AL-FARABI KAZAKH NATIONAL UNIVERSITY

Faculty of Medicine and Healthcare, Higher School of Medicine

Department of Fundamental Medicine

**PROGRAM**

**of midterm examination I on discipline Pharmacology**

**MZiB2216 "Mechanisms of Defense and Disease”**

**I. Purpose:** The purpose of midterm examination is to allow students demonstrate their competence and knowledge in pharmacology discipline.

**Objectives:** At the completion of this midterm examination I, student will be able to:

1. Define the drug name, dosage, indications and contraindication, side effects of the drug.
2. Describe the mechanism of the drug.
3. Compare the drug with another group of drugs.

**II.** **The format and instruction of Midterm examination I.**

**Read the instructions below carefully.**

The Midterm Examination will be administered during the class, **orally,** on 5th week of academic study and at its scheduled time.

**Format:** Ticket will be shown on the screen. It consists of two Tasks ( Task 1 and Task 2). Each Task will involve 3 questions. Every question will be evaluated regarding **Table 2**. (Grading). Please check the evaluation scale.

**Time:** Students will have 10 minutes to complete the midterm examination.

Task 1- 5 minutes

Task 2- 5 minutes

**Rules:** The student’s mark will be ***“0”*** and can not retake midterm examination, **IF** :

1. Student have network connection problems.
2. Student will not appear on scheduled time.
3. Students are not allowed to discuss the questions and send it to other students, and take a picture of questions or copy.

Students are not allowed to use their books, notes, lecture Powerpoints and cheat other student’s response sheets. The mobile phone and other electrical devices should be turned off.

**IMPORTANT!** A student must appear on Google meet on scheduled time (arranged by the Group leader according to the list of the students in Journal). If the student will break the listed rules, student participation will be declared as invalid and the mark will ***“ 0”***. **Re-grading policy ( appeal):** *A student who considers that he or she has been awarded an incorrect mark for a midterm examination may request that the mark be reviewed. You must appeal officially within* ***1 days*** *after getting unsatisfied examination marks. After the watching record* Commission's of Appeal  *will decide whether student can retake or not Midterm control. If the student will be given chance to retake midterm exam:*

1. Student will have ONLY 5 minutes to complete the answer in front of the Commission's of Appeal (consist of 6 commission members). If a student cannot answer questions his/her latest mark will be the final mark;
2. The questions will be higher-ordered.

**EXAMPLE OF THE TICKET ON MIDTERM EXAMINATION I.**

**Ticket №1**

**Task1.** A student of the 7th grade suffers from epilepsy. He used phenobarbital for a long time. He notes that the drowsiness caused by the drug and its effectiveness gradually decreased (seizures began to develop more often).

Q1. What is the reason for these changes from the standpoint of pharmacokinetics?

Q2. What should be done to increase the effectiveness of phenobarbital?

Q3. Explain the terms: Agonist and Antagonist of receptors.

**Task2.** A 16-year-old patient was taken to the toxicology department of the hospital in a state of psychomotor agitation, disoriented, profuse sweating, profuse salivation, vomiting, individual muscle fibrillation, respiratory disorders due to increasing bronchorrhea and bronchospasm, bradycardia. Pupils are narrowed. Involuntary loose stools, frequent urination. According to relatives, the patient independently ingested eye drops, which were used to treat glaucoma by the patient's grandfather.

Q1. Name the drug that can cause these features?

Q2. Explain the mechanism of action of this drug?

Q3. Give comparison of the selected drug with acetylcholine

**III. List of topics. Table 1.**

|  |  |
| --- | --- |
| 1 | Introduction to Pharmacology.The value of the subject. Dosage Forms. INN, trade names. Medicinal dosage forms. Drug prescription. |
| 2 | Pharmacokinetics. Principles of interaction of human bodies with the drugs. Absorption, distribution, biotransformation and excretion of chemicals. Effects of impaired organ functions on pharmacokinetics. |
| 3 | Pharmacodynamics. Principles of interaction of drugs with human bodies. Different mechanisms of action – agonism and antagonism to different types and subtypes of receptors, inhibition of enzymes, blocking or opening of channels. Interaction of the drugs |
| 4 | PNS. Cholinergic drugs. Acetylcholine, it’s function in the healthy human body. M and N cholinoreceptors, different subtypes. Cholinoblockers and cholinomimetics. Cholinesterase inhibitors. |

**Main questions:**

1. Formulation. Definition. The concept of a medicinal substance, a dosage form and a medicinal preparation
2. Classification of dosage forms (by consistency, method of administration). Oficinal and magistral medicinal forms.
3. Recipe: definition, rules of prescription in prescription drugs, features of prescribing poisonous, potent, narcotic drugs
4. The concept of solid dosage forms and their varieties. Dosing methods.
5. The concept of soft medicinal forms and their varieties.
6. Common volume units for measuring liquid dosage forms. Principles of calculation of doses in the preparation of solutions. Methods of expressing the concentration of solutions.
7. Liquid dosage forms
8. Dosage forms for injection. Requirements for them. Rules of prescription in the recipe.
9. Definition and objectives of general pharmacology. Main sections of pharmacology.
10. Pharmacokinetics of drugs, definition. Ways of drug administration.
11. Absorption of drugs from the injection site. Factors contributing to better absorption of medicinal substances.
12. Distribution of medicinal substances in the body. The importance of histohematological barriers in the distribution of drug substances.
13. Metabolism of medicinal substances in the body. Types of metabolic reactions of drugs
14. The role of microsomal liver enzymes in the metabolism of drugs. Induction and depression of microsomal enzymes.
15. Excretion of drugs and their metabolites. Elimination, the period of semi-elimination.
16. Pharmacodynamics of medicines, definition. The mechanism of action of drugs. The concept of specific receptors.
17. The essence of the receptor theory of mechanisms of action of drugs. Affinity, inner activity. Agonists, antagonists, mimetics and blockers of specific receptors.
18. Types of action of drugs (local, resorptive, reflex). Basic and non-basic pharmacological effects. The concept of the side effects of medicines.
19. Pharmacological and physiological factors affecting the magnitude of the pharmacological effect.
20. Genetic, biological and emotional factors affecting the magnitude of the pharmacological effect. The concept of a placebo.
21. Dose. Dependence of pharmacological effect on dose. Types of therapeutic doses: threshold, average and higher therapeutic dose. Latitude of the therapeutic effect of the drug.
22. Interaction of drugs with their combined use. Types of interaction: pharmaceutical, pharmacological. Synergism and antagonism of drugs.
23. Changes in the effect of drugs when they are repeated. Drug dependence (physical and mental). Adaptation (tolerance), sensitization, cumulation.
24. Toxic effects of medicines.
25. Construction and function of the cholinergic synapse. Types of cholinergic receptors. Effects of stimulation of M-cholinergic receptors and H-cholinergic receptors.
26. Classification of cholinergic drugs.
27. Anticholinesterase drugs (proserine, galantamine, physostigmine). Classification. Mechanism of action. Pharmacological properties. Application.
28. Sharp poisoning with anticholinesterase agents (and organophosphorus compounds). Symptoms of poisoning. Measures of assistance. Specific antidotes (dipiroxime, isonitrozine).
29. Features of pharmacodynamics of M-H-cholinomimetics. Mechanism of action of acetylcholine. Pharmacological properties.
30. M-cholinomimetics (acetylidine, pilocarpine). Differences from anticholinesterase agents. Pharmacological effects. Application.
31. M-cholinoblocking agents. Mechanism of action. Pharmacological properties of atropine (influence on the eye, cardiovascular system, glands, smooth muscles). Features of the action on the central nervous system. Indications for use.
32. Features of pharmacological action of scopolamine, platyphylline, gastrozepin, somatropin. Comparative characteristics, indications for use. Side effects.
33. Acute poisoning with M-holinoblokatorami. Symptomatic of poisoning. Measures of assistance.
34. Influence of N-cholinomimetic agents on the cardiovascular and respiratory system. Application. Side effects.
35. Ganglion blockers. Mechanism of action. Effects of stimulation of sympathetic and parasympathetic ganglia. Indications for use. Side effects.
36. Miorelaxants. Classification. The mechanism of action of depolarizing and nondepolarizing agents.
37. The principle of the action of muscle relaxants. Indications for use Possible complications in their use. Antagonists of muscle relaxants.

**IV. List of drugs.**

Acetylcholine

Carbachol

Neostigmine

Physostigmine

Galantamine

Pilocarpine

Tacrine

Pralidoxime

Nicotine

Lobeline

Atropine

Homatropine

Tropicamide

Hyoscine (Scopolamine)

Pirenzepine

Ipratropium bromide

Tubocurarine

Pancuronium

Pipecuronium

Atracurium

Suxametonium

Organophosphates

**V. Table 2. Grading of Midterm examination I.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Criteria** | **Level (point)** | | | | | |
| **Out of programm** | **At the levell of the Programm** | **Not complete answer** | **Need correction** | **need to study more** | **no pass** |
| **Task 1** | **Case** | 1 question | 30 | 30 | 20 | 15 | 10 | 0 |
| 2 question | 30 | 25 | 20 | 15 | 10 | 0 |
| 3 question | 40 | 35 | 25 | 20 | 15 | 0 |
|  | **100** | **90** | **65** | **50** | **35** | **0** |
| **Task 2** | **Case** | 1 question | 40 | 35 | 25 | 20 | 15 | 0 |
| 2 question | 30 | 27 | 20 | 15 | 10 | 0 |
| 3 question | 30 | 28 | 20 | 15 | 10 | 0 |
|  | **100** | **90** | **65** | **50** | **35** | **0** |