

APOLLO

Chemical Kinetics

FBISE Chemistry Class 11 (HSSC-I)

Domain B: Physical Chemistry

22 questions | questions

Original FBISE question crops. National Curriculum 2022-23 topic.

In a series of experiments, the initial rate of a reaction was measured at different concentrations of reactant A (with all other conditions constant):

Experiment	[A] / mol dm ⁻³	Initial Rate / mol dm ⁻³ s ⁻¹
1	0.10	0.020
2	0.20	0.080
3	0.40	0.320

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Based on the experimental data, what is the correct rate equation for the reaction with respect to reactant A?

Rate = k[A]

Rate = k[A]²

Rate = k[A]³

Rate = k

20.	At higher temperature, the Boltzmann distribution curve becomes:	Narrower and taller	Broader and flatter	Unchanged	Discontinuous
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27.	A student studies the decomposition of a substance A. The reaction is found to be first order, with a half-life of 10 minutes at a fixed temperature. The value of the rate constant (k) is:	0.0693 min ⁻¹	0.693 min ⁻¹	14.43 min ⁻¹	1.443 min ⁻¹
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Q3	Using the Boltzmann distribution curve of molecular energies, explain briefly why a higher temperature increases the rate of reaction. Explain how the use of a catalyst increases the rate of a reaction.	2+2	OR	Use the rules of systematic nomenclature (IUPAC) to write the name of the following structures. CH ₂ =C(CH ₃)-CH ₂ -CH(CH ₃)-CH ₃ (CH ₃) ₂ CH-CH(CH ₃)-CH ₂ -OH CH ₃ -C(O)-CH(CH ₃)-CH ₂ -CH ₃
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16.	Identify correct relationship for determination of half-life of a first order reaction:	$t_{1/2} = 0.693 / k$	$t_{1/2} = [A^0] / 2k$	$t_{1/2} = 1 / k[A^0]$	$t_{1/2} = 0.0231[A^0] / k$	☐	☐	☐	☐
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OR	For the reaction $N_2O_4 \longrightarrow 2NO_2$, the concentration of N_2O_4 is reduced from 0.1M to 0.05M in 60 sec. If reaction is 1 st order, calculate rate constant for this reaction.	03
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What is solubility product? Derive an expression for the solubility product of CaF_2 . How can the concept of solubility product be applied to predict the precipitation of CaF_2 on mixing aqueous solutions of Ca^{+2} and F^{-1} ions?	1+2 +4	OR	Explain the occurrence of a chemical reaction with reference to molecular collisions, activation energy, formation of activated complex and enthalpy changes in the reaction.
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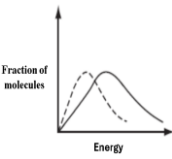
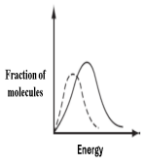
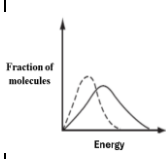
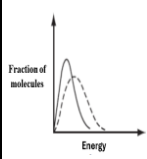
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reaction.	
OR How does a catalyst affect the rate of a chemical reaction? Explain by drawing a reaction pathway diagram.	03
How can Iodoform test be applied for identification	

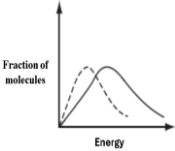
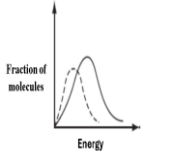
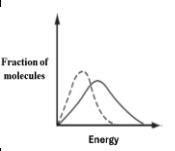
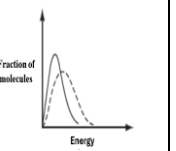
standard enthalpy of formation:				
7. A catalyst increases the rate of reaction by:	Increasing activation energy	Decreasing temperature	Changing equilibrium constant	Lowering activation energy
If an element "X" has 1 st ionization energy				

Q.5	Use the Maxwell-Boltzmann distribution curve to explain the effect of temperature on the rate of a reaction with the help of General graphical representation.	3+3
Q.6	What is meant by Nucleophilic addition reaction?	

Q1. Fill the relevant bubble against each question according to curriculum. Each part carries one mark.

	Question	A	B	C	D	A	B	
i.	0.1 mole of NaCl contains 6.02×10^{22}	molecules	formula units	ions	atoms	☐	☐	(
ii.	Which solid-line curve most accurately represents the distribution of molecular energy in a gas at 500 K if the dotted-line curve represents the corresponding distribution for the same gas at 300 K?					☐	☐	(

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iii.	For the rate law , Rate = $k[A]^{\frac{1}{2}}[B]$, predict order with respect to A, the order with respect to B and the total order.	$\frac{1}{2}$; 0; $\frac{1}{2}$	$\frac{1}{2}$; 1; 1	$\frac{1}{2}$; 1; $\frac{3}{2}$	$\frac{1}{2}$; 1; 2	☐	☐	☐

First Annual 2025 | Section A Q13 | 1 mark

13.	When a reaction proceeds in a sequence of steps, the overall rate is determined by:	Fastest step	Slowest step	Order of reaction	Molecularity of all steps
			Number of		Number of

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

(ii)	What is the effect of catalyst on the following: a) Rate of reaction b) The energy of activation c) The equilibrium position	03
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First Annual 2025 | Section B Q2(xii) | 3 marks

(xii)	The rate law for the following reaction $2H_2 + 2NO \longrightarrow N_2 + 2H_2O$ $Rate = K[H_2][NO]^2$ Propose mechanism. Identify rate determining step in the mechanism.	03
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First Annual 2025 | Section B Q2(xiv) | 3 marks

(xiv)	How the nature of reactant and surface area affect the rate of reaction?	03
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Second Annual 2025 | Section A Q13 | 1 mark

13.	Which factor does NOT affect the rate of reaction?	Temperature	Concentration	Catalyst	Color of reactants
14.	Colligative properties depend on:	Nature of solute	Number of solute	Molar mass of solvent	Volume of solvent

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

OR	crystallization and geometrical shape.	
	Briefly explain what is meant by the terms activation energy and activated complex.	1.5 +1.5

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

(x)	Differentiate between homogeneous catalysis and heterogeneous catalysis.	1.5 +1.5
(xi)	Why a solution has a lower vapor pressure than	

First Annual 2026 | Section C Q3 OR | 6 marks

Attempt the following questions.

Q.3	20 g of H_2SO_4 on dissolving water completely ionizes. Calculate:			What is order of reaction? Give one example each of first order, zero order, second order, third order and pseudo first order reactions.	
	a. No. of H_2SO_4 molecules	2x3	OR		1x6

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

OR	What is meant by order of reaction? Write rate equation for following reaction. $NH_4NO_2 \rightarrow N_2 + 2H_2O$
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First Annual 2026 | Section B Q2(x) OR | 3 marks

OR	Differentiate between homogeneous and heterogeneous catalysis.	03
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