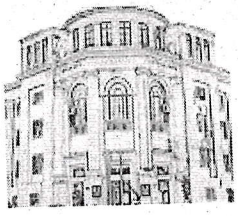
«ԵՐԵՎԱՆԻ ՄԽԻԹԱՐ ՀԵՐԱՑՈՒ ԱՆՎԱՆ ՊԵՏԱԿԱՆ ԲԺՇԿԱԿԱՆ ՀԱՄԱԼՍԱՐԱՆ» ՀԻՄՆԱԴՐԱՄ

"YEREVAN STATE MEDICAL UNIVERSITY AFTER MKHITAR HERATSI" FOUNDATION

Ֆարմացիայի ամբիոն
Department of Pharmacy



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Questionnaire on IV year "Pharmaceutical chemistry" state exam for bachelor's degree students

2025-2026 academic year

1. Drug analysis methods: physical, chemical, physicochemical, biological. Methods of pharmacopea, Purity detection methods.
2. Drugs identity detection. Drugs identity detection chemical methods, general (group) and specific (particular) reactions, their differences. Inorganic substances functional analysis. Anions and kations general identification methods.
3. Element-organic analysis. Mineralization methods for sulfur, nitrogen, halogens, metals containing organic substances. Belstein test, description and significance.
4. Organic drugs functional analysis: nitration reactions, nitrozation reactions, diazotation and azoconjugation reactions, halogenation reactions, condensation reactions for amine and carbonyl groups, lignin test reaction.
5. Organic drugs functional analysis: salt and complex formation reactions. esteration, acylation, hydrolysis reactions. Oxidation-reduction and decomposition reactions.
6. Organic bases and their salts detection reactions: general and specific alkaloid reagents, their description. Heterocycles detection: pyridine detection reaction: Zinke method. Xanthine derivatives detection reactions: murexide sample reaction.
7. Drugs quantitative analysis chemical methods. Advantages and disadvantages. Drugs quantitative analysis titrimetric methods. Acid-base titration in aqueous medium. Direct and indirect neutralization methods. Titration in non-aqueous solvents medium: titration of weak and very weak bases.
8. Precipitating titration methods. Argentometry: Mohr, Volhard, Fajans methods. Thiocyanometry, mercurimetry, mercurometry.
9. Oxidation-reduction titration methods. Iodometry, iodine-chlorometry, iodatometry, bromatometry, bromometry, permanganatometry, cerimetry. Complexometry, complexonometry: conditions, titrant, indicators. Nitritometry (methods of equivalence point detection). Gravimetric and gasometric methods of quantitative analysis. Element quantitative analysis. Keldahl method. Method of burning with oxygen in a flask.
10. Physical and physicochemical methods usage in drug analysis. Classification of physicochemical methods.
11. Optical methods: refractometry. Refractive index, factors influencing on the refractive index. Specificities of refractometry. Structure and work principle of the devices applied in refractometry.

26. Salicylic acid derivatives: Salicylic acid, Acetylsalicylic acid, Salicylamide, Phenylsalicilate. Synthesis, identification, quantitative analysis.
27. Para aminophenol derivatives : Paracetamole, structure, identification, quantitative analysis.
28. Narcotic analgesics. Phenantren isochinoline /morphinan/ derivatives. Morphine hydrochloride. Chemical structure, physicochemical properties, identification, quantitative analysis. Morphine derivatives: Codeine, Codeine phosphate, Apomorphine hydrochloride, Naltrexone hydrochloride, Promedole. Chemical structure, physicochemical properties, identification, quantitative analysis.
29. Antihistaminic products- H1 histamine receptor blockers. Diphenyl hydramin hydrochloride /dimedrol/, chemical structure. Synthesis, identification, quantitative analysis, usage. H2 histamine receptor blockers: Ranitidine hydrochloride, synthesis, physical properties, identification, quantitative analysis.
30. Calcium antagonists. Nifedipine chemical structure, synthesis, identification, quantitative analysis, usage. Verapamil chemical structure, identification, quantitative analysis.
31. Drugs acting on blood system. Neodicumarine, Phepromaron, Varfarin. Identification, quantitative analysis. Indandione derivatives, Phenyllin. Identification, quantitative analysis.
32. Spasmolytics: Benzylisoquinoline derivatives. Papaverin, Drotaverin /no-spa/ hydrochloride, chemical structure, physical properties. Papaverin hydrochloride synthesis, physical properties. Identification, quantitative analysis, storage conditions.
33. Benzimidazole derivatives: Dibazole /Bendazol/. Dibazole hydrochloride chemical structure, synthesis, identification, quantitative analysis, storage conditions.
34. Nitrates- Nitroglycerine, Nitrosorbit, Isosorbit mono-nitrate, Erinite, synthesis, physical properties, identification, quantitative analysis, storage conditions.
35. Anti-metabolites. Pyrimidine derivatives. Uracil derivatives, fluorine-uracil, methyl-uracil, tegafur-uracil (ftorafur), zidovudine, stavudine. Fluorine-uracil synthesis, physical properties, identification, quantitative analysis. Methyl-uracil, synthesis, physical properties, identification, quantitative analysis.
36. Purine synthetic derivatives. Mercaptopurine, synthesis, identification, quantitative analysis. Azathioprine, riboxin, allopurinol, physical properties, identity, quantitative analysis.
37. Hormones. Corticosteroids: cortizon, dezoxicorticosteron, hydrocortisone, prednisolone, prednisone. Cortisone industrial synthesis. Physical properties, identity, quantitave analysis. Corticosteroids, fluorine derivatives /semi-synthetic dexamethasone, triamcinolone, flumethasone pivalate, fluocinolone acetonide, synthesis, identity, quantitative analysis.
38. Female sex hormones. Hestagen and semi-synthetic derivatives. Progesterone and its semi-synthetic derivatives norethisterone and met-oxy-progesterone acetate. Progesterone synthesis, identification quantitative analysis.
39. Estrogen hormones- estrone, estriol, estradiol, estradiol di-propionate, ethinyl estradiol, sinthesys, physical properties, identification, quantitative analysis. Synthetic estrogenes: hexestrol, diethylstilbesterol, sinthesys, physical properties, identification, quantitative analysis.
40. Male sex hormones. Androgens. Natural androgen hormones androsterone, dehydroandrosteron, testosteron. Testosterone industrial synthesis. Testosterone semi-synthetic derivatives-testosterone propionate and methyl-testosterone, sinthesys, physical properties, identification,

53. Bioflavanoids, Vitamin P: Rutine, Cvercetin. Identification reactions, quantitative determination methods.
54. Vitamin C: Ascorbinic acid. Synthesis, physical properties. Identification reactions, quantitative determination methods.
55. Oxymethylpyridine derivatives: Vitamin B_6 synthesis, Pyridoxin, Pyridoxamin, Pyriditol. Pyridoxin hydrochloride, synthesis, identification reactions, quantitative determination methods, usage. Pyriditol synthesis, identification reactions, quantitative determination methods, usage. Parmidin synthesis, identification reactions, quantitative determination methods, usage.
56. Pyridine derivatives: Vitamin PP. Nicotinic acid, Nicotinamide, Vitamin PP coenzyme . Nicotinic acid synthesis, identification reactions, quantitative determination methods, usage. Nicodin, Niketamid, Cordiamin. Synthesis, identification reactions. Coamide, Feramide. Synthesis, identification reactions, quantitative determination methods.
57. Isoalloxazine derivatives. Riboflavin Vitamin B_2. synthesis, identification reactions, quantitative determination methods.
58. Pterin derivatives, Folic acid, synthesis, identification reactions, quantitative determination methods.
59. Vitamin K: Vikasol synthesis, identification reactions, quantitative determination methods.
60. Corrin Vitamins, Cyanocobalamin: Vitamin B_{12} synthesis, identification reactions, quantitative determination methods..
61. Retinols: A group vitamins. Vitamin A. Structure and activity. Retinol acetat, Retinol palmitat. identification reactions, quantitative determination methods.
62. Calciferoles, Vitamin D. Synthesis, identification reactions, quantitative determination methods.

Literature

1. «Drug chemistry», Zhamharyan A.G., Sargsyan F.A., Ericyan E.L., YSMU, 2014.
2. "Pharmaceutical chemistry" V.G. Belikov, 2007
3. "Fundamentals of Medicinal Chemistry" Gareth Thomas, 2003.
4. "Pharmaceutical chemistry" Akobyan R., 2007.
5. Lectures of Pharmaceutical chemistry III and IV year.

Head of Pharmacy department _____ associate prof. Zhamharyan A.G.