

# **GENERAL PHARMACEUTICAL CHEMISTRY**

## **EXAM QUESTIONS**

1. State pharmacopoeia. National and regional pharmacopoeias. International pharmacopoeia. The main documents regulating the quality of produced medicines.
2. Classification of medicines. Types of classification. Pharmacological and pharmacotherapeutic classification. Chemical classification.
3. Obtaining medicinal substances from herbal raw materials. Obtaining medicinal substances from animal raw materials and microorganisms. Organic synthesis of pharmaceutical substances.
4. Prerequisites for the development of a new medicinal substance. The stages of development of a new medicinal substance.
5. The standardisation system in health care. Main directions of standardisation of medicines. Tasks and objectives of standardisation.
6. Validation. Validation process. Types of validation process. Particular cases of validation.
7. The main validation steps. Validation parameters.
8. Metrology. Main sections. Goals and objectives. Metrology in pharmacy.
9. Sources and causes of impurities in medicinal products. Classification of impurities.
10. Quality control of medicines. Types of intrachemist's control.
11. The control and analytical laboratory and its functions. Activities of a pharmacist analyst. Professional and job responsibilities. Requirements for a pharmacist-analyst.
12. What is GMP? Main components and principles of GMP. Regulations and standards.
13. Drug incompatibilities and their types. Causes of incompatible drug combinations. Classification of pharmaceutical incompatibilities.
14. Identification of pharmaceutical substances. Criteria for chemical analysis.
15. Identification of inorganic medicinal substances - detection of cations.
16. Identification of inorganic medicinal substances - detection of anions.
17. Identification of organic pharmaceutical substances - aromatic amino group, nitro group, single and multi-atom alcohols, phenolic hydroxyl, aldehyde and keto groups, carboxylic and ester groups.
18. Acid-base titration in aqueous and non-aqueous media.
19. Precipitation titration. Argentometry. Mohr's method. Volhard's method. Fajans method. Mercurimetric titration. Characteristics of the method, working solutions, indicators. Advantages and disadvantages of mercurimetry.
20. The essence and methods of oxidimetry. Permanganatometry. Characteristics, Working solution, standardisation. Determination of oxidising and reducing agents. Advantages and disadvantages of the method.

21. General description of the iodometric titration method. Fixing equivalence point. Standard solutions in iodometry. Preparation, standardisation of working solutions.
22. Application of iodometry in pharmaceutical analysis - determination of ascorbic acid, sodium metamizole and caffeine. Advantages and disadvantages of iodometry.
23. Redox titration - bichromatometry, cerimetry. Characteristics, titration methods, working solutions.
24. Nitritometry. The essence of the method. Working solutions. Indicators of the nitritometry method.
25. Application of the nitritometry method in pharmaceutical analysis. Determination of sulphonamide, tetracaine and chloramphenicol. Advantages and disadvantages of the nitritometry method.
26. General characteristics of the bromatometric method. Preparation and standardisation of working solutions. Fixing the titration end-point. Applications in pharmaceutical analysis.
27. Complexometric titration. Complexons. Chemistry. Methods Fixation of the titration endpoint. Analysis of two- and three-charged cations. Examples.
28. Virus, definition, characteristics. Structure of the virion. Classification of viruses.
29. Influenza. Structure of the virion. The antiviral drug for influenza is Rimantadine.
30. Structure of the HIV-1 virion. Life cycle of HIV-1. Nucleoside Reverse transcriptase inhibitors (NRTIs) of HIV-1. Classification. Azidothymidine, Zidovudine.
31. HIV-1 reverse transcriptase. Structure, function. Inhibitors of the enzyme.
32. Non-nucleoside reverse transcriptase inhibitors (NNRTIs) of HIV-1. Area of binding of NNRTIs to the viral enzyme. Etravirine, rilpivirine - structure, characterization.
33. Viral enzyme - integrase, its function, structure. Integrase inhibitors: Raltegravir - characteristic, structure.
34. HIV-1 protease inhibitors - peptidomimetics. Darunavir - structure, characteristics.
35. Steps of HIV-1 virion entry into the cell. Receptors.
36. Inhibitors of virus attachment to the cell. Cyclosporine-sulfonamides, Tenofovir - structures, characteristics.
37. Inhibitors of virus binding to CCR5 and CXCR4 co-receptors (scheme). Maraviroc - characteristics, structure.
38. Hepatitis B virus (HBV). Structure, life cycle. Nucleoside drug for HBV treatment - lamivudine, adefovir - structure, characteristics.
39. General characteristics of hepatitis C virus. Structure of HCV virion. Life cycle.
40. General pharmaceutical analysis of hepatitis C virus treatment agents: Nucleoside inhibitors of RNA-dependent RNA polymerase (RdRp) - 4'-

- Azidocytidine (R1479) and its prodrug form balopiravir - structure, characteristics.
41. Viruses of the family Herpesviridae. Structure, life cycle.
  42. Anti-herpes drugs in clinical practice: Acyclovir, Valacyclovir - structure, characteristics. Biotransformation of famcyclovir to penciclovir.
  43. General pharmaceutical analysis of anticytomegalovirus drugs: ganciclovir, foscarnet.
  44. General pharmaceutical analysis of anticytomegalovirus drugs: letermovir, maribavir.
  45. Characteristics of the family Coronaviridae. Structure of the coronavirus virion. Life cycle.
  46. Therapy for coronavirus infections: dexamethasone, favipiravir.
  47. General pharmaceutical analysis of antiviral drugs for different applications. Inhibitors of late viral protein synthesis - Thiosemicarbazone derivatives: methisazone - obtaining, analysis.
  48. General pharmaceutical analysis of antiviral drugs for different applications. Antiviral agents of local action: tetraoxotetrahydronaphthalene (oxolin), tebropfen - obtaining, characteristics.
  49. General pharmaceutical analysis of antiviral drugs for different applications. Interferons: interferon alpha, interferon alpha-2a, interferon alpha-2b (monocytic).

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