

Variant 1

1. What reactions called parallel? Give examples.
2. Write Arrhenius equation for activation energy.
3. **Task.** Calculate the time of decomposition of 7% of substance, if rate constant is equal to $13,5 \cdot 10^{-3} \text{ min}^{-1}$

Variant 2.

Theme «CHEMICAL KINETICS. CATALYSIS»

1. What is order of chemical reaction? Give an example of 1-st order reaction.
2. What reactions called sequential? Give examples.
3. **Task.** Calculate how many % of substance will decompose through 11 days, if rate constant is equal to $0,6 \cdot 10^{-4} \text{ day}^{-1}$.

Variant 3

Theme «CHEMICAL KINETICS. CATALYSIS»

1. What is order of chemical reaction? Give an example of 2-nd order chemical reaction in case of equal initial concentration of reagents.
2. What reactions called sequential? Give examples.
3. **Task.** Rate constant of alkaline hydrolysis of butylacetate in 10°C is equal to 1,9, and in 20°C – $3,93 \text{ l} \cdot \text{mol}^{-1} \cdot \text{min}^{-1}$. Calculate the energy of activation of this reaction.

Variant 4

Theme «CHEMICAL KINETICS. CATALYSIS»

1. Classification of complex reactions with examples.
2. What substances called catalysts. Mechanism of catalysts' action.
3. **Task.** Rate constant of medicinal substance decomposition in aqueous solution in 20°C is equal to $1,5 \cdot 10^{-8} \text{ s}^{-1}$. Calculate the time of 10% decomposition of this substance.

Variant 5

Theme «CHEMICAL KINETICS. CATALYSIS»

1. What is pseudomonomolecular reactions. Give examples.
2. Give a definition of enzymatic catalysis. Give examples.
3. **Task.** During accident on atomic electric station the ^{126}I isotope with half-life period 8 days is emitted to atmosphere. Calculate the time of 90% decomposition of radioactive isotope.

Variant 6

Theme «CHEMICAL KINETICS. CATALYSIS»

1. What is order of chemical reaction? Give an example of 2-nd order reaction (different initial concentrations of reagents) and write its kinetic equation.
2. What is energy of activation. Write Arrhenius equation for energy of activation.
3. **Task.** Rate constant of hydrolysis of medicinal substance in 10-% solution in 313 K temperature is equal to $6,6 \cdot 10^{-6} \text{ мин}^{-1}$. Energy of activation of this reaction is 55,2 kDj/mol. Calculate the rate constant of this reaction in 20 °C.

Variant 7

Theme «CHEMICAL KINETICS. CATALYSIS»

1. Explain, how the rate of chemical reaction depends on energy of activation?
2. What reactions called heterophase? Give examples.
3. **Task.** Calculate, how many % of substance will decompose trough 25 min., if the rate constant of this decomposition is equal to $17 \cdot 10^{-5} \text{ min}^{-1}$.

Variant 8

Theme «CHEMICAL KINETICS. CATALYSIS»

1. What factors influence rate constant value?
2. What is homogenous catalysis? Give example of acid-base catalysis.
3. **Task.** 10% decomposition of substance goes in 23 min. Calculate the rate constant of this reaction.

Variant 9

Theme «CHEMICAL KINETICS. CATALYSIS»

1. Explain the law mass action. Write its mathematical representation.
2. What is heterogeneous catalysis? Give examples.
3. **Task.** While dehydration of succinic acid forms maleic acid. The reaction goes according to 1-st order kinetics with half-reaction period 15,86 min. How many time is needed for 99% dehydration of succinic acid?

Variant 10

Theme «CHEMICAL KINETICS. CATALYSIS»

1. Describe the accelerated aging method.
2. What is inhibitors? Give examples of using inhibitors?
3. **Task.** Calculate the energy of activation of chemical reaction, if the rate constant of this reaction in 25° C is equal to 87 kDj/mol, and in 30° C 155 kDj/mol.

Variant 11

Theme «CHEMICAL KINETICS. CATALYSIS»

1. Write Arrhenius equation for the dependence of rate constant from temperature. Call all the values in this equation.
2. What is catalytic poison?
3. **Task.** Half-life period of substance is 18 min. Calculate the rate constant of this reaction (decomposition goes according to 1-st order kinetics).

Variant 12

Theme «CHEMICAL KINETICS. CATALYSIS»

1. What is half-life period? How to calculate it?
2. What is energy of activation?
3. **Task.** 50% denaturation of protein in 60 °C went for 8 min. What time is needed for 99% denaturation? (reaction of 1-st order).

Variant 13

Theme «CHEMICAL KINETICS. CATALYSIS»

1. What is molecularity of reaction?
2. What kinds of catalysis do you know?
3. **Task.** The rate constant of reaction in 10 °C is equal to $2,38 \cdot 10^{-3} \text{ min}^{-1}$. Calculate the time, needed for 50% decomposition of substance.