Szegedi Tudományegyetem Gyógyszerésztudományi Kar
Gyógyszertechnológiai Intézet
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Final exam topics for Pharmaceutical Technology
Theoretical questions-2013-

Physical, colloidal and chemical engineering principles of pharmaceutical technology

1. Electric and magnetic properties of molecules and their significance in pharmaceutical technology
2. Rheological principles of pharmaceutical technology: forces, deformations. Grouping of deformation types
3. Experimental methods of rheology (rheometry)
4. Practical rheology: transport of liquids
5. Disperse and coherent systems in pharmaceutical technology. Grouping of composites and dosage forms according to physical chemical principles
6. Disperse dosage forms and their properties
7. Coherent dosage forms and their properties
8. Surface and interfacial tension. Surfactants
9. Definition, structure and pharmaceutical applications of polymers (in general)
10. Solubility of polymers. Intelligent or sensitive polymers
11. Distillation, ion exchange. Types of purified water in the Pharmacopoeia
12. Reverse osmosis in water purification. Desalination of sea water
13. Purpose and theory of mixing. Diffuse and convective mixing
14. Theory and practice of mixing liquids
15. Theory and practice of the mixing of semi-solid and solid materials. Calculating the degree of mixing
16. Theory and practice of filtration
17. Theory and practice of centrifugation
18. Theory of drying. Moisture content of solid materials. The drying of moist material
19. Process of drying. Dryers
20. Theory and practice of fluidization
21. Theory and practice of crystallization. Nucleation and the kinetics of crystal growth. Crystallization from solution and molten material
22. Supercritical conditions in crystallization. Spherical and co-agglomerational crystallization
23. Properties of crystalline materials. Crystal structure, habit and polymorphism
24. Amorphization of crystalline materials. The properties of the amorphous state
25. Theory and practice of crushing and grinding
26. Particle reduction: the theory and practical respects of micronization and nanonization
27. Theory and practice of the manufacture of solid dispersions
28. Pharmaceutical technological properties of solid materials: particle size, particle size distribution
29. Pharmaceutical technological properties of solid materials: micromorphological properties, bulk and real densities
30. Theory and practice of molecular encapsulation. Co-crystals in pharmaceutical technological development.

Properties, structure and examination of dosage forms

31. Solution. Solubility, rate of dissolution. Colligative properties. Solutions as dosage forms.
32. Processing of herbal drugs into pharmaceutical preparations. Herbs and herbal teas
33. Theory and practice of extraction. Tinctures, extracts, decoctions and infusions
34. Manufacture, stability and examination of pharmaceutical preparations for inhalation
35. Properties of emulsions, the process of emulsification. The stability of emulsions and the examination of the dosage form
36. Special types of emulsions: micro- and complex emulsions. Liquid crystalline and self-emulsifying systems
37. Properties of suspensions, the process of dispersion. The stability of suspensions and the examination of the dosage form
38. The theory and practice of sterilization. The circumstances of aseptic preparation
39. Microbiological preservation, the examination of the efficacy of preservatives
40. Aspects of the manufacture of eye drops and eye cleaning solutions. Solutions for contact lenses
41. Powders for the preparation of eye drops and eye cleaning solutions. Semi-solid ophthalmic preparations
42. Circumstances of the manufacturing of parenteral dosage forms and the main dosage form examinations (sterility and pyrogen tests)
43. Manufacture, types, properties and examination of injections
44. Manufacture, types, properties and examination on infusions
45. Definition and grouping of ointments, creams, gels and pastes
46. Manufacture, examination and stability of semi-solid preparations
47. Grouping, manufacture and examination of rectal preparations
48. Grouping, manufacture and examination of vaginal preparations
49. Definition, manufacture and examination of pharmaceutical powders
50. Process of granulation. The definition, grouping and dosage form examination of granules
51. Definition, grouping, properties and dosage form examination of tablets
52. Process of tablet making. Compactibility. Deformations. Forces during compression
53. General observances during tablet making
54. Excipients of tablet making
55. Process of coating. Methods of coating. Coating equipments and coating materials
56. Definition, grouping, properties and dosage form examination of coated tablets
57. Process of capsulation. Excipients. Definition, types and examination of capsules as a dosage form
58. Manufacture of soaps and plasters. Preparations containing soaps
59. Preparation and examination of pharmaceutical preparations for veterinary use
60. Manufacture and examination of the most important blood preparations and wound dressings

Applied biopharmacy

61. Characterization of physical-chemical properties of API and its influence on physiological effect (solubility, ionization)
62. Characterization of physical-chemical properties of API and its influence on physiological effect (lipophilicity, permeability)
63. Connection between physical-chemical property of API and dosage forms (lipophilicity-pH profile, lipophilicity-dosage form)
64. Biopharmaceutical classification of APIs (BCS)
65. Strategies for increasing solubility and permeability of API.
66. Explanation of dissolution profiles (first and zero order kinetics, Higuchi correlation)
67. Explanation of dissolution profiles (Hixon-Crowell, Korsmeyer-Peppas és Hopfenberg modell)
68. Characterisation of other dissolution profiles (Weibull model, etc.). Difference and similarity factors of dissolution results
69. Absorption of API from buccal cavity. Formulation and biopharmaceutical aspects of buccal preparations
70. Biopharmaceutical and technological aspects of pharmacons absorbing from the GI tract
71. Colon therapy, development and design of connecting dosage forms
72. Biopharmaceutical and technological aspects of rectal therapy
73. Programming of effect in case of solid systems (diffusing, dissolution-controlling systems and systems based on surface erosion)
74. Programming of effect in case of solid systems (osmotic and ion exchanging systems)
75. Biopharmacy of parenteral preparations (injections and infusions)
76. Modified-release parenteral preparations, system for implantation
77. Pulmonary drug administration. Technological influencing factors. Dosage forms
78. Nasal drug administration. Dosage forms. Technological influencing factors
79. Anatomical, physiological and biochemical principals of transdermal absorption. Dosage forms and APIs
80. Definition, advantages, disadvantages and main types of transdermal preparations.
81. Experimental investigation of penetration and permeation of APIs
82. Biopharmaceutical aspects of vagina and uterus in designing dosage forms
83. Biopharmaceutical aspects of eyes and ears in designing dosage forms
84. Micro- and nanoparticles as drug delivery systems (systems built up by tensides, polimer micella, pharmacosome, niosome)
85. Micro- and nanoparticles as drug delivery systems (polimer-based systems, polimer adducts, microcapsules, microspheres, nanocapsules, nanospheres)
86. Micro- and nanoparticles as drug delivery systems (systems based on tensides, polymers and lipids: solid lipid dispersion (SLN), liposomes)
87. Biopharmaceutical aspects of liotropic lamellar liquid-crystal systems. Microemulsions and self-emulsifying systems
88. Proteins in pharmaceutical technology and their biopharmaceutical aspects
89. Biopharmaceutical aspects of pediatric dosage forms
90. Biopharmaceutical aspects of geriatric dosage forms

Comprehensive questions

91. Definition and object of pharmaceutical technology, stages of its development
92. Active agents in the preparation of dosage forms. Process of manufacturing. Characterisation of pharmaceutical active agents (API).
93. Excipients. Selection of excipients. Classification
94. Classification of dosage forms due to Ph. Hg. VIII. Generations of dosage forms
95. Pharmaceutical drug development. Innovative and generic drugs
96. Factorial design and neural networks
97. Patents in pharmaceutical industry
98. Quality assurance in manufacturing
99. Operational and methodical principles of industrial manufacturing. Law of self-cost. Law of large numbers of parameters. Law of scale up
100. Instrumentation of technological procedures. Automatization
101. Packaging. Definitions of packaging
102. Glass and plastic containers. Aluminium as a packaging material
103. Environmental parameters influencing the stability of pharmaceutical products. The main chemical decomposition
104. Physical-, physico-chemical and colloid-physical changes in preparations.
105. Microbiological decomposition of pharmaceutical products. Testing for microorganisms and pyrogens
106. Determination of the expiry date. Stability testing of pharmaceutical products due to ICH
107. Stability assurance
108. Definition and comparison of interaction and incompatibility
109. The main incompatibilities and their solutions
110. Role of wetting process in phenomena and technological procedures
111. Application of surfactants
112. Role of adsorption in phenomena and technological procedures
113. Role of adhesion and bioadhesion in phenomena and technological procedures
114. Role of diffusion in phenomena and technological procedures
115. Effect of granulation method on granule structure
116. Methods of tablet preparation and their effects on tablet structure
117. Films and film-forming agents. Structure and investigation of polymer films
118. Comparison of aerosols, emulsions and suspensions in view of preparation, properties and stability
119. Manufacturing of cytostatic infusions
120. Aseptic manufacturing. Clean room technique