonance	Phenol has a higher molecular weight.	Alcohols do not undergo electrophilic substitution reactions	○ ○ ○ ○

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

OR	-OH group is a characteristics functional group of ethanol and phenol. Explain why phenol is more acidic than ethanol?	03

OR	Complete the following reactions of phenol. Draw and write the name of the compounds formed (A –F). $C_6H_5OH + Na \rightarrow A + B$ $C_6H_5OH + C_6H_5N_2Cl^- \rightarrow C + D$ $C_6H_5OH + HNO_3 \rightarrow E + F$	**06**

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

(xiii)	Write the mechanism of the given reaction: $2CH_3OH \xrightarrow[140°C]{Conc.H_2SO_4} CH_3OCH_3 + H_2O$	**03**

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

OR	Identify the stronger acid from phenol and 2-Nitro phenol and explain the reason behind the increased acidic strength.	**03**

(x)	Arrange the following alcohols in order of increasing reactivity towards cleavage of C-O bond; Ethanol, 2-Propanol and 2-Methyl-2-Prpanol.	**03**
(xi)	Write mechanism of the given reaction:	

First Annual 2025 | Section C Q4 OR | 6 marks

	Benzene highlighted by key steps and intermediates.
OR	Provide the chemical reaction for the preparation of diethyl ether using the following methods: **a.** Williamson synthesis **b.** Reaction of Alkyl halides with dry silver oxide (Ag_2O)

Second Annual 2025 | Section A Q10 | 1 mark

				of nucleophile	of substrate	of catalyst
10.	Which compound shows Hydrogen Bonding?	C_2H_5OH	C_2H_6	C_2H_5Cl	CH_3-O-CH_3	

Second Annual 2025 | Section A Q11 | 1 mark

11.	Phenol can be prepared from benzene sulfonic acid by:	Dehydro-genation	Nitration	Fusion with NaOH	Hydrolysis of alkyl halides

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

Why is Nitration of Phenol faster than Benzene?

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

	reactions.
(xii)	Why phenol is more acidic than alcohol? Explain briefly.

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

Predict the product when phenol is treated with bromine water. Why does this reaction occur at room temperature, unlike benzene?

First Annual 2026 | Section C Q6 | 6 marks

CH_3Cl using $AlCl_3$ as a catalyst.

Justify the following order of acidic strength by drawing the resonance structures of their conjugate bases: Phenol > Water>Ethanol

2HA-I 26005 (B)

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

	Arrange water, phenol, and ethanol in order of increasing acidity and explain the reason for this order.	1+2
	Why amides do not readily accept protons like	

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

	explain the reason for their relative stabilities.	
(x)	Write chemical equations to prepare phenol from aniline.	1.5 + 1.5

First Annual 2026 | Section C Q6 | 2 marks

Ethanoic acid > Phenol > Ethanol

When phenol is treated with bromine water, a white precipitate is formed.

Q.6	When phenol is treated with bromine water, a white precipitate is formed. • Write balanced equation. • Compare this reaction with bromination of	**2+4**

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

OR	-OH group is a characteristics functional group of ethanol and phenol. Explain why phenol is more acidic than ethanol?	03

OR	Complete the following reactions of phenol. Draw and write the name of the compounds formed (A –G). $C_6H_5OH + NaOH \rightarrow A$ $C_6H_5OH + Na \rightarrow B + C$ $C_6H_5OH + C_6H_5N_2Cl^- \rightarrow D + E$ $C_6H_5OH + HNO_3 \rightarrow F + G$	**07**

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Carbonyl Compounds

Domain E: Organic Chemistry

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

xiv.	Which of the following compounds will NOT produce benzoic acid when treated with hot alkaline $KMnO_4$?	Methyl benzene	Ethyl benzene	Benzene	Isopropyl benzene	○ ○ ○ ○

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

OR	Starting from an acyl chloride, how would you prepare the following compounds? Provide chemical equations. i. Phenyl benzoate ii. Propyl ethanoate	1.5 + 1.5

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

(v)	Describe how acyl chlorides can be prepared using phosphorus trichloride (PCl_3). Include reagents and conditions in your answer.	03

OR	Explain why chloroethanoic acid is a stronger acid than ethanoic acid.	03

1+2	**OR**	The three Chloro compounds acyl chloride, aryl chloride and alkyl chloride vary in their ease of hydrolysis. Suggest an explanation for these differences in reactivity.	03

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

Arrange the following alcohols in order of increasing reactivity towards the cleavage of O-H bond: Ethanol, 2-Methyl-2-Propanol and 2-Propanol.	03
Write any three differences between E_a and E_r	

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

Which is stronger acid between Di-Flouro ethanoic acid or Tri-Flouro ethanoic acid? Given reason.	03

Provide the chemical equations for the Nucleophilic addition reactions between. **a.** Acetone and Phenyl Hydrazine **b.** Acetaldehyde and 2,4- Dinitrophenyl Hydrazine **c.** Formaldehyde and Hydrazine	**2x3**
Describe the effects of pH, Temperature and Substrate	

				c. Formaldehyde and Hydrazine	
Q.6	By providing resonance structures of their conjugate bases, explain why the order of acidic strength is: RCOOH > Phenol > Alcohol	**07**	**OR**	Describe the effects of pH, Temperature and Substrate Concentration on enzyme activity. (Include a general graphical representation illustrating the optimum conditions for enzyme activity.)	**2+2 +3**

First Annual 2025 | Section C Q5 OR | 6 marks

OR	Provide the chemical equations for the Nucleophilic addition reactions between: **a.** Acetaldehyde and Hydrazine **b.** Acetone and Hydroxyl amine **c.** Formaldehyde and 2,4-Dinitrophenyl Hydrazine 0.48g of an organic compound containing only "C", "H"	**2x3**

Second Annual 2025 | Section A Q12 | 1 mark

12.	Which aldehyde will show aldol condensation?	Ethanal	Formaldehyde	Benzaldehyde	Propanal

Second Annual 2025 | Section A Q13 | 1 mark

Which carboxylic acid derivative is least reactive?	Amide	Acyl chloride	Acid anhydride	Ester

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

3. 1, 3 Diethyl cyclo pentane	1.5
Write mechanism of reaction when Grignard reagent (CH_3MgBr) reacts with an Ester (CH_3COOCH_3).	03

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

How can acetic acid be prepared by Grignard reagent?

iodide.	
What is aldol condensation? Write its mechanism when two molecules of Acetaldehyde react together to form Crotonaldehyde.	2+4

First Annual 2026 | Section C Q6 OR | 6 marks

the order of stability for each.
Justify the given order of ease of hydrolysis: Acyl chloride > Alkyl chloride > Aryl chloride.

First Annual 2026 | Section A Q11 | 1 mark

diazonium salt is.		dioxide		
.. Which of the following is more acidic?	CH_3CH_2COOH	$Cl_2CHCOOH$	$ClCH_2COOH$	CH_3COOH

First Annual 2026 | Section C Q5 | 4 marks

Q.5	Justify the following order of acidic strength by drawing the resonance structures of their conjugate bases: Ethanoic acid > Phenol > Ethanol
Q.6	When phenol is treated with bromine water, a

FBISE model paper | Section A Q9 | 1 mark

9. Benzoic acid is obtained by oxidation of:

A. m-Xylene B. p-Xylene
C. Toluene D. Phenol

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

xiv. Compare acidity of phenols and carboxylic acid. Support your answer by drawing resonance structures? (1+2)

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Nitrogen Compounds

Domain E: Organic Chemistry

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

x.	Which of the following reagent and condition is required for the diazotization reaction of phenylamine before coupling with phenol?	NaOH and heat	HNO_3 at room temperature	HNO_2 and HCl below 5°C	Br_2 in the presence of $FeBr_3$	○ ○ ○ ○

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

(iii)	Electrophoresis can be used to separate amino acids which are produced by the hydrolysis of a polypeptide. Using glycine (NH_2CH_2COOH) as an example, explain why the result of electrophoresis depends on pH.	03

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

OR	Write down the steps involved in the mechanism of the reaction between an aldehyde or ketone and hydrogen cyanide.	03

	controlled.	
Q.5	Write down the reagents and conditions used to prepare primary and secondary amines starting from a. Chloro ethane b. Ethanamide c. Methyl cyanide	**06**

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

	molecules of acetic acid.	
	Explain why the basic strength of amines follows the order Secondary amine > Primary amine > Tertiary amine	03

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

OR	Identify the stronger base between ammonia and methyl amine and justify the reason behind the increased basic strength.	03
	Write chemical equations to show the amphoteric	

Second Annual 2025 | Section C Q5 OR | 6 marks

Compare the basicity of Ammonia and Methyl Amine. Write chemical reactions in series for the preparation of quaternary salt when Ammonia reacts with Ethyl Iodide.	2+4

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

(ix)	Draw the zwitterionic form of an amino acid and label the acidic and basic sites.

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

temperature, unlike benzene?

Write the chemical equation for the formation of benzenediazonium chloride from phenylamine. Why the reaction is carried out below 1°C?

First Annual 2026 | Section C Q4 OR | 7 marks

Write rate equation for given reaction

State two factors that affect the basic strength of amines, and use these factors to explain the order of basicity:
Phenylamine > Ammonia > Ethylamine.

Explain the trend in thermal stability of Group II

First Annual 2026 | Section A Q9 | 1 mark

The product formed when chloroethane reacts with KCN is:	Methane	Propanenitrile	Ethanol	Methanenitrile

First Annual 2026 | Section A Q10 | 1 mark

10.	The gas evolved during hydrolysis of diazonium salt is:	Nitrogen	Carbon dioxide	Oxygen	Hydrogen

First Annual 2026 | Section A Q12 | 1 mark

12.	Which amine is more basic in aqueous solution?	$(CH_3)_3N$	$C_6H_5NH_2$	CH_3NH_2	NH_3

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

1.5 + 1.5	OR	Why amides do not readily accept protons like amines? Give a reason	03

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

Identify the stronger base between ammonia and methylamine. Explain the reason behind increased strenght.

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Polymers

Domain E: Organic Chemistry

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

(ii)	How can nylon-6,6 be prepared from Hexandioic acid ? Give complete chemical reaction. Also mention type of polymerization.	02 + 01

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

OR	Write at least three repeating unit of the polymer formed from the monomer CH_2=CHCl, and classify it as either an addition polymer or a condensation polymer.	03

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

with each of these pollutants.	
Differentiate between addition and condensation polymers with suitable example in each.	03
Provide the chemical equation to illustrate how	

Second Annual 2025 | Section A Q15 | 1 mark

Which polymer is formed by condensation reaction?	Polystyrene	Polyethylene	Nylon	PVC

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

Differentiate between condensation and addition polymerization.

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

	Write the chemical equation for the polymerization process of PVC from vinyl chloride. State the type of polymerization involved.
	Enlist any three factors which affect enzymes activity.

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

(x)	Differentiate between addition and condensation polymerization.

First Annual 2026 | Section A Q13 | 1 mark

Which monomers undergo condensation polymerization?	Vinyl chloride	Amino acids	Ethene	Propene

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

(xi)	Differentiate between addition and condensation polymers.	**1.5 + 1.5**
(xii)	Differentiate between molecular ion peak and base	

First Annual 2026 | Section C Q4 OR | 7 marks

b. $HNO_3 + HI \rightarrow NO + I_2 + H_2O$			
Compare the arrangement of d-orbitals in octahedral and tetrahedral complexes. (Support your answer by drawing their diagrams of d-d splitting pattern).	**3.5 + 3.5**	**OR**	Write the chemical equations for the preparation of Nylon-6,6 and Kevlar. (Use the following monomers: benzene 1,4dioic acid, benzene 1,4-dicarboxylic acid, adipic acid, hexamethylene diamine).
Justify the following order of acidic strength by			State two factors that affect the basic strength of

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

(ii)	How can nylon-6,6 be prepared from Hexandioic acid ? Give complete chemical reaction. Also mention type of polymerization.	02 + 01

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

OR	Write at least three repeating unit of the polymer formed from the monomer CH_2=CHCl, and classify it as either an addition polymer or a condensation polymer.	03

First Annual 2026 | Section C Q4 | 7 marks

	instrumentation and working.	
Q.4	Differentiate between addition and condensation polymers with suitable examples. Also, write the chemical equation for the preparation of Nylon-6,6.	4+3
Q.5	Write chemical reactions to explain the basic nature	

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

iv. How can nylon-6,6 be prepared from Adipic acid ? Give complete chemical reaction. (1+2)

OR

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Organic Synthesis

Domain E: Organic Chemistry

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

	transition elements?	
	Identify the type of synthesis (Partial or total) for each of the following: **a.** Conversion of Ethanol into Ethanal. **b.** Synthesis of vegetable Ghee from oil.	**03**
	Write chemical reactions of $KMnO_4$ in acidic medium	

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

(viii)	Identify the type of synthesis (Total or partial) for each of the following: **a.** Oxidation of Toluene to form Benzoic acid. **b.** Synthesis of Urea from NH_3 and CO_2	**03**

First Annual 2025 | Section C Q5 | 6 marks

	underlying reasons)	
Q.5	Outline the step by step synthesis of Butanoic acid, 2-Methy-2-Propanol and Methane using a suitable Grignard reagent.	**2x3**

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

Differentiate between partial and total synthesis with suitable example in each case.

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Biochemistry

Domain E: Organic Chemistry

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

xiii.	What is a key structural component that differentiates RNA from DNA?	RNA contains ribose sugar, while DNA contains deoxyribose sugar.	DNA contains only thymine base, while RNA contains only uracil base.	RNA is always found in a double-helix structure.	DNA and RNA have the same sugar and nitrogenous bases.	○ ○ ○ ○

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

(viii)	What are enzyme inhibitors? Differentiate between competitive and non-competitive inhibition with examples.	03

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

c. Diethyl Ether and Methyl Propyl Ether	
Briefly explain simple, conjugated and derived proteins with one example in each case.	03
Describe two sources of oxides of Nitrogen and	

First Annual 2025 | Section C Q6 OR | 7 marks

	3. Formaldehyde and Hydrazine	
OR	Describe the effects of pH, Temperature and Substrate Concentration on enzyme activity. (Include a general graphical representation illustrating the optimum conditions for enzyme activity)	**2+2 +3**

5005 (B) ——

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

(vii)	How is DNA different from RNA in terms of ribose sugar, nitrogen bases and functions?	**03**

Second Annual 2025 | Section A Q14 | 1 mark

The building blocks of proteins are:	Fatty acids	Monosaccharides	Amino acids	Nucleotides

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

Draw the open chain and closed chain structures for Glucose and Fructose.

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

Briefly explain the effect of temperature on enzyme activity with general graphical representation.

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

	polymerization involved.
	Enlist any three factors which affect enzymes activity.

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

(xi)	Classify lipids into simple, phospholipids, derivative lipids, giving one example of each.
(xii)	A mass spectrum shows M+ peak = 100% and (M

First Annual 2026 | Section A Q14 | 1 mark

14. Which protein carries oxygen in the blood?	Keratin	Elastin	Hemoglobin	Collagen

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

Briefly explain monosaccharides, disaccharides, and polysaccharides.	1x3

First Annual 2026 | Section A Q16 | 1 mark

to produce.				
The functional groups present in simple carbohydrates are:	–OH and – COOH	–OH and – CHO or –CO	$–NH_2$ and – COOH	–CO– and – NH_2

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

OR	Describe the structural difference between D-glucose and L-glucose. How it affects their biological function?

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

OR	Why irreversible inhibitors lead to permanent loss of enzyme activity? Give one industrial or medical example.	2+1
	Briefly explain the terms COD and BOD used in	1.5

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

	catalyst.			example.	
(xii)	Write three differences between DNA and RNA.	1x3	OR	Briefly explain the terms COD and BOD used in environmental chemistry.	1.5 + 1.5

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Uncertainties and errors in measurement and results

Domain F: Empirical Data Collection and Analysis

(viii)	Differentiate between qualitative and quantitative analysis with suitable example in each.	**03**
(ix)	How can ethanol and acetone be differentiated using	

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Qualitative analysis (Mass Spectrometry)

Domain F: Empirical Data Collection and Analysis

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

OR	An unknown organic compound has a strong absorption band around 1700 cm^{-1} in its IR spectrum. What functional group is likely present? Suggest a possible structure if its molecular formula is C_3H_6O.	03

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

	analysis with suitable example in each.	
(ix)	How can ethanol and acetone be differentiated using I.R spectroscopy specifically through characteristic signals?	**03**
(x)	Write major products in the given reactions:	

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

OR	Identify any three types of electronic transitions that occur when acetone molecules are subjected to ultra violet radiations.	03

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

Write any three applications of atomic emission spectroscopy.

Second Annual 2025 | Section C Q4 | 7 marks

	reactions with water and alkalis.	2+2
Q.4	What is mass spectrometry? Explain its construction and working.	2+5
Q.5	Justify the following statements:	

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

What is molecular ion peak? State its symbol and write its importance.
Write principle of IR spectroscopy? Enlist any one

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

	Write its importance.
	Write principle of IR spectroscopy? Enlist any one application of IR spectroscopy.

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

	derivative lipids, giving one example of each.
(xii)	A mass spectrum shows M^+ peak = 100% and (M+1) peak = 5.5%. Calculate the number of carbon atoms in the molecule.
(xiii)	Why deuterated solvents are required in NMR

First Annual 2026 | Section A Q16 | 1 mark

The base peak in a mass spectrum corresponds to the:	Molecular ion	Hydrogen bonding	Heaviest fragment	Most stable ion
(CH3CH2OH) has ... different carbon				

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

	Identify the functional groups (type of bond) corresponding to the following IR absorption bands: 3300–3500 cm^{-1}, 1700–1725 cm^{-1}, and 1050–1150 cm^{-1}.	1x3
	Describe the following terms related to	

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

(xii)	Differentiate between molecular ion peak and base peak in mass spectrometery .	1.5 + 1.5

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

	environment.	
OR	Compare the UV absorption of cyclohexene and 1,3-butadiene and explain the difference in terms of conjugation. (Exact range of UV radiations is not required).	03

FBISE model paper | Section A Q8 | 1 mark

8. Which one of the following technique does not involve interaction of electromagnetic radiations with matter?

A. IR spectroscopy B. NMR spectroscopy
C. Mass spectroscopy D. UV spectroscopy

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NMR

Domain F: Empirical Data Collection and Analysis

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

xv.	How can colourless compounds be detected in Thin Layer Chromatography (TLC)?	By observing their natural colors under normal light.	By using ultraviolet (UV) light or chemical staining reagents.	By heating the TLC plate until compounds become visible.	By dissolving the TLC plate in a solvent.	○ ○ ○ ○

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

(iv)	What information can be obtained from the number of signals in a ^{1}H NMR spectrum? Support your answer with a suitable example.	03

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

Briefly describe why ethanol exhibits three signals in its NMR spectrum, whereas acetone shows only one signal.	**03**

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

OR	What is chemical shift? Why is tetramethyl silane (TMS) used as reference for calculating the chemical shift of other compounds in NMR spectroscopy?	**03**
	What will be the effect of Infra red, Ultra violet and	

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

	What information is obtained from number of peaks in NMR spectrum?
	Name any three raw materials used in manufacture

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

in the molecule.			
Why deuterated solvents are required in NMR spectroscopy.	03	OR	Describe the following terms relate chromatography. **a.** Stationary phase **b.** Solvent Front
What is a catalyst? Explain its action with a general			What are pesticides? Enlist any two of their n

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

	in the molecule.
(xiii)	Why deuterated solvents are required in NMR spectroscopy

First Annual 2026 | Section A Q1 | 1 mark

The maximum distance traveled by the solvent is referred as:	Starting point	Solvent front	R_f value	Mobile phase
	Increasing	Changing	Increasing	Lowering

First Annual 2026 | Section A Q17 | 1 mark

correspond to the:		bonding	fragment	ion
17. (CH_3CH_2OH) has _____ different carbon environments in its ^{13}C NMR spectrum.	3	2	1	4
2HA L26005 (D)				

First Annual 2026 | Section C Q6 OR | 6 marks

Phenylamine > Ammonia > Ethylamine.

OR

A student records a ^1H NMR spectrum using tetramethylsilane (TMS) as a reference.

a. Why TMS is used as a standard for chemical shift measurements? Explain.

b. Why deuterated solvents are required in NMR

Phenylamine > Ammonia > Ethylamine.

A student records a ^1H NMR spectrum using tetramethylsilane (TMS) as a reference.

a. Why TMS is used as a standard for chemical shift measurements? Explain.

b. Why deuterated solvents are required in NMR spectroscopy? Explain.

FBISE model paper | Section A Q7 | 1 mark

7. Which one of the following is used as reference in NMR spectroscopy?

A. Tetra chloromethane B. Tetra methylsilane

C. Tetra silanemethane D. Tri iodomethane

FBISE model paper | Section A Q17 | 1 mark

17. Which one of the following nuclei is NMR active?

A. C^{12} B. C^{13}

C. O^{16} D. Ne^{10}

OR

What information is obtained from number of peaks and area under the peaks in NMR spectrum? (1+2)

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Materials

Domain F: Empirical Data Collection and Analysis

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

OR	Describe the mechanism by which a catalyst speeds up a chemical reaction. Explain this using the oxidation of sulfur dioxide) to sulfur trioxide in the presence of vanadium (V) oxide as a catalyst.	03

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

(xiv)	What is a catalyst? Explain its action with a general graphical representation.

SECTION

First Annual 2026 | Section A Q2 | 1 mark

solvent is referred as:

Catalysts accelerate reactions by:	Increasing temperature only	Changing reaction enthalpy	Increasing reactant concentration	Lowering activation energy

$Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$

(xiv)	Describe any three properties of alloys that make them important.	**1x3**

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Agriculture

Domain F: Empirical Data Collection and Analysis

Second Annual 2025 | Section A Q16 | 1 mark

Which gas is mainly responsible for acid rain?	CH_4	SO_2	O_2	N_2

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

a. Stationary phase b. Solvent Front
What are pesticides? Enlist any two of their negative aspects.

ks 26)

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

Briefly describe any three different types of fertilizers along with their importance.	1x3

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

1+2	**OR**	Write a balanced chemical equation for the reaction of acid rain (containing sulphuric acid) with calcium carbonate in the soil. Explain how this reaction affects soil pH and crop growth.	03

FBISE model paper | Section A Q4 | 1 mark

4. Aerosols and lotions are used as:

A. Fungicides B. Repellents

C. Herbicides D. Miticides

APOLLO

Industry

Domain F: Empirical Data Collection and Analysis

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

				acid and acetic acid.
(vi)	What is destructive distillation of Coal? Write any two products obtained by destructive distillation of coal.	03	OR	Write any three important fractions along with their specific use obtained by fractional distillation of petroleum.

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

OR	Write any three important fractions along with their specific use obtained by fractional distillation of petroleum.	03

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

(xii)	Briefly describe the "Atmosphere", "Lithosphere" and "Biosphere" as a source of raw materials for chemical industries.	**03**
(xiii)	A stream of water has the following BOD levels 5mg/l	

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

FTIR spectrum?	
Name any three raw materials used in manufacturing of Nail Polish.	
Brief [illegible]	

APOLLO

Titrations

Domain G: Lab and Practical Skills

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

	Acetophenone from benzene.	
OR	A 20.0 cm^3 sample of 0.200 $moldm^{-3}$ $NH_3(aq)$ was titrated with 0.100 $moldm^{-3}$ HCl. Sketch how the pH changes during this titration. Mark clearly where the end point occurs.	03

Second Annual 2025 | Section A Q1 | 1 mark

Titration is the example of:	Structural analysis	Quantitative analysis	Qualitative analysis	Speculative analysis
Which element in Period 3 has the highest				

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

with the help of chemical reactions?	
Sketch the titration curve of a weak base with a strong acid and indicate the position of the equivalence point.	2+1
Write the IUPAC name of the following coordination	1.5