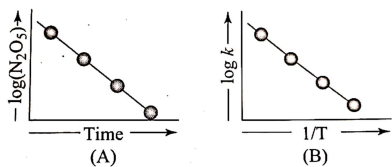


NEW STANDARD ACADEMY

SEMRI KOTHI SUPER MARKET, RAEBARELI

CLASS 12 (Chemistry) DPP (Academy)

- The decomposition of Cl_2O_7 at 400 K in the gas phase to Cl_2 and O_2 is a first order reaction. After 55 sec at 400K, the pressure of Cl_2O_7 falls from 0.062 to 0.044 atm, the rate constant (in s^{-1}) is calculated as $x \times 10^{-3}$, x is _____
- The reaction $\text{SO}_2\text{Cl}_2(\text{g}) \rightarrow \text{SO}_2(\text{g}) + \text{Cl}_2(\text{g})$ is a first order gas reaction with $k=2.2 \times 10^{-5} \text{sec}^{-1}$ at 320°C . What % of SO_2Cl_2 is decomposed on heating for 90 min?
- The half-life of the reaction $\text{N}_2\text{O}_5(\text{g}) \rightarrow 2\text{NO}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g})$ is 2.4 hrs at 30°C . Starting with 10g of N_2O_5 how many grams of N_2O_5 will remain after a period of 96 hour?
For question 14-15
- Dinitrogen pentoxide decomposes to NO_2 and O_2 following first order kinetics
 $\text{N}_2\text{O}_5(\text{g}) \rightarrow 2\text{NO}_2 + \text{O}_2(\text{g})$, 0.2 mole of N_2O_5 was taken in 2L vessel and heated at 200 K. The concentration of N_2O_5 is measured at different intervals following graphs A and B were obtained from the data.

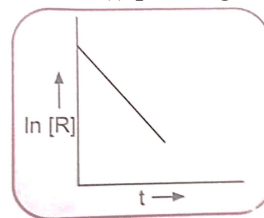


- Slope of straight line in graph A is $-1.2 \times 10^2 \text{sec}^{-1}$. What is half-life of the reaction?
 - $2.5 \times 10^{-2} \text{s}$
 - $2.5 \times 10^{-3} \text{s}$
 - $12.5 \times 10^{-4} \text{s}$
 - $2.5 \times 10^{-3} \text{m}$
- The rate of reaction after $5 \times 10^{-3} \text{s}$ is
 - $6.90 \text{mol L}^{-1} \text{s}^{-1}$
 - $3.42 \text{mol L}^{-1} \text{s}^{-1}$

c) 6.84mol L^{-1}

d) 6.84mol s^{-1}

- Show graphically the average and instantaneous rate of reaction
- Distinguish between rate expression and rate constant of reaction.
- Explain the difference between order and molecularity of reaction with examples
- Define velocity constant. What are the units of rate constant of zero first and second order reaction.
- What do you understand by a first order reaction?
Show that for a first order reaction time required to complete a definite fraction of the reaction is independent of initial concentration.
- What is the effect of temperature, concentration and catalyst on rate and rate constant of the reaction?
- Define order of reaction. Give an example and mathematical expression for a zero order reaction.
- The following data were obtained during the first order thermal decomposition of SO_2Cl_2 at a constant volume.
- For a chemical reaction $\text{R} \rightarrow \text{P}$, the variation in the concentration (vs. time(t) plot is given as:



- Predict the order of the reaction.
 - What is the slope of the curve?
 - Write the unit of rate constant for this reaction.
- Define the following terms:
 - Pseudo first order reaction
 - Half period of reaction
 - Derive integrated rate equation for rate constant of zero order reaction.
 - For the reaction $2\text{N}_2\text{O}_5(\text{g}) \rightarrow 4\text{NO}_2(\text{g}) + \text{O}_2(\text{g})$, the rate of formation of $\text{NO}_2(\text{g})$ is $2.8 \times 10^{-3} \text{Ms}^{-1}$. Calculate the rate of disappearance of $\text{N}_2\text{O}_5(\text{g})$.

- The conversion of molecules X to Y follows second order kinetics. If concentration of X is increased to three times how will it affect the rate of formation of Y?
- A first order reaction has a rate constant $1.15 \times 10^{-3} \text{ s}^{-1}$. How long will 5g of this reactant take to reduce to 3g?
- What do you understand by the rate law and rate constant of a reaction? Identify the order of a reaction if the units of its rate constant are:
 - $\text{L}^{-1} \text{ mol s}^{-1}$
 - $\text{L mol}^{-1} \text{ s}^{-1}$
- What happens to the rate constant k and activation energy E_a as the temperature of a chemical reaction is increased? Justify.

NEW STANDARD ACADEMY

SEMRI KOTHI SUPER MARKET, RAEBARELI

CLASS 11 (Chemistry) DPP (Academy)

- What is the basic theme of organization in the periodic table?
- What is the basic difference in approach between the Mendeleev's periodic law and the modern periodic law?
- In terms of period and group where would you locate the element with $z=114$?
- Write the atomic number of the element present in the third period and 17th group of the periodic table.
- Which element do you think would have been named by
 - Lawrence Berkeley laboratory
 - Seaborg's group?
- What does atomic radius and ionic radius really mean to you?
- What do you understand by isoelectronic species? name a species that will be isoelectronic with each of the following atoms or ions.
 - F^-
 - Ar
 - Mg^{2+}
 - Rb+
- Consider the following species : $N^{3-}, O^{2-}, F^-, Na^+, Mg^{2+}$ and Al^{3+}
 - What is common in them?
 - Arrange them in the order of increasing ionic radii
- Explain why Cations are smaller and anions are larger in radii than their parent atoms?

- What is the significance of the terms 'isolated gaseous atom and ground state while defining the ionization enthalpy and electron gain enthalpy?
- Energy of electron in the ground state of the hydrogen atom is $-2.18 \times 10^{-18} \text{ J}$. calculate the ionization enthalpy of atomic hydrogen in terms of J/mol
- Among the second period elements, the actual ionization enthalpies are in the order: $Li < B < Be < C < O < N < F < Ne$
explain why : (a) Be has higher $\Delta_i H$ than B (b) O has lower $\Delta_i H$ than N and F?
- What are the various factors due to which the ionization enthalpy of the main group elements tends to decrease down the group?
- The first ionization enthalpy values (in kJ/mol) of group 13 elements are:

B	Al	Ga	In	Tl
801	577	579	558	589

 How would you explain this deviation from the general trend ?
- Would you expect the second electron gain enthalpy of O as +ve, more -ve or less -ve than the first? Justify your answer
- Use the periodic table to answer the following questions:
 - Identify an element with -5 electrons in the outer sub-shell.
 - Identify an element that would tend to lose two electrons
 - Identify an element that would tend to gain two electrons
 - Identify the group having metal non-metal, liquid as well as gas at the room temperature.
- Assign the position of the element having outer electronic configuration:
 - $ns^2 np^4$ for $n=3$
 - $(n-1)d^2 ns^2$ for $n=4$ and
 - $(n-2)f^7 (n-1)d^1 ns^2$ for $n=6$, in the periodic table
- Considering the elements B, Al, Mg and K, the correct order of the metallic character is?
- Considering the elements F, Cl, O and N, the correct order of their chemical reactivity in terms of oxidizing property is:
- the first ($\Delta_i H_1$) and second ($\Delta_i H_2$) ionization enthalpies and electron gain enthalpies ($\Delta_{eg} H$) few elements are given below ;

S

Element	$\Delta_i H_1$ (kJ/mol)	$\Delta_i H_2$ (kJ/mol)	$\Delta_{eg} H$ (kJ/mol)
I	530	7300	-60
II	419	3051	-48
III	1681	3374	-328
IV	1008	1846	-295
V	2372	5251	+48
VI	738	1451	-40

which of the above element is likely to be ;

- The least reactive element
- The most reactive element
- The most reactive non- metal
- The least reactive non- metal
- The metal which can form stable binary halide of the formula MX_2