Assessment tools for conducting attestation
in discipline «Methods of Pharmacopoeial Analysis»
for students of 2024, 2023 year of admission
under the educational programme
33.05.01. Pharmacy,
specialisation (profile) Pharmacy
(Specialist's degree),
form of study full-time
for the 2025-2026 academic year

1. Assessment tools for conducting current discipline assessment

1.1. Evaluation tools for conducting certification in seminar-type classes

Certification in seminar-type classes includes the following types of tasks: testing, situational task solving, control work, interview on control issues, assessment of the development of practical skills.

1.1.1. Examples of test tasks:

The indicators of competence achievement being verified: GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.

1. The temperature limit of distillation means
a) the moment when the liquid begins to bubble during its boiling
b) the corrected temperature at which the vapor pressure of the liquid is 101.3 kPa
c) the interval between the initial and final boiling temperatures at normal pressure
d) the interval between the initial and final boiling temperatures at any pressure

2. On which parameter does the value of the refractive index not depend?
a) temperatures
b) concentration of the substance
c) the nature of the solvent
d) pressure

3. What law describes the refraction of a ray of light?
a) Raoult's law
b) Stokes' law
c) Snell's law
d) Bernoulli's law

4. Choose the correct statement
a) the solidification temperature coincides with the melting temperature for all substances
b) the solidification temperature coincides with the melting temperature only for a pure substance
c) they never coincide
c) the solidification temperature is the difference between the temperatures of the beginning and end of melting

5. The founder of iatrochemistry is
a) Theophrastus Paracelsus
b) Dmitry Ivanovich Mendeleev
c) Alexander Mikhailovich Butlerov
d) Hoenig Brand

6. The device used to measure the viscosity of a liquid is called
a) hydrometer
b) pycnometer
c) viscometer
d) densitometer

7. Viscosity is:
a) the property of fluid bodies to resist the movement of one of their parts relative to another
b) it is the intensity of distribution of one substance relative to another
c) it is a chemical interaction of a dissolved substance with water, caused by hydration
d) addition of water to a substance

8. The criteria for pharmaceutical analysis are:
a) time factor, instability, sensitivity
b) density
c) pharmacokinetics, pharmacodynamics
d) detection limit, accuracy and reproducibility of the analysis

9. According to the technique of execution, the following types of chromatography are distinguished:
a) column
b) analytical
c) preparative
d) distribution

10. In practice, the following is used as an indicator electrode for measuring pH:
a) tungsten
b) glass
c) graphite
d) coal

1.1.2. Examples of situational tasks:

Verifiable indicators of competence achievement: GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1

1. Justify the set of tests to assess the quality of the pharmaceutical substance Metamizole sodium. To do this:

- Provide the structural formula of the compound, characterize its structure and physical properties.
- Explain the method of obtaining and methods of pharmaceutical analysis of this substance.
- For treatment of what diseases and in what dosage forms is it used?

2. The pharmaceutical substance phthalazole was received by the quality control department of a pharmaceutical company for the production of tablets for quality assessment.

- Write the structural formula of this substance, describe the chemical structure, indicate the functional groups.
- What class of drugs does this compound belong to? What other drugs of this class do you know?
- In accordance with the chemical structure, suggest identification reactions and methods of assay. Write reaction equations.

3. According to the requirements of the regulatory documents, the substance "Atropine sulfate" must contain no less than 98.5% and no more than 101.0% atropine sulfate in terms of dry matter. A sample of the analyzed substance m = 0.9550 g is dissolved in glacial acetic acid. Titrated with 0.1 M perchloric acid solution (K = 1.000). The equivalence point is determined potentiometrically. Mr

(atropine sulfate) = 694.8.

- What is the content of the active substance in the sample taken if the volume of titrant used for titration was V=13.5 ml.
- Draw a conclusion about the compliance of this substance with the requirements of regulatory documents.

1.1.3. Examples of test options:

Verifiable indicators of competence achievement: GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1

Option 1

1. Refractometry - definition, concept. What is the difference between "absolute refractive index" and "relative refractive index"? Mathematical and graphical content of Snell's law.
2. Methods for determining melting point. Brief description of methods.
3. Boiling point, boiling temperature. Physical meaning of boiling point. Methods of determining boiling point 1 and 2.

Option 2

1. Refractometry as a method of qualitative and quantitative assessment of dissolved substances (application).
2. Polarimetry– definition, concept. Natural and polarized light rays. Degree of polarization. Optically active substances. Chirality.
3. Methods based on emission of radiation. Methods based on the use of a magnetic field.

1.1.4. Examples of interview control questions:

Verifiable indicators of competence achievement: GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1

1. State Pharmacopoeia. The procedure for developing general pharmacopoeial articles and pharmacopoeial articles.
2. Determination of the rules for the application of terms, concepts and methods used in pharmacopoeial articles (description, color, odor, mass, volume, vacuum, temperature, humidity, control experiment, precise weighing).
3. Methods of sampling medicinal products.
4. Expiry dates of medicines.
5. Physical and physicochemical methods of analysis. Optical methods.

1.1.5. Examples of tasks for assessing the development of practical skills

The indicators of competence achievement being verified: GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.

1. Pharmaceutical analysis of solutions for internal administration (ampoules): calcium chloride

10%, sodium thiosulfate 30%.
2. Pharmaceutical analysis of powder for oral solution: magnesium sulfate (heptahydrate).
3. Pharmaceutical analysis of boric acid substance.
4. Pharmaceutical analysis of the multicomponent dosage form “Ringer’s solution”.
5. Pharmaceutical analysis of glucose solution.

1.2. Assessment tools for students' independent work

Assessment of independent work includes testing.

1.2.1. Examples of test tasks with a single answer

Verifiable indicators of competence achievement:GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1,PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1

1. In assay on a substance by polarimetry, the following parameter is determined:
A. Specific rotation
B. Angle of rotation of polarized light
C. Refractive index of the solution

2. In the TLC method of identification, the following parameter is determined:
A. Refractive index
B. The value of Rf
C. Absorbance

3. The general group reaction to drugs derived from tropanes is the reaction:
A. Vitali-Morin test
B. Murexide test
V. Zincke test
G. Taleiochin test

4. Chemical properties that underlie the assay on benzoic acid:
A. acidic
B. reductive
C. oxidative
D. basic

5. The most accurate technique for water determination is:
A. Karl Fischer method
B. Weight loss on drying determination
C. Distillation method

6. Sample taken for weight loss on drying determination of immunobiological medicinal products:
A. 0.15– 0.20 g
B. 1-2 g
C. 0.5-1 g
D. 5 g

7. Constant weight is achieved when the difference between two weighing results does not exceed:
A. 0.0005 g

B. 0.001 g
C. 0.0002 g
D. 0.01 g

8. Temperature range of heating in “weight loss on drying” test:
A. 100–105 ° C
B. 150-160 ° C
C. 500-650 ° C
D. 50-60 ° C

9. What parameter is measured in UV-spectrophotometry
A. Absorbance
B. Transmittance
C. Chemical shift
D. Intensity

10. NMR-spectrometry can be used for
A. Identification of molecules
B. Determination of purity
C. Quantitation of compounds (assay)
D. All of the above

1.2.2. Examples of test tasks with multiple choice and/or matching and/or sequencing

Verifiable indicators of competence achievement:GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1,PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1

1. Choose three answers out of five. Potassium pyroantimonate solution is used in the identification of:
A. Sodium nitrite
B. Sodium thiosulfate
B. Hydrogen peroxide
G. Calcium chloride
D. Sodium bicarbonate

2. Choose three answers out of four. The reaction for the identification of potassium bromide is carried out with the following reagents:
A. Tartaric acid
B. Chloramine B
B. Silver nitrate
G. Oxalic acid

3. Choose three answers out of four. The identification of hydrogen peroxide is determined using the following reagents:
A. Potassium permanganate
B. Potassium iodide
B. Magnesium sulfate
G. Lead sulfide

4. Choose two answers out of four. If stored incorrectly, they change their appearance...
a) sodium tetraborate
b) potassium bromide

c) potassium chloride
d) magnesium sulfate

5. Choose two answers out of five. Pharmacopoeial tests for identification of phosphates are reactions with:
a) ammonium molybdate
b) diphenylamine
c) barium chloride
d) silver nitrate
d)sodium hydroxide

6. Establish a correspondence: operation for determining moisture by drying method – corresponding material support (equipment, devices, utensils):

1. place the exact mass of the medicinal substance	A) drying chamber
2. Cool after drying for 50 minutes	B) dried and weighed weighing cup
3. Place on a wire rack to dry	C) desiccator

7. Establish a correspondence: type of ash - composition of ash:

1. sulfated ash	A) silica, silicates, mechanical impurities
2. total ash	B) metal sulfates, characterized by low volatility and high heat resistance
3. ash insoluble in 10% hydrochloric acid	C) inorganic salts, oxides of metals and non-metals

8. Establish a correspondence: name of the solvent – formula:

1. diethyl ether	A) $CH_3COOC_2H_5$
2. ethyl acetate	B) $CHCl_3$
3. chloroform	B) C_2H_5OH
4. ethyl alcohol	C) $C_2H_5OC_2H_5$

9. Give the sequence of the reaction for detection of nitrogroup:
1. adding sodium nitrite solution
2. reduction

3. adding ammonium sulfamate solution
4. adding a solution of (1-naphthyl) ethylenediamine

10. Provide the sequence of stages for identifying the stabilizer (acetanilide) in a hydrogen peroxide solution:
1. Azo coupling with 2-naphthol
2. Formation of diazonium salt
3. Hydrolysis using hydrochloric acid

1.2.3. Examples of open-ended tasks (a question with an open answer)

Verifiable indicators of competence achievement: GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1,PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1

1. The parts of molecules taking part in the absorption of light are termed _____
2. An area in IR spectra that is < 1500 cm^{-1} is termed _____
3. The region of the electromagnetic spectrum that the human eye can detect (which spans waves of wavelength 400–700 nm) is referred to as the _____spectrum.
4. Most frequently used and non-toxic alternative to methanol in Karl Fischer method is _____.
5. The aim (objective) of sulfated ash determination is _____.

1. Assessment tools for conducting intermediate certification in the discipline

The intermediate certification is conducted in the form of an exam. The list of questions for preparation for intermediate certification:

No.	Questions for intermediate certification	Verifiable indicators of competency achievement
1.	The Russian State Pharmacopoeia. The International Pharmacopoeia. National and regional pharmacopoeias. Pharmacopoeial monographs: types, structure and terms of use.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
2.	Pharmacopoeial analysis. Criteria, basic terms and concepts of pharmacopoeial analysis.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
3.	Determination of melting point. Methods, equipment.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
4.	Boiling point. The physical meaning of boiling point. Methods for determining the boiling point. Determination of the temperature limits of distillation.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.

5.	Refractometry. Absolute and relative refractive index. Snell's Law. Calculations in refractometry. Measurement of refractive index. Equipment.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
6.	Polarimetry – definition, concept. Natural and polarized rays of light. The degree of polarization. Optically active substances. Chirality. Optical system of polarimeters. Rotation angle. Specific rotation. Calculation formulas.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
7.	Determination of ash. Total ash, sulphated ash. Ash insoluble in hydrochloric acid. Methods of determination. Calculation formulas.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
8.	Determination of drug solubility. Types of concentration used in pharmaceutical analysis.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
9.	Determination of color intensity of liquids. Determination of transparency and degree of turbidity of drug solutions.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
10.	Chromatographic methods of analysis. Classification. Thin layer chromatography. Gas chromatography. Ion exchange chromatography. High performance liquid chromatography (HPLC).	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
11.	Acidity, alkalinity. The ionic product of water. Determination of pH. Acid-base indicators. Potentiometric method for determining the acidity of the medium. Colorimetric method for determining the acidity of the medium.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
12.	Pharmacopoeial analysis of compounds containing halogens. Alkali metal halides.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
13.	Pharmacopoeial analysis of compounds containing oxygen and sulfur. Sodium thiosulfate, hydrogen peroxide.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
14.	Pharmacopoeial analysis of compounds containing boron. Boric acid, sodium tetraborate.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.

15.	Pharmacopoeial analysis of compounds containing magnesium, zinc and calcium. Magnesium sulfate, zinc sulfate, calcium chloride.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
16.	Pharmacopoeial analysis of bismuth subnitrate.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
17.	Pharmacopoeial analysis of compounds containing silver, copper and platinum. Silver nitrate, silver colloidal for external use. Copper sulfate. Ferrous sulfate. Cisplatin.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
18.	Halogenated hydrocarbons of the aliphatic series. Ethyl chloride (chloroethane), chloroform, fluothane (halothane).	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
19.	Alcohols and esters. Diethyl ether. Oxidation reactions of medical ether, storage conditions of the drug. Ethyl alcohol.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
20.	Alcohols and esters. Glycerol. Nitroglycerin. Explosion hazard, warning measures, storage conditions.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
21.	Aldehydes and their derivatives: formaldehyde, hexamethylenetetramine (methenamine).	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
22.	Carbohydrates: glucose.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
23.	Aliphatic carboxylic acids and their derivatives. Potassium acetate, calcium gluconate, sodium citrate.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
24.	Amino acids of the aliphatic series. Glutamic acid, cysteine, gamma-aminobutyric acid (GABA).	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1,

		PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
25.	Amino acids of the aliphatic series. Proline derivatives: captopril, enalapril. Aminocaproic acid.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
26.	Phenols. Phenol, thymol, resorcinol.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.

27.	Carboxylic acids of the aromatic series. Benzoic acid, salicylic acid, acetylsalicylic acid.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
28.	Aromatic amino acids – derivatives of para-aminobenzoic acid. Procaine, benzocaine, tetracaine.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
29.	Aromatic amines: paracetamol. Derivatives of phenylacetic and phenylpropionic acids: diclofenac, ibuprofen.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
30.	Benzenesulfochloramide derivatives: chloramine B, halazone.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
31.	Substituted sulfonylureas as antidiabetic agents: butamide, chlorpropamide.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
32.	Sulfonamides. Sulfanilamide, sulfacetamide sodium. Sulfaguanidine, sulfathiazole.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
33.	Diethylaminoacetanilides: trimecaine, lidocaine.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.

34.	Terpenoids. Bicyclic terpenoids: Menthol, validolum. Bicyclic terpenoids: camphor, bromocamphor.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
35.	Derivatives of 5-nitrofuran. Nitrofurazone.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.
36.	Pyrazole derivatives. Phenazone, metamizole sodium.	UC-8.1.1, UC-8.2.1, UC-8.3.1, GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1.

The intermediate attestation includes the following types of tasks: interviewing questions and solving situational tasks.

1.1. Examples of situational tasks:

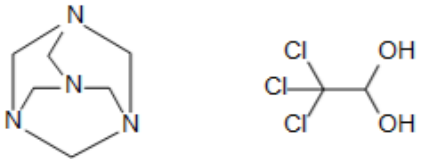
Verifiable indicators of competence achievement: GPC-1.1.1, GPC-1.2.1, GPC-1.3.1, PC-4.1.1, PC-4.2.1, PC-4.3.1, PC-10.1.1, PC-10.2.1, PC-10.3.1, PC-11.1.1, PC-11.2.1, PC-11.3.1

1. The trainee prepared a solution of caffeine-sodium benzoate using the mass-volume method and determined the refractive index of this solution.
   - Calculate the concentration of a caffeine-sodium benzoate solution if the refractive index of the solution is 1.3663, the refractive index of water is 1,333.
   - The refractive factor of caffeine-sodium benzoate is 0.00112.
   - Provide a definition and brief description of this method. What law underlies this method?
   - What does the phenomenon of "total internal reflection" mean?

2. The trainee prepared a 40% glucose solution for injection and determined the angle of optical rotation of this solution.
   - Calculate the concentration of the glucose solution if the values of the optical rotation angle α are equal to 5.1°; 4.9°; 5.3°.
   - A 20 cm long cuvette was used for the determination; 6.25 ml of the preparation was diluted in a 50 ml flask.
   - Specific rotation [α] of glucose is 52.8°.
   - The trainee must provide an opinion on the compliance of the concentration of the solution prepared by him with the requirements of the regulatory documents.

Provide a definition and brief description of this method. What law underlies this method?

3. When assessing the quality of pharmaceutical substances of the following chemical structures



the conclusion was made: both powders are white, finely crystalline substances, the first is odorless and sublimes without melting, and the second one has a characteristic pungent odor.

- Provide justification for their quality in terms of indicators "Description".
- Name these substances, describe their chemical structure and “Solubility” parameter.
- To what class of compounds do these substances belong, and how are they synthesized in industry?

In accordance with the chemical structure, suggest identification reactions and assay methods.

Example of an exam card:

Federal State Budgetary Educational Institution of Higher Education
"Volgograd State Medical University"
Ministry of Health of the Russian Federation

Department: **Pharmaceutical, toxicological chemistry, pharmacognosy and botany.**
Discipline: **Methods of pharmacopoeial analysis**
Speciality at the speciality **33.05.01 Pharmacy**
Academic year: **2025 - 2026**

EXAMINATION CARD № 1

1. Pharmacopoeial analysis of compounds containing halogens. Alkali metal halides. Potassium iodide.
2. Pharmacopoeial analysis of aromatic amino acids – derivatives of *para*-aminobenzoic acid. Procaine, benzocaine.
3. Solutions with a concentration of 1%, 3%, 5%, 10% were prepared in order to determine the refractive factor (F) of a glucose solution. The refractive indices of the solutions are respectively equal to 1.3344; 1.3373; 1.3401; 1.3472.

   - calculate the refractive factor (F).

   - describe the refractometric method: the instruments used, the scope of application, and the advantages and disadvantages of the method.

Stamp place Head of department A.A. Ozerov

The full fund of assessment tools for the discipline/practice is available in the VolgSMU Electronic Information and Educational System at the link(s): https://elearning.volgmed.ru/course/view.php?id=11216

Considered at the department meeting Pharmaceutical, Toxicological Chemistry, Pharmacognosy and Botany, protocol of «30» May 2025 г. № 10.

Head of the Department  A. Ozerov