

## Physical and Organic chemistry

1. The subject of physical chemistry and its basic concepts.
2. The laws of Thermodynamics. First law of Thermodynamics.
3. Hess law. Consequences of Hess's law.
4. Heat of reaction dependence on temperature, Kirchhoff law.
5. The laws of Thermodynamics. Second law of Thermodynamics.
6. Entropy. Calculating absolute entropy using the Boltzmann hypothesis.
7. The laws of Thermodynamics. Third law of Thermodynamics.
8. Thermodynamic potentials. Gibbs– Helmholtz equation.
9. Isothermal and isobaric equations of reaction.
10. Solutions. Solubility.
11. Composition of solutions. Expressing methods.
12. Colligative properties of solutions.
13. Cryoscopy. Ebullioscopy.
14. Basic concepts Chemical kinetics.
15. Kinetics of first-, second- and third-order irreversible reactions.
16. The effect of temperature on the reaction rate.
17. Photochemical reactions, properties, regularities.
18. Catalytic reactions and its properties.
19. Homogenous catalysis.
20. Hheterogeneous catalysis.
21. Electrochemistry.
22. Electrical conductivity of solutions.
23. Organic chemistry and relationship with another natural sciences.
24. Types of bonds chemical compounds.
25. Organic compounds. Homologous series, nomenclature, isomerism.
26. Alkanes. Synthesis and chemical behaviours.
27. Alkanes.
28. Alkadienes.
29. Alkynes.
30. Cycloalkanes.
31. Aromatic hydrocarbons.
32. Benzene structure. Criteria for aromaticity.
33. Alcohols.
34. Phenols.
35. Aldehydes. Structure, polarity and polarity ability of carbonyl group.
36. Aldehydes. Synthesis and chemical behaviours.
37. Ketones.
38. Carboxylic acids.
39. Esters.
40. Fats and fatty acids.
41. Hydrogenation and saponification of oils
42. Synthetic detergents. Soaps.
43. Carbohydrates. Classification and synthesis of Carbohydrates.
44. Carbohydrates. Chemical behaviours.

- 45.** Amines. Classification, nomenclature, isomerism and basicity.
- 46.** Amines. Synthesis and chemical behaviours.
- 47.** Amino acids.
- 48.** Proteins.