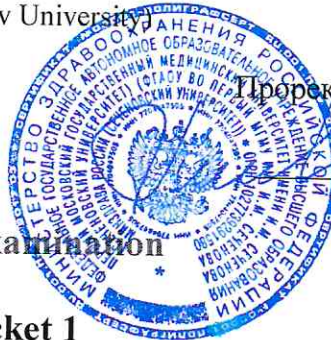


Federal State Autonomous Educational Institution of Higher Education  
FIRST MOSCOW STATE MEDICAL UNIVERSITY Named after I.M. SECHENOV  
Ministry of Health of Russia  
(Sechenov University)



Проректор по учебной работе

Т.М. Литвинова

10.02.2021 г.

State Examination

Ticket 1

1. Give the definition of the dosage form "Powder". Describe this dosage form, its advantages and disadvantages. What are the different techniques for prescribing powders? Describe Trituration: what is Trituration, what are the types of Triturations and in what cases (for what purpose) they are used in extemporaneous compounding. Describe the technique of making easier the grinding of "hard-to-grind" substances.
2. **For analytical control of quality of norsulfazole and streptocide in samples of several series, the appearance did not meet the requirements of the State Pharmacopoeia under the section "Description" - the powders were wet and had a yellowish tint. Give description**
  - Give their chemical formulas, Latin and rational names, characterize the structure, substantiating the physicochemical properties of each of them (appearance, water solubility, spectral characteristics) and the possibility of their use for quality control of substances.
  - Suggest group and differentiation reactions for their detection in medicines.
  - Provide methods for the quantitative determination of streptocide and norsulfazole.
3. Write down the Latin and English names of the crude herbal drugs, producing plant and family of licorice roots.
4. The great importance in pharmacy organization is given to the provision of qualified pharmaceutical care. For uninterrupted supply of the population and medical organizations a turnover plan is developed. To ensure the high quality of manufactured dosage forms, measures are taken to improve intrapharmacy quality control of drugs. Rational use of drugs contributes to the work on the pharmaceutical expertise of incoming prescriptions.
  - a) Give a definition and name the main objectives of pharmaceutical care.
  - b) Describe the methodology of planning the turnover of goods for the population and medical organizations for the year with the distribution by component parts and quarters.
  - c) What is the pharmaceutical review of prescriptions? List the prescription and dispensing requirements for drugs containing narcotic, poisonous, and potent drugs.
5. What parameters can be used to compare amino acids used in medical practice and what influences the choice of a method for obtaining these amino acids in production? What methods of obtaining pure amino acids are known? What is their comparative characteristic? Give examples of obtaining.

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10.02.2021 г.

State Examination  
Ticket 2



1. List and characterize liquid dosage forms produced in a pharmacy according to the type of dispersed system. Give examples.  
Point the dispersion media used for the extemporaneous compounding of liquid dosage forms.
2. **For analytical control of the caffeine-sodium benzoate substance:**
  - Give the structural formula of caffeine-sodium benzoate. Describe its physicochemical properties and suggest their use in quality control of drugs.
  - According to the chemical structure and properties, suggest possible methods for the quantitative determination of the drug in the proposed mixture.
3. What are "leaves" used as crude herbal drugs in pharmaceutical practice?
4. In the "Romashka" pharmacy in the prescription and production department the pharmacy director has set a sliding schedule of pharmacists on duty in the aseptic unit, including work with distillation and sterilization equipment.
  - a) Which drugs require aseptic conditions during manufacture?
  - b) Which document records staff time and attendance? How can we draw up a plan for the payroll of pharmacy employees?
  - c) List health and safety measures in pharmacies
5. Determine the essence of an industrial biocatalyst, its functional purpose with the solution of certain problems of biotechnological production.

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Т.М. Литвинова

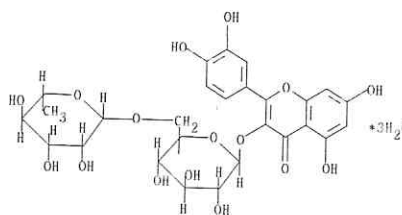
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## State Examination

### Ticket 3

1. Characterize a dosage form "Mixture". Specify the features of the extemporaneous compounding of mixtures: different methods of introducing solids into the mixture, the features of filtration, packaging and storage.  
 Describe techniques to increase the solubility or speed up the dissolving, used for extemporaneous compounding. Give examples for each technique.

2. The quality control department of a pharmaceutical production for the manufacture of tablets received several drugs of the following structure for quality control:



- Give the Russian, Latin and rational names of the drug. Describe its physicochemical properties (appearance, water solubility, spectral characteristics) and the standard indicators due to these properties.
  - Suggest possible authentication reactions and methods for quantifying the drug. What impurity is present in the preparation when it is obtained from medicinal plant materials? Suggest ways to find it.
  - Indicate the pharmacological group, medical use and other natural sources of its production.
3. Define the concept "vitamins".
  4. The pharmacy received the goods from the supplier - sterile bandages packed in the bale. The condition of the package is not broken, but the traces of soaking can be seen. Gross weight is actually 54 kg. According to accompanying documents - 53 kg. At opening of a package it is found out conformity of enclosures to the documents, 100 bandages are wet and are not suitable for application.
    - a) List the primary documents to be drawn up when receiving the goods in this case.
    - b) In which accounting accounts will the above business transaction be reflected?
    - c) What kind of commodity transactions does it refer to?
  5. Features of GMP requirements for biotechnological production and the reasons for validation when replacing producer strains in production.

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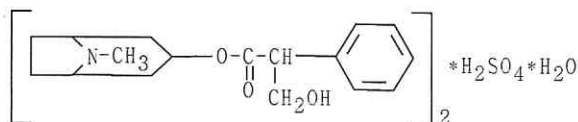
Проректор по учебной работе

Т.М. Литвинова

2021 г.

**State Examination  
 Ticket 4**

1. Define a high molecular compound (macromolecular).  
 Give the classification of macromolecular compounds (with examples):  
 a) according to the source (origin)  
 b) according to the features of dissolution  
 c) according to the application  
 Describe how the dissolution of macromolecular compounds proceeds. What is the difference between dissolution of limited swelling compounds and unlimited swelling compounds?
2. The control analytical laboratory of a chemical-pharmaceutical production received for analysis a drug of several series from various manufacturers of the following chemical structure:



- Give the Russian, Latin name of the medicinal product. Describe the physical and chemical properties (appearance, solubility, spectral and optical characteristics) and their use for quality control.
  - Propose identification reactions and quantification methods according to chemical properties. Write down the reaction equations.
3. Where is the essential oil localized in peppermint leaves? Name the histochemical reaction that is used to determine it.
  4. A survey of consumers of ophthalmologic preparations was conducted at the pharmaceutical market of Moscow region. The analysis of the survey results showed that if consumers are relatively satisfied with the assortment available on the market, the level of prices for medicinal products is too high for most consumers. Overpriced ophthalmic medicines, in consumers' opinion, force them to refuse to buy them, which leads to lower demand.
    - a) Give a description of demand: definition, its relationship to the concepts of need and consumption.
    - b) \_\_\_\_\_ Which groups of demand are classified by degree of satisfaction.
    - c) \_\_\_\_\_ How to calculate elasticity coefficient?
  5. Determine the capabilities of the biological object in its functional relation and create conditions for obtaining a high-quality target product with the maximum profitability of the process.

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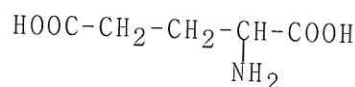
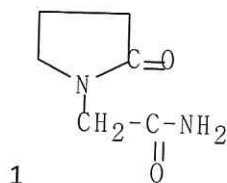


Проректор по учебной работе  
 Т.М. Литвинова

State Examination

Ticket 5

- Describe the features of the extemporaneous compounding of pepsin solutions (composition of solutions, dissolution and filtration). Indicate what the prepared pepsin solutions are used for.
- The pharmaceutical production for the getting of tablet dosage forms received several series of drugs from various manufacturers of the following chemical structure:



- Give the Russian, Latin and rational name of the medicinal product. Describe the physical and chemical properties (appearance, solubility, spectral characteristics) and their use for quality control.
  - Propose identification reactions and quantification methods according to chemical properties. Write down the reaction equations.
- Define the concept "humidity" of crude herbal drugs.
  - The Potion pharmacy is studying the size of the population's demand for a vitamin group medicine called Vitrum and the factors affecting it. The drug is obtained by the pharmacy from a pharmacy warehouse, which often allows for interruptions in supply. In this case, in the absence of the drug "Vitrum", a replacement is offered.  
 As a result of the study of demand, consumer groups are identified by criteria - income, age and education. It is established that the income elasticity coefficient is equal to + 5.0; the price elasticity coefficient is 3.0.
    - What types of demand do you know? Name the directions for studying demand.
    - What is the difference and what is the total between the income elasticity coefficient and the price elasticity coefficient?
    - Absence of what element of a commodity stock can be the reason of refusals in a pharmacy? Which formula is used for its calculation
  - The role of mutagenesis in the creation of industrial strains. Give examples. The role of reversion.

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Е.М. Литвинова

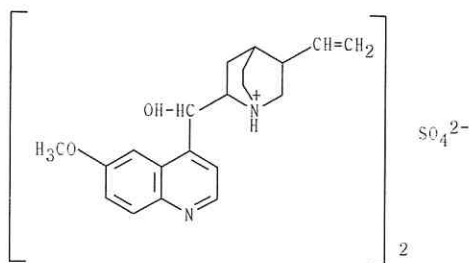
## State Examination

### Ticket 6



1. Give definition to "Colloidal Solution" What is the characteristic optical effect of a colloidal solution?  
 Describe the types of stability of dispersed systems. How can aggregate stability be improved for colloidal solutions?  
 Suggest what happens when a strong electrolyte is added to the collargol solution.

2. Under industrial conditions, suppositories are made containing a drug of the following chemical structure:



- Give the Russian, Latin and rational name of the medicinal product. Describe the physical and chemical properties (appearance, solubility, spectral characteristics) and their use for quality control.
  - Propose identification reactions and quantification methods according to chemical properties. Write down the reaction equations.
3. Define the concept "identity" of crude herbal drugs.
  4. The pharmacist prepared 15 dosage forms, after which the main pharmacist began to perform intra-pharmacy control. During a survey control, the main pharmacist made a remark to the pharmacist that he did not remember the ingredients in the mixture. When checking the quality of manufactured powders the pharmacist used the following types of in-store control: chemical, physical, survey. Is it enough to apply these three types of internal pharmacy control?
    - a) Was the main pharmacist right?
    - b) How can we calculate the cost of pharmaceutical forms produced in a pharmacy?
    - c) Which document (or documents) reflects the tariff for the production of extemporal dosage forms?
  5. Evaluate the role of biotechnology in solving the problems of pharmaceutical practice.

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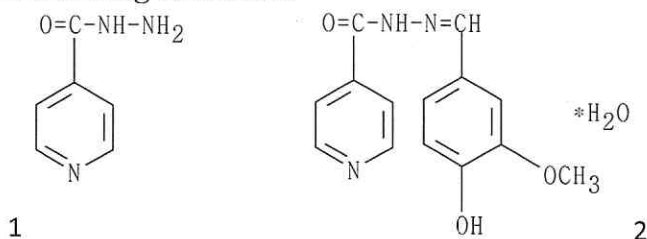
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State Examination

Ticket 7

1. Describe what collargol and protargol are.  
Give the features of making their solutions.  
What is colloidal protection? What performs the function of colloidal protection in collargol and protargol solutions?

2. A pharmaceutical production for the manufacture of tablets received drugs of several series of the following structure:



- Give the Russian, Latin and rational names of medicines. Describe the physical and chemical properties (appearance, solubility, spectral characteristics) and their use for quality assessment.
  - Propose identification reactions and quantification methods according to chemical properties. Write down the reaction equations.
3. Specify the method of State Pharmacopoeia that is used to determine the content of essential oils in crude herbal drugs. What is it based on? Describe method 1, draw the device.
4. A pharmacy company checks the actual presence of goods in its departments. As a result of the inspection it was found: In the Recipe and Production Department the balance of ethyl alcohol - 2.6 kg (the balance of alcohol according to the data of the previous inspection - 5.0 kg, the arrival for the interinvestment period - 10 kg, the consumption by individual recipes - 12 kg).
- Which groups of medicines are subject to substantive-quantitative accounting?
  - How should the subject- quantity control of drugs be organized in a pharmacy? Procedure for calculation and write-off of losses within the normal range?
  - Which item of circulation costs does the loss within the normal range relate to? Methodological methods of planning circulation costs by items of expenses.
5. Technology for producing recombinant proteins. Organization of the process. Obtaining and evaluation of the final product. Safety measures in the work with recombinant proteins.

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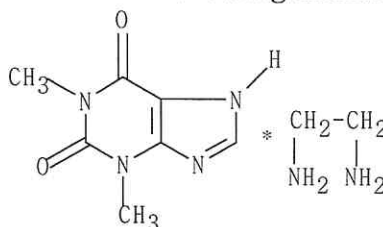
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State Examination

Ticket 8



1. Give the definition of the dosage form "Suspension".  
Describe the 2 methods (techniques) for the extemporaneous compounding of suspensions.  
Describe the differences in the technology of compounding suspensions from insoluble hydrophilic substances and suspensions from insoluble hydrophobic substances. Give examples of hydrophilic, hydrophobic and ultra-hydrophobic substances.
2. A pharmaceutical production for the manufacture of a solution for injection received a drug of several series of the following chemical structure:



- Give the Russian, Latin and rational name of the medicinal product. Describe the physical and chemical properties (appearance, solubility, spectral) and their use for quality control.
  - Propose identification reactions and quantification methods according to chemical properties. Write down the reaction equations.
3. Specify the chemical composition of calendula flowers. Write down the formula of  $\beta$ -carotene. What vitamins group does this compound belong to?
  4. The Pepper Patch product is in the maturity stage of its life cycle. The coefficient of price elasticity of demand according to the data of special studies is - 1.5. The patch packaging costs 80 rub., the market is saturated.
    - a) How will demand change if the price decreases by 10 rub. Which limit can the price of Pepper Patch be reduced to? Which pricing method can be used to increase sales volume.
    - b) What factors affect the elasticity of demand?
    - c) Name other stages of the goods life cycle. By what signs can they be identified?
  5. Screening in BT in the expansion of the range of drugs. The essence of screening, options, problems, solutions.

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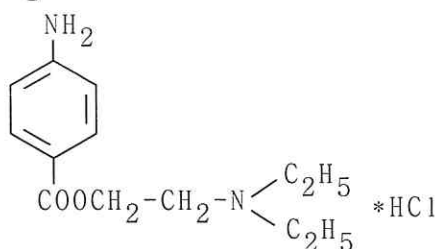
М. Литвинова

2021 г.

## State Examination

### Ticket 9

1. Give the definition of the dosage form "Emulsion".  
 Describe the main types of emulsions. How can the emulsion be stabilized (indicate with what substances and in what quantity)?  
 Write a method for determining the readiness of the primary emulsion.
2. In the interhospital pharmacy, after sterilization, yellowing of an injection solution containing the following drug structure was detected:



- Give the Russian, Latin and rational name of the medicinal product. Describe the physical and chemical properties (appearance, solubility, pH value of the solution, spectral characteristics) and their use for quality control.
  - Propose identification reactions and quantification methods according to chemical properties. Write down the reaction equations.
3. Specify the chemical composition of the nettle leaves and the formula(s) of the main compound(s). What group of biologically active substances does this compound belong to?
  4. A pharmacy has purchased trade equipment worth 25,000 rub. and with a useful life of 15 years. The equipment was purchased and put into operation on March 15. The pharmacy has adopted the method of uniform repayment of the equipment cost.
    - a) Which group of economic resources will be included in the incoming trade equipment and why?
    - b) At what cost will the trading equipment be reflected in the balance sheet, what is its composition?
    - c) Which primary documents will reflect that the trading equipment has been recovered and put into operation?
  5. From the point of view of the concept of enzymes and their properties, determine the possibility of organizing production. Problems and solutions.

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**State Examination**  
**Ticket 10**

1. Describe the dosage forms "Infusion" and "Broth": the plant raw materials used and the infusion mode (with a volume of up to 1 liter).  
Describe the technological features of the manufacture of aqueous extracts from medicinal plant materials containing alkaloids.  
What is the ratio of raw materials to the volume of the finished extract has to be taken to prepare the Thermopsis infusion?  
How can the water absorption coefficient be used in the calculations?
2. **In pharmacies of city clinical hospitals, Ringer's solution is made with the following composition:**  
Sodium chloride 0.9  
Potassium chloride 0.02  
Calcium chloride 0.02  
Sodium bicarbonate 0.02  
Water for injection up to 100 ml
  - Give the Russian, Latin and rational names of the medicines that make up Ringer's solution. Describe the physical and chemical properties (appearance, solubility) and their use for quality control.
  - According to the chemical properties, suggest identification reactions and methods for quantitative determination of ingredients. Write down the reaction equations.
3. What are "extractive substances"? Write down the scheme of the procedure for the extractive substances determination in crude herbal drugs.
4. In the pharmacy organization, great importance is put to providing qualified pharmaceutical care. To ensure uninterrupted supply of the population and medical organizations, a trade turnover plan is being developed. To ensure the high quality of manufactured dosage forms, measures are being taken to improve intrapharmacy quality control of medicines. The rational use of medicines is facilitated by pharmaceutical examination of incoming prescriptions.
  - a) Define and state the main tasks of pharmaceutical care.
  - b) Describe the methods of planning the trade turnover for the population and medical organizations for the year with distribution by parts and quarters.
  - c) What is the pharmaceutical evaluation of prescriptions? List the requirements for prescriptions and delivery of medicines containing narcotic, poisonous or potent drugs.
5. Environmental aspects in biotechnology. Opportunities, problems and solutions.

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## State Examination

### Ticket 11

1. Give the definition of ophthalmic dosage forms.  
Give the definition of the dosage form "Eye drops".  
Indicate the main quality requirements for ophthalmic dosage forms.  
What is isoosmoticity (isotonicity)? What substances are used as isotonicisers?  
Explain what osmolarity is. Write how may osmolarity be calculated.
2. **In quality control of potassium iodide in samples from a single batch the drug was not in accordance with "description" chapter of SP monograph – powder was moist and had pale-yellow color. Explain changes in its appearance according to storage conditions and chemical properties. Propose other tests to be used in quality control. For that:**
  - Provide Latin name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations.
3. How can one prove the presence of polysaccharides in crude herbal drugs according to regulatory documentation? Name the reaction, specify the result.
4. The accountant of the pharmacy accrued depreciation on the equipment used for sterilization of drugs as of 01.01.2016 after 2 years of its operation, using a linear method, taking the residual value of 5000 rub as a basis.
  - a) What mistake did the accountant make?
  - b) What other ways of charging depreciation of fixed assets are used in pharmacies?
  - c) What types of value do fixed assets have and what are they made of?
5. Identify and define the focal point of research and biotechnological production of medicines as resources in the appropriate classification. Determine the advantages of biotechnological production over other methods of obtaining drugs.

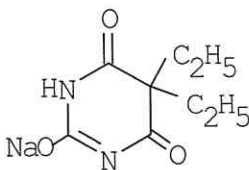
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**State Examination  
Ticket 12**

1. Give the definition of the dosage form "Ointment".  
Give the classification of ointments according to the type of disperse system.  
Specify the classification of ointment bases. Give examples
2. Substance of the following structure was received for analysis:



- Provide English, Latin and systematic name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations.
3. List the quality indicators of the plantain leaves, indicate their regulation
  4. A visitor turned to the pharmacy with a prescription for 40 Pentalgin N tablets. The prescription is written out on form No. 107-1/u, has all the main details, is decorated with a round seal of a medical organization and the inscription "On Special Prescription", is signed and stamped by a doctor. The inspector took a prescription and released the medicine. At the end of the working day the director of the pharmacy saw the prescription accepted by the pharmacist while performing the subject and quantitative accounting of narcotic drugs. She made a remark to the pharmacist and explained that the pharmacist had made mistakes by releasing the prescription.
    - a) What mistakes have been made by the pharmacist?
    - b) List the prescription and dispensing requirements for medicines containing narcotic, poisonous or potent drugs.
    - c) Procedure for setting retail prices for OTC drugs in pharmacies.
  5. Material support of the biosynthesis process. Apparatus. Determine the influence of mass transfer characteristics on the final result of fermentation.

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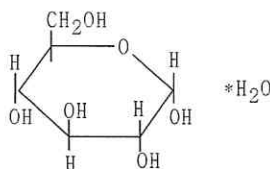




## State Examination

### Ticket 13

1. Specify the features of the rectal route of administration. Give the definition of the dosage form "Suppositories". Indicate the main types of suppositories. What are the methods of making suppositories used in extemporaneous compounding? Which one is suitable for making gelatin-glycerin-based suppositories?
2. Analytical laboratory of pharmaceutical manufacture received ampule and flasks containing solutions of a substance with the following chemical structure, that was not in accordance with the "description" chapter of SP monograph – solution contained yellow tint.



Provide explanation for changes the substance can undergo in preparation of formulation, for that:

- Provide English, Latin and systematic name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations.
3. Describe the external signs of lily of the valley leaves (in form of a table).
  4. A pharmacy organization that has a license for retail sales will have to conclude a contract for the supply of products from a wholesale pharmaceutical organization, which in turn receives the goods directly from manufacturers.
    - a) Name the main steps and criteria for selecting a supplier.
    - b) Determine the level of the goods traffic channel.
    - c) How to calculate the volume of goods received?
  5. Problems and solutions for the construction of amino acid-producing strains. Basic principles of the process of cultivation of amino acid-producing strains.

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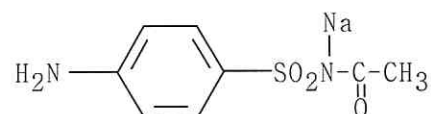
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State Examination

Ticket 14

1. What is size reduction? What are objectives of size reduction? Describe construction, working, advantages and disadvantages of ball mill.
2. **Pharmaceutical manufactures and pharmacies prepare formulations containing a substance with the following structure:**



- Provide English, Latin and systematic name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations.
3. Describe the external signs of greater plantain leaves (in form of a table).
  4. There is a state pharmacy in town N, which sells drugs by prescription and without prescription, medical products. Every quarter the accountant of the pharmacy draws up a balance.
    - a) Name the possible organizational structure of the pharmacy and the composition of the premises.
    - b) What changes in the balance sheet and in which parts of it will cause the following business operations:
      - Pharmacy transferred revenue from "Cash" to "Current account"
      - Profits have been reallocated to the "Special Purpose Fund" (consumption and savings)
      - There is a prepayment to the supplier for the goods
      - Products received, but not paid for.
      - A short-term bank loan was received (the money was received in the current account).
    - c) What is balance? What is its structure?
  5. Factors affecting the biosynthesis of enzymes in connection with the intensification of the process of growth and synthesis of enzymes in industrial conditions.

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State Examination

Ticket 15



1. What is size separation? Discuss various types of pharmaceutical sieves. Describe construction, working, advantages and disadvantages of cyclone separator.
2. Rp.: Bismuthi subnitrat  
Magnesii oxydi ana 2,0  
Aquae purificatae 100ml  
M.D.S.: По 1 чайной ложке 2 раза в день.  
**Propose identification and quantification methods for substances in suspension, prepared according to provided prescription, suitable for mixture with simultaneous presence of those components. For that:**
  - Provide English and Latin of all substances. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations.
3. Describe the external signs of peppermint leaves (in form of a table).
4. In the Lotus pharmacy in the prescription and production department the pharmacy director has set a sliding schedule for pharmacists on duty in the aseptic unit, including work with distillation and sterilization equipment.
  - a) Was the director of the pharmacy right to organize the work?
  - b) Which drugs require aseptic conditions during manufacture?
  - c) List the safety measures in pharmacies
5. ICA and ELISA. Concept. Using. Theory and practice of the method. Technology for obtaining vaccines and serums.

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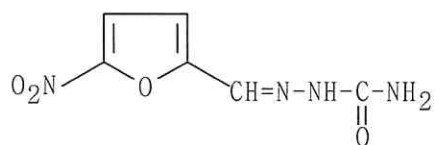
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State Examination

Ticket 16



1. Explain basic mechanisms of heat transfer. Write applications of heat exchangers and heat interchangers. Classify them.
2. **Quality control department received several batches of a substance with the following structure from several different manufacturers for manufacturing tablets.**



**Propose characteristics for substance's quality control, for that:**

- Provide English, Latin and systematic name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations.
3. Describe the external signs of licorice roots (in form of a table).
  4. The study of demand for certain medicines in pharmacy "Pharma" showed that there is an unsatisfied demand for the new drug "I". Having analyzed the price lists and terms of delivery, the Pharmacy Director identified 2 major suppliers of this product with whom contracts for supply to the pharmacy were concluded.
    - a) Identify the demand and classify the types of demand according to their degree of satisfaction.
    - b) List the documents on the basis of which the goods are accepted at the pharmacy and name the documents which take into account the goods received at the pharmacy.
    - c) At what prices are the goods to be delivered? Give the formula for calculating the goods (receipt)?
  5. Give the organization of the material support of the biosynthesis process in terms of equipment, stages and modes of fermentation on a specific example of your choice.

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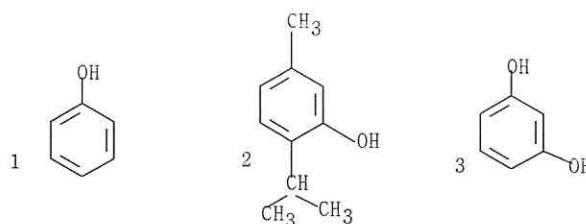




## State Examination

### Ticket 17

1. Explain mechanism of evaporation. Rate of evaporation and factors effecting it. What is mechanism and significance of forced circulation vaporator?
2. In quality control of a substance with the structural formula "3" it has been noted, that samples from one batch were not in accordance with "description" chapter, described in SP monograph – samples were moist and had slight pink tint.



Explain changes in substance's appearance with its chemical properties, propose tests, that can be used in its quality control. For that:

- Provide English, Latin and systematic name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
- Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations.

3. Describe the external signs of cowberry leaves (in form of a table).
4. The cashier of the pharmacy, having received the 02.02 payroll with the date of issue of salary 02 -04.02, the same day, after the issue of wages to employees left in excess of the established standard (limit) 5 280 rub for their payment to employees who are on official local business trip on that day. The cashier gave the rest of the money to the bank in the evening of 02.02.
  - a) What kind of cash transactions are the receipt of money for the issuance of wages and salaries? What changes in the balance sheet do they cause?
  - b) Name the main forms and types of wages.
  - c) How is the wage fund planned in the pharmacy?
5. Proteomics in the search for new targets for antimicrobial agents.

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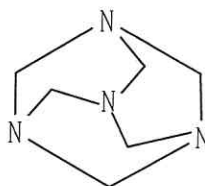
Проректор по учебной работе



State Examination

Ticket 18

1. Give pharmaceutical applications of drying. Explain mechanism of drying. Describe construction, working, advantages and disadvantages of fluidized bed dryer (FBD). Why FBD is most used dryer in pharmaceutical industry?
2. **Quality control department received several batches of a substance with the following structure:**



- Provide English, Latin and systematic name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations.
  - Explain the procedure used for preparation of solutions for injections and describe procedure for determination of specific impurities. Provide reaction equations.
3. Describe the external signs of knotgrass herb (in form of a table).
  4. The director of the pharmacy enterprise "Phoenix" conducts negotiations with the supplier on delivery of medicines which cost in its price list is considerably lower, than at other suppliers. Having no experience of working with this supplier, the Pharmacy Director would like to protect himself by removing the threat of financial risk.
    - a) Name the main steps and criteria to select a supplier
    - b) Which form of cashless payments should be preferred in this situation? What other forms of non-cash payments are known to you?
    - c) Characteristics of pharmacy organizations by form of ownership and legal status.
  5. Problems of contamination and their solution in the production of antibiotics.

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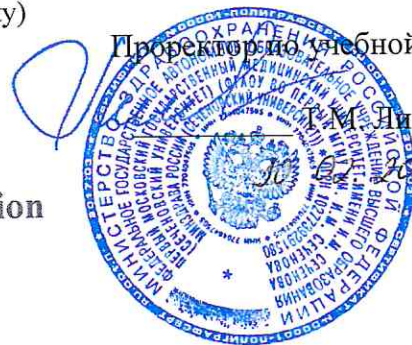


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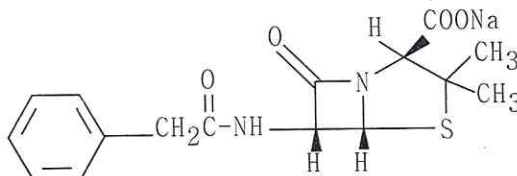
Г.М. Литвинова

State Examination

Ticket 19



1. What are mixing objectives in pharmaceutical manufacturing? What are criteria for selection equipment for mixing? Describe construction, working, advantages and disadvantages of planetary mixer.
2. **Quality control department received several batches of a substance with the following structure:**



- Provide English, Latin and systematic name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations.
3. Describe the external signs of buckthorn bark (in form of a table).
  4. The cashier of the pharmacy, having received the 02.02 payroll with the date of issue of salary 02 -04.02, the same day, after the issue of wages to employees left in excess of the established standard (limit) 5 280 rub for their payment to employees who are on official local business trip on that day. The cashier gave the rest of the money to the bank in the evening of 02.02.
    - a) What kind of cash transactions are the receipt of money for the issuance of wages and salaries? What changes in the balance sheet do they cause?
    - b) Name the main forms and types of wages.
    - c) How is the wage fund planned in the pharmacy?
  5. Specificity of technologies for obtaining steroid drugs. Microbiological and analytical control. Examples of industrial use of microbiological transformations.

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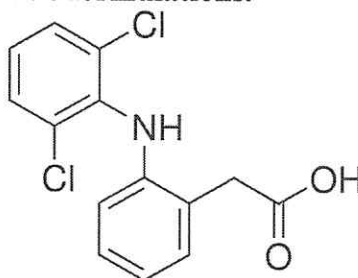
Проректор по учебной работе

Т.М. Литвинова

2021 г.

**State Examination  
Ticket 20**

1. Enlist water for injections (WFI) requirements. Discuss various methods of WFI preparation. Storage and distribution of WFI.
2. A batch of substance with the following structure has been delivered from abroad for manufacturing therapeutic formulations.



**Under inspection substance was found to deviate from the parameters, stated in “description” chapter of SP monograph: substance contained yellow tint. To avoid possible falsification, substance was subjected to analytical control. Propose tests for quality control procedure, for that:**

- Provide English, Latin and systematic name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations.
3. Describe the external signs of oak bark (in form of a table).
  4. 1. Pharmacy "Vita" provides medicines and medical products of the plant "Vympel". 2. The pharmacy receives medicines through intermediaries (distributors Puls, Protek, Katren, etc.).
    - a) Specify the type of goods channel and level.
    - b) Which type of sales refers to the sale of drugs and medical devices by pharmacies to institutional consumers. Discover the methods of planning this type of implementation.
    - c) Which documents take into account the leave of goods attached to the pharmacy by medical institutions?
  5. Describe the possibilities of improving the biological object for obtaining new drugs in the organization of production. Give examples.

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State Examination

Ticket 21

1. Give ideal characteristics of tablet dosage forms. What is granulation? Compare types of granulations, its objectives, advantages, and limitations. Describe construction, working, advantages and disadvantages of multi-station press tablet manufacturing machine.
2. . **An analytical laboratory received purified water, used in a pharmacy for formulation preparation. Propose quality control procedure, for that:**
  - Explain when and in which circumstances is quality control of purified water performed. What factors influence quality of purified water?
  - Propose chemical and physical-chemical methods for quality control of purified water. Provide reaction equations.
3. Describe the external signs of belladonna leaves (in form of a table).
4. A visitor turned to a Moscow pharmacy with a prescription written out in the city of Noginsk, Moscow region, for 20 amps of "Fluorotan" solution. The prescription was written out on form No. 148-1/ou-88 (for the full price), there are all the main details, as well as the number and address of the patient, the prescription was written out in 2 copies, decorated with the seal "For prescriptions". The inspector released only 10 ampoules, because he decided that the limit of one-time "Fluorotan" leave was overstated, and the corresponding inscription "For special prescription" is not on the prescription. A visitor complained to the pharmacy director about the pharmacist. Commenting on the actions of the pharmacist, the pharmacy director said that the pharmacist was wrong. And she explained why.
  - a) What drugs are not allowed out of the pharmacy for outpatients?
  - b) For which drugs is the maximum quantity allowed per prescription, can it be exceeded?
  - c) Characteristics and structure of the balance sheet.
5. Describe the biochemical mechanisms of bacterial resistance to antibiotics.

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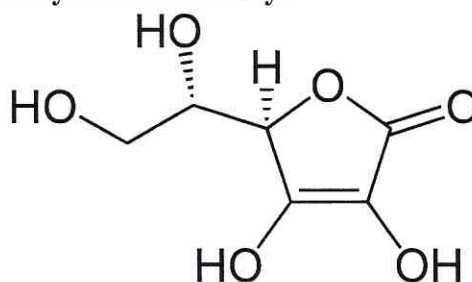
Г.В. Раменская

State Examination

Ticket 22



1. Classify liquid oral preparations with examples. Enlist main excipients used in oral formulations manufacturing. Give principal technological scheme of syrups manufacturing.
2. A 5% solution for injections, containing substance of the following structure, has been received for analysis by analytical laboratory.



- Provide English, Latin and systematic name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations. Explain which tests should additionally be carried out in formulations for injections.
3. Indicate the pharmacological group and herbal drugs of nettle medicinal plant.
  4. The study of the demand for certain medicines in the "Adonis" pharmacy showed that there is an unsatisfied demand for the new drug "I". Having analyzed the price lists and terms of delivery, the Director of the pharmacy identified 2 main suppliers of this product with whom contracts for supply to the pharmacy were concluded.
    - a) Identify the demand and classify the types of demand according to their degree of satisfaction.
    - b) List the documents on the basis of which the goods are accepted at the pharmacy and name the documents which take into account the goods received at the pharmacy.
    - c) At what prices are the goods to be delivered? Give the formula for calculating the goods (receipt)?
  5. Possibilities and technologies for the production of monoclonal antibodies. Theory and practice of production. Obtaining and cleaning. Application.

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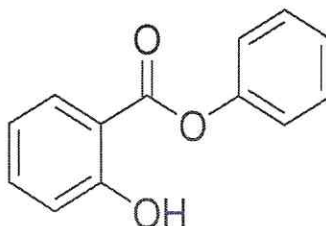
Т.М. Литвинова

19.06.2021 г.

## State Examination

### Ticket 23

1. Define capsules. What is the difference between hard and soft gelatin capsules? Give principal technological scheme of soft gelatin capsules manufacturing via rotary-die process. Discuss stability testing of capsules.
2. **Quality control department received several batches of a substance with the following structure:**



- Provide English, Latin and systematic name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations
3. Indicate the pharmacological group and herbal drugs of peppermint medicinal plant.
  4. A visitor turned to a Moscow pharmacy with a prescription written out in the city of Zhukovsky, Moscow region, for 20 amps of Fentanyl solution. The prescription was written out on form No. 148-1/ou-88 (for the full price), there are all the main details, as well as the number and address of the patient, the prescription was written out in 2 copies, decorated with the seal "For prescriptions". The inspector released only 10 ampoules, because he decided that the limit of the lump-sum Fentanyl leave was overstated, and the corresponding inscription "For special prescriptions" is not on the prescription. A visitor complained to the pharmacy director about the pharmacist. Commenting on the actions of the pharmacist, the pharmacy director said that the pharmacist was wrong. And she explained why.
    - a) What drugs are not allowed out of the pharmacy for outpatients?
    - b) For which drugs is the maximum quantity allowed per prescription, can it be exceeded?
    - c) Characteristics and structure of the balance sheet.
  5. Organization of biotechnological production of drugs on the basis of plant cell and tissue cultures. Examples.

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Проректор по учебной работе

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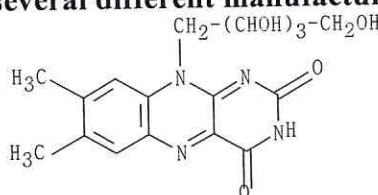
2021 г.

## State Examination

### Ticket 24

1. Define and classify parenteral dosage forms. Give principal technological scheme of injections preparation manufacturing. Describe difference of ampule sealing methods. Enlist general requirements for injections.

2. Quality control department received several batches of a substance with the following structure from several different manufacturers.



**Propose characteristics for substance's quality control, for that:**

- Provide English, Latin and systematic name of the substance. Describe its physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substance's chemical properties. Provide reaction equations.
3. Indicate the pharmacological group and herbal drugs of plantain medicinal plant.
  4. A pharmacy has purchased trade equipment worth 25,000 rub. and with a useful life of 15 years. The equipment was purchased and put into operation on March 15. The pharmacy has adopted the method of uniform repayment of the equipment cost.
    - a) Which group of economic resources will be included in the incoming trade equipment and why?
    - b) At what cost will the trading equipment be reflected in the balance sheet, what is its composition?
    - c) Give a description of the equipment and facilities of the pharmacy. What is validation?
  5. Genetic engineering in the development of the drug market. Capabilities. Resources. Organization of production. Assessment of the quality of the manufactured product.

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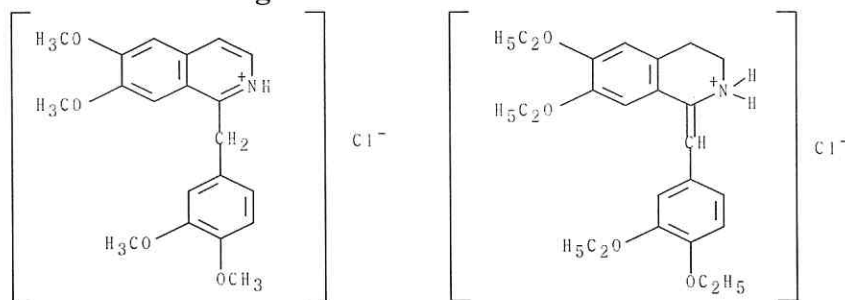


State Examination

Ticket 25



1. Classify semisolid dosage forms. Discuss main excipients used ointment preparations. Describe construction, working, advantages and disadvantages of three roll mill. Give principal technological scheme of transdermal patch manufacturing.
2. Pharmaceutical manufactures and pharmacies prepare formulations containing a substances with the following structures:



- Provide English, Latin and systematic name of the substances. Describe their physical-chemical properties (appearance, solubility, spectral and optical properties), and their use in quality control procedure.
  - Propose identification reactions and quantification methods, based on the substances chemical properties. Provide reaction equations.
3. Write down the rules for nettle leaves storing (group and storage conditions).
  4. The accountant of the pharmacy accrued depreciation on the equipment used for sterilization of drugs as of 01.01.2019 after 2 years of its operation, using the linear method, taking as a basis the residual value - 5000 e.g.
    - a) What mistake did the accountant make?
    - b) What other ways of charging depreciation of fixed assets are used in pharmacies?
    - c) What is the classification of the property (economic means) of the pharmacy?
  5. Determine the relationship of the biological activity of steroid drugs with the structure of their molecules. Mechanisms and methods of obtaining therapeutically active steroid drugs.

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