**Kazakh National University named Al-Farabi**

**Department of Chemistry and Chemical Technology**

**Department of Chemistry and Technology of Organic Substances, Natural Compounds and Polymers**

**PROGRAM**

**of final exam on discipline**

**Fundamentals of Pharmacology - 5 ECTS**

**Expected outcomes:** Students in the final exam must demonstrate the ability to:

1. Know the pharmacokinetic parameters, mechanisms of absorption and biotransformation of drugs

2. Apply knowledge of pharmacodynamics and mechanisms of action of drugs in the main pathological processes (affecting the acid-base state, hemostasis and hematopoiesis, inflammation, infectious process, allergies, autoimmunity, onco-process). Know the types of undesirable side reactions and understand the possibilities of their correction

3. Demonstrate the ability to identify learning gaps and create strategies to enhance one’s own knowledge and skills

4. Effectively communicate with other students and teachers regarding medical and scientific information, articulate their opinions clearly when discussing and work effectively as a member of the team

**Approved final exam form - written exam**

**Topics included in final exam:**

1. Introduction to the discipline. Subject, objects and methods of pharmacology. Place of discipline in the specialty "Technology of pharmaceutical production".

2. General prescription. Recipe structure. Rules for prescribing medicines. Dosage forms**.**

3. Normative legal acts regulating the prescription, storage and dispensing of drugs. Pharmacopoeia**.**

4. Pharmacokinetics of drugs. Basic concepts.

5. Pharmacodynamics of drugs

6. Anti-inflammatory drugs. The pathogenesis of the inflammatory process. Classification and mechanisms of action of anti-inflammatory drugs.9. Antiallergic and immunosuppressant drugs

7. Pathogenesis of allergic reactions of immediate and delayed type. Antiallergic drugs. Classification and mechanisms of their action.

8. Nociceptive and antinociceptive systems. Analgesics, their difference from local anesthetics. Classification and mechanisms of action.

9. Diseases of the gastrointestinal tract, pathogenesis. Medicines affecting the functions of the digestive system. Their classification and mechanisms of action

10. Drugs used in emergency conditions (anaphylactic shock, acute coronary insufficiency, bronchospasm, hypertensive crisis, hyper- and hypoglycemic coma).

 11. Antimicrobial agents. Classification. Basic principles of prescribing antibacterial agents.

12. Antibiotics - principles of prescription and choice. Antibiotic resistance.

13. Synthetic antimicrobial agents.

14. Principles of prescribing and choosing antifungal and antiviral agents. Classification.

15. Etiopathogenesis of tuberculosis. Principles of tuberculosis treatment. Classification of anti-tuberculosis drugs

**List of drugs to repeat before final examination**

1. Epinephrine

2. Norepinephrine 3. Enalapril

4. Atorvastatin

5. Acetylsalicylic acid 6. Metoprolol

7. Losartan

8. Hydrochlorothiazide 9. Insulin Actrapid 10.Insulin NPH

11.Levodopa/carbidopa combination

12.Metoclopramide

13.Fluticasone

14.Digoxin

15.Ketoprofen

16.Salbutamol (Albuterol) 17.Clomiphene

18.Amoxicillin/clavulanate 19.Tamoxifen

20.Alendronate

21.Thyroxin

22.Cortisol (hydrocortisone)

23.Spironolactone

24.Omeprazole

25.Fexofenadine

26.Lidocaine

27.Fluoxetine

28.Metformin

29.Diphenhydramine 30.Fexofenadine 31.Ranitidine

32.Thyamaz

**Types of questions for final exam:**

1. Tell the mechanism of action of the drug

2. Explain the mechanism of drug side effects

3. Explain the mechanism of drug interaction

4. Explain the pharmacologic basis of switching one drug to another 5. Compare mechanism of action of two drugs with similar effect 6. Propose agonist/antagonist of hormone

7. Explain the mechanism of action of hormone, and how drugs can affect it 8. Describe the drug – partial agonist, agonist, inverse agonist 9. List the additional medication, that can help in this condition 10. Explain how the side effects are linked with drug mechanism of action

**Scale of response quality**

|  |  |  |
| --- | --- | --- |
| **Evaluation**  | **Criteria**  | **Scale, points** |
| Excellent  | 1. All key aspects included and presented logically; 2. High accuracy (relevance, without redundancy) and consistent focus on question; 3. Excellent integration of theoretical issues; 4. Provision of relevant examples; 5. In-depth analysis and theoretical justification of given problem (if applicable), all key aspects identified and interpreted; 6. Fluency in use of professional terminology | 90 - 100 |
| Good  | 1. All key aspects included and presented logically;  | 75 - 89 |

|  |  |  |
| --- | --- | --- |
|  | 2. Consistent focus on question with satisfactory accuracy, and relevance, and/or some redundancy; 3. Satisfactory integration of theoretical issues; 4. Lack of examples; 5. Satisfactory analysis and theoretical justification of given problem (if applicable), most key aspects identified and interpreted; 6. Correct use of professional terminology |  |
| Satisfactory  | 1. Most key aspects included; 2. Satisfactory focus on question - some lapses of relevance and/or noticeably redundancy; 3. Theoretical issues presented without noticeably integration; 4. Provision of unsuccessful examples or no examples; 5. Some analysis and theoretical justification of given problem (if applicable), most key aspects identified and interpreted; 6. Correct use of professional terminology | 50 - 70 |
| Unsatisfact ory (FX) | 1. Most key aspects missed; 2. Lack of focus on question - no relevance and notable redundancy; 3. Some theoretical issues presented in someway; 4. No or irrelevant examples; 5. Some analysis and theoretical justification of a given problem (if applicable), most key aspects missed; 6. Lapses in use of professional terminology | 25 - 49 |
| Failed  | 1. Most or all key aspects missed; 2. No focus on question, irrelevant information; 3. Theoretical issues missed or superficial; 4. No or irrelevant examples; 5. No analysis and no theoretical justification of a given problem (if applicable), most key aspects missed; 6. Lapses in use of professional terminology | 0-24 |

**Grading system**

|  |  |  |  |
| --- | --- | --- | --- |
| **Letter Grade** | **The digital** **equivalent of points** | **% content**  | **Traditional system assessment** |
| А  | 4,0  | 95-100  | Excellent |
| А-  | 3,67  | 90-94 |
| В+  | 3,33  | 85-89  | Good |
| В  | 3,0  | 80-84 |
| В-  | 2,67  | 75-79 |
| С+  | 2,33  | 70-74  | Satisfactory |
| С  | 2,0  | 65-69 |
| С-  | 1,67  | 60-64 |
| D+  | 1,33  | 55-59 |
| D-  | 1,0  | 50-54 |
| FX  | 0  | 25-49  | Unsatisfactory “Discipline is not completed” *(not taken into account when calculating GPA)* |
| F  | 0  | 0-24 |
| I (Incomplete) | -  | -  |
| P (Pass) | **-**  | **-**  | "Credit" *(not taken into account when calculating GPA)* |
| NP (No Рass) | **-**  | **-**  | «Fail» *(not taken into account when calculating GPA)* |
| W (Withdrawal) | -  | -  | "Failure to discipline" *(not taken into account when calculating GPA)* |
| AW (Academic Withdrawal) |  |  | Withdrawal for academic reasons *(not taken into account when calculating GPA)* |
| AU (Audit) | -  | -  | "Discipline is listened" *(not taken into account when calculating GPA)* |
| Certified  |  | 30-60 50-100 | Certified (examined) |

|  |  |  |  |
| --- | --- | --- | --- |
| Not certified  |  | 0-29 0-49 | Not certified |
| R (Retake)  | -  | -  | Re-learning the discipline |

**Guidelines for exam technology**

1. The exam lasts 3 hours.

2. At the specified time the student enters the site "app.oqylyq.kz". 3. The student receives a login and password from the IS Univer. 4. Tickets for each student are made automatically.

5. The exam starts with a mandatory proctor (you can't turn off the camera and microphone): - You need a laptop with a webcam or a home computer. If not, you can use your smartphone's camera, for example, with the DroidCam client application.

6. The answer is printed in the OQYLYQ program itself. Acceptance of a handwritten response form on paper is NOT provided.

7. At the end of the exam the student presses the "Finish" button.

**Basic literature**:

1. Basic & Clinical Pharmacology [Electronic resource] : collection / ed.: B. G. Katzung, A. J. Trevor. - 13th ed. - New York ; Ghicago ; San Francisco : McGraw-Hill Education, 2015. - 1837 p. - ISBN 978-0-07-182641-9 : 0.00

**Additional literature:**

1. Essentials Of Medical Pharmacology by K.D. Tripathi [Electronic resource]: textbook / K.D. Tripathi. - 8th ed. - Jaypee Brothers Medical Publishers (P) Ltd:, 2019. - 1080 p. - ISBN 78-9352704996

**WWW Resources:**

1. https://www.msdmanuals.com/professional/clinical-pharmacology