FACULTATEA DE FARMACIE
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TEMATICA DE CONCURS
pentru ocuparea postului didactic de Profesor universitar, poziţia 14 din Statul de funcţiuni al Departamentului II, Facultatea de Farmacie
Disciplina: Chimie organică; Produse tehnico-medicale

Themes for the contest:

1. Introduction to organic chemistry. Composition and constitution of organic compounds. Electronic structure and properties of organic compounds. Electronic effects in organic molecules.
2. Optical isomerism. Central chirality, axial chirality, planar chirality. The importance of optical isomerism in biological processes and in chiral drugs synthesis.
3. Alkanes. Reaction mechanisms: homolytic substitution (through free radicals), ionic (heterolytic) reactions. Cycloalkanes. Ring strain theory. Stereoisomerism of cyclic compounds.
4. Saturated, allylic, vinylic halogenated compounds. Unimolecular aliphatic nucleophilic substitution and bimolecular aliphatic nucleophilic substitution.
5. Alkenes. Isomerism of alkene-diastereomers. The mechanism of unimolecular and bimolecular elimination reactions. The mechanism of electrophilic addition and radical (homolytic) addition
6. Dienes and polyenes. Conjugation and resonance. Polymers. Polymerization reactions. Alkynes. Addition reactions, ionic combinations of alkynes.
7. Aromatic hydrocarbons. Aromaticity. The mechanism of electrophilic aromatic substitution. Arenes: alkylbenzenes and alkenylbenzenes. Reaction mechanisms: nucleus vs. lateral chain, rate vs. equilibrum.
8. Polycyclic aromatic hydrocarbons. Synthesis of polycyclic derivatives via cyclization. Haworth synthesis. Potentially carcinogenic hydrocarbons: mechanism of action.
9. Aliphatic hydroxy compounds. Alcohols. Grignard reaction. The mechanism of esterification reaction. Halogenoalcohols. Dihydric and polyhydric alcohols
10. Aromatic hydroxy compounds. Phenols. Electrophilic aromatic substitution: the Fries rearrangement, the Kolbe Schmith reaction. Halogenophenols.
11. Ethers and epoxides. Crown ethers: host-guest interaction and molecular recognition.

12. Nitrogen compounds. Amines. The importance of acylation rection. Sulfonation of aromatic amines-sulfonamides. Polyamines with biological importance. Nitroderivatives, nitroso-derivatives, hydroxylamines. Diazonium salts. The mechanism of diazotization and coupling reactions. Polyamides. Aminoalcohols, aminophenols.
13. Carbonyl compounds: aldehydes and ketones. Organic compounds. Dicarbonyl and polycarbonyl combinations. The mechanism of nucleophilic addition. The mechanism of condensation in acid and base catalysis. Unsaturated carbonyl compounds, quinones.
14. Carboxylic acids. α, β unsaturated carboxylic acids. Dicarboxylic acids. Hydroxy acids.
15. Functional derivatives of carboxylic acids. Nucleophilic substitution at C-sp^2. Acid halides. Acid anhydrides. Esters. The mechanism of esters hydrolysis in acid and base catalysis. Lipids, waxes, soaps. Polyesters. Amides. Nitriles. Isonitriles.
16. Heterocyclic compounds. Pentatomic heterocyclic compounds. Hexatomic heterocyclic compounds. The importance of heterocyclic compounds in biology and pharmacy.
17. Carbohydrates (saccharides): Monosaccharides: molecular structure, properties, optical activity. Disaccharides. Polysaccharides. Structure, properties, representatives and their importance in pharmacy.
18. Terpenoids, carotenoids, steroids. Representatives and their importance in pharmacy.
19. Amino acids: natural state, isomerism, preparation, physical and chemical properties. Peptides: the geometry of peptide bond, structure determination of peptides, peptide synthesis. Proteins: primary, secondary, tertiary and quaternary structure, conjugated proteins.
20. Organic chemistry of drugs. Drug design. Quantitative Structure-Activity Relationships (QSAR).
21. Technical-medical products for wound management. Protective materials and equipment.
22. Accessories for parenteral administration of drugs.
23. Diagnostic devices and apparatus. Self-testing devices.
24. Devices used in dentistry. Parapharmaceuticals for oral hygiene.
25. Products for sexual protection and contraception.
26. Technical-medical products for childcare.

Bibliography:

1. Leroy Wade Jan Simek, Organic Chemistry, Global Edition, Pearson Education Limited, 2022.
2. William H. Brown, Brent L. Iverson, Eric Anslyn, Christopher S. Foote, Organic Chemistry 9th Edition, Cengage Learning, Inc, 2022.
3. Paul Arnaud, Cours de chimie organique, 20e édition, Dunod, Paris, 2021.

4. Vogel P., Houk K.N., Organic Chemistry: Theory, Reactivity and Mechanisms in Modern Synthesis, 1st Edition, Wiley-VCH, 2019
5. Bruice P.Y., Organic Chemistry, 8th Edition, Pearson Education, 2015.
6. Jonathan Clayden, Nick Greeves, Stuart Warren, Organic Chemistry, Second edition, Oxford University Press Inc., New York, 2012.
7. C.D. Neniţescu, Chimie Organică vol. I + II, Ediţia VIII, Editura Didactică şi Pedagogică, Bucureşti, 1980.
8. Margareta Avram, Chimie Organică, vol. I + II, Editura Academiei, 1983.
9. Ahmed Ibrahim Fathelrahman, Medical Devices for Pharmacy and Other Healthcare Professions, Taylor & Francis Ltd, 2021.
10. Sevastre A.S., Produse Tehnico-Medicale, Editura Sitech, Craiova, 2017.
11. Simona Mirel, Flavius Neag, Produse Tehnico-Medicale, Editura Medicală Universitară "Iuliu Haţieganu", Cluj-Napoca, 2008.
12. The European Pharmacopoeia, Tenth edition, Council of Europe, 67075 Strasbourg Cedex, France, 2019.