

APPROVED
at a meeting of the
Scientific Council
NJSC «Al-Farabi KazNU».
Minutes No.10 dated
May 13, 2023.

The program of the entrance exam for applicants to the PhD
for the group of educational programs
D011 – «Training of physics teachers»

1. General provisions.

1. The program was drawn up in accordance with the Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 31, 2018 No. 600 “On Approval of the Model Rules for Admission to Education in Educational Organizations Implementing Educational Programs of Higher and Postgraduate Education” (hereinafter referred to as the Model Rules).

2. The entrance exam for doctoral studies consists of writing an essay, passing a test for readiness for doctoral studies (hereinafter referred to as TRDS), an exam in the profile of a group of educational programs and an interview.

Block	Points
1. Essay	10
2. Test for readiness for doctoral studies	30
3. Exam according to the profile of the group of the educational program	40
4. Interview	20
Total admission score	100/75

3. The duration of the entrance exam is 4 hours, during which the applicant writes an essay, passes a test for readiness for doctoral studies, and answers an electronic examination. The interview is conducted on the basis of the university before the entrance exam.

2. Procedure for the entrance examination.

1. Applicants for doctoral studies in the group of educational programs D011 - «Training of physics teachers» write a problematic / thematic essay. The volume of the essay is at least 250-300 words.

2. The electronic examination card consists of 3 questions.

Topics for exam preparation according to the profile of the group of the educational program.

Disciplines «Pedagogy of higher education and Psychology»

1. Pedagogical science and its place in the system of human sciences. The main categories of higher education pedagogy. The main directions and trends in the development of higher education in the modern world.
2. The legal framework of the education system and higher education of the Republic of Kazakhstan. Credit training system. The Bologna Process.
3. Methodology of pedagogy of higher education. Pedagogy methodology levels. Methods of pedagogical research.
4. Pedagogical activity and structure of pedagogical activity. The personality of the teacher of higher education and modern requirements for his competence.
5. Professional and pedagogical culture of a university teacher. Pedagogical skill of a university teacher.
6. The content and structure of pedagogical communication. Styles and levels of pedagogical communication.
7. The holistic pedagogical process of higher education. Patterns and principles of the pedagogical process of higher education. Stages of the pedagogical process of higher education.
8. The concept of didactics and the learning process. Patterns and principles of training. Components of the learning process in higher education.
9. The content of higher professional education. The structure and levels of educational content.
10. Classification of teaching methods.
11. The subject of psychology, its tasks and methods. Methodological foundations of the study of man. The science of man. The main methods of psychological research.
12. The concept of the psyche and its evolution. The origin and development of human consciousness. The concept of consciousness. The development of the human psyche. Physiological basis of the human psyche.
13. The general concept of sensations. Types of sensations. The main properties and characteristics of sensations. Sensory adaptation and interaction of sensations. Description of the main types of sensations.
14. General characteristics of perception. Physiological basis of perception. The main properties and types of perception.
15. Definition and general characteristic of memory. The main types of memory. The main processes and mechanisms of memory. Individual features of memory and its development.
16. Nature and basic types of thinking. The main forms of thinking. Theoretical and experimental approaches to the study of thinking. The main types of mental operations. The solution of complex mental problems and creative thinking. The development of thinking.
17. General concept of personality. The relationship of social and biological in the individual. The formation and development of personality.
18. General characteristics of human abilities. Ability development levels and individual differences. Development of abilities.
19. Temperament and character. The concept of temperament. A brief review of the teachings on temperament. The concept of character. Theoretical and experimental approaches to the study of character. Character formation.

3. List of references

Main:

1. Mynbaeva A.K. Fundamentals of pedagogy of higher education: Textbook. - 3rd ed., Ext. - Almaty, 2013 .-- 190 p.
2. Akhmetova G.K., Isaeva Z.A. Pedagogy for a magistracy. - Almaty: Kazakh University, 2006.
3. Taubaeva Sh. T. Methodology and methodology of didactic research. Tutorial. - Almaty: Kazakh University, 2015 .- 246 p.
4. Stolyarenko L.D. Psychology and pedagogy of higher education. Tutorial. - Rostov-on-Don: Phoenix. - 2014 .- 620 s.
5. Credit system of study at the university. - Almaty: Kazakh University, 2006. - 180 p.
6. Andreeva G.M. Social Psychology. - M.: Aspect Press, 2009 .-- 432 p.
7. Aronson Elliot, Wilson Tim, Aikert Robin. Social Psychology. The psychological laws of human behavior in society. - SPB, Prime EUROSNAK, 2008 .-- 560 s.
8. Bern E. Games that people play: Psychology of human relationships / Eric Bern; per. from English A. Gruzberg. - M: Eksmo, 2012 .- 353 p.
9. Byrne E. People who play games: Psychology of human fate / Eric Byrne; per. from English A. Gruzberg. - M: Eksmo, 2012 .- 574 p.
10. Burlachuk L.F. Psychodiagnostics of personality. - Kiev, 2009 .- 300 s.

Additional:

1. Egorov V.V. Pedagogy of high school. Tutorial. - Novosibirsk: 2010. - 260 s.
2. Mynbaeva A.K. Modern education is in the focus of new pedagogical concepts, trends and ideas. - Almaty: Rarity, 2005. - 90 p.
3. Isaeva Z.A., Mynbaeva A.K., Sadvakasova Z.M. Active methods and techniques of teaching in higher education. - Almaty: Kazakh University, 2005. - 122 p.
4. Mynbaeva A.K., Sadvakasova Z.M. Innovative teaching methods or how interesting to teach. - Almaty, 2010. - 284 p.
5. The state program for the development of education in the Republic of Kazakhstan for 2011-2020 // <http://www.edu.gov.kz>
6. Moreva N. A. Technologies of vocational education. - M.: Academy, 2009.
7. Leontiev A.N. The formation of the psychology of activity: Early work / Ed. A.A. Leontiev, D.A. Leontiev, E.E. Falcon. - M.: Sense, 2010. - 439 p.
8. Leontiev A.N. Lectures on general psychology. - M.: Sense, 2010. - 428 p.
9. Maklanov A. G. General psychology: a textbook for high schools. - St. Petersburg, 2012. - 583 p.
10. Nurkova VV Psychology: a textbook for bachelors / VV Nurkova, N.B. Berezanskaya. -M.: Higher education, 2012. - 575 p.
11. Petrovsky V.A. Personality in Psychology. - Rostov-on-Don: Phoenix, 2010. - 512 p.
12. Hohel S. Steps of consciousness. -M.: Eksmo, 2008 .-- 400 p.
13. Houston Miles, Strebe Wolfgang. Leading into social psychology. European approach. - M.: UNITY-DANA, 2008. - 622 p.

Internet sources

1. https://ru.wikipedia.org/wiki/Академия_Google
2. <https://cyberleninka.ru/>
3. window.edu.ru/resource/678/77678
4. http://www.gumer.info/bibliotek_Buks/Psihol/makl/index.php
5. <http://psylib.org.ua/books/rubin01/>
6. http://yspu.org/images/2/2c/Леонтьев_А.Н._Лекции_по_общей_психологии.pdf

Discipline " Methods of Solving Problems in Physics "

1. Subject and research methods of teaching physics. Connection of teaching methods of physics with other sciences. General questions of methods of teaching physics
2. Particular questions of methods of teaching physics. Teaching methodology at the basic and specialized level.
3. Particular questions of methods of teaching physics. Teaching methodology for solving physical problems.
4. The concept of "physical problem". Structure. Classification. The role, place of tasks in teaching physics. Methodology for solving and teaching methods for solving LPT.
5. The essence and structure of the LPT solution process. Stages of the process of solving physical problems.
6. Types of tasks. The role of logic problems in teaching physics. Acquaintance with the content of the logical task.
7. Types and features of solving graphic problems.
8. Experimental tasks. Formulation and solution of experimental problems.
9. LPT as a means of control and a way to assess knowledge and skills. Content and assessment of tests and tests in physics
10. Some general questions of the methodology for solving physical problems in various sections of the general course of physics at the university.
11. Features of teaching methods for solving physical problems in mechanics at the university.
12. Features of teaching methods for solving physical problems in molecular physics at a university.
13. Teaching methodology for solving problems in electrostatics at the university.
14. Methods of teaching the solution of physical problems in the section "Direct and alternating currents" in the university.
15. Teaching methodology for solving physical problems in the section "Magnetic field. Electromagnetic induction. Electromagnetic vibrations and waves "at the university.

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Main:

1. Иродов И.Е. Задачи по общей физике: учеб. пособие для вузов / И. Е. Иродов. - 10-е изд. - М. : БИНОМ. Лаб. знаний, 2014. - 431, [2] с.
2. Савельев И. В. Курс общей физики: учеб. пособие: в 5 т. / И. В. Савельев. - 5-е изд., испр. - СПб.; М.; Краснодар: Лань. - 2011. - ISBN 978-5-8114-1206-8 Т. 1: Механика. - 336 с.
3. Трофимова Т.И. Краткий курс физики: с примерами решения задач: учеб. пособие / Т. И. Трофимова; Учеб.-метод. центр "Класс. учебник". - 4-е изд., стер. - М.: КноРус, 2015. - 279с.
4. Коркина В. И. Общие основы педагогики: учеб. для студ. пед. специальностей / В. И. Коркина, Г. С. Тишмаганбетова; М-во образования и науки РК, КарГУ им. Е. А. Букетова. - 3-е изд. - Караганда: Ақнұр, 2019. - 171 с.
5. Ахметова Г.К. Стратегия образовательных инноваций: преемственность многоуровневого образования: монография / Г. К. Ахметова, Г. Н. Паршина; КазНУ им. аль-Фараби. - Алматы: Қазақ ун-ті, 2007. - 185, [2] с.
6. Айтбаева А.Б. Арт-методы в образовании: учеб. пособие / А. Б. Айтбаева, Г. А. Қасен; КазНУ им. аль-Фараби. - Алматы: Қазақ ун-ті, 2018. - 203 с.

Additional:

1. Бережнова Е.В. Основы учебно-исследовательской деятельности студентов: Учебник для студ. сред. спец. учеб. заведений/ Е.В. Бережнова, В.В. Краевский. - М.: Академия, 2005. - 128 с.
2. Шкляр М. Ф. Основы научных исследований: учебное пособие/ М. Ф. Шкляр. - 4-е изд.. - М.: Дашков и К, 2012. - 244 с
3. Колесникова И. А. Педагогическое проектирование: учебное пособие/ И. А. Колесникова. - 3-е изд., стер.. - М.: Академия, 2008. - 288 с.
4. Жукарев А. С. Задачи повышенной сложности в курсе общей физики [Текст]: монография / А. С. Жукарев, А. Н. Матвеев, В. К. Петерсон; Под ред. А. Н. Матвеева. - М.: Изд-во МГУ, 1985. - 200 с.
5. Антонов Л.И. Методика решения задач по электричеству [Текст] : учеб.-метод. комплекс / Л. И. Антонов. - М. : Изд-во МГУ, 1982. - 167 с.

Discipline: "Methods of teaching physics»

1. Goals and objectives of the discipline "Methods of teaching physics". Tasks of teaching methods. The role of physics in the educational process.
2. Learning functions. The role of physical science in the educational process.
3. Types of physics lessons. Planning of training sessions in physics, calendar plan, lesson plan. The plan of the lesson of new material in physics. Requirements for a modern physics lesson.
4. The subject "Physics" as an academic discipline, its structure, content. Modern trends in improving the content of the physics course. Types of educational experiment in physics. Requirements for the physics classroom.
5. Scientific logical methods used in teaching physics, the synergetic basis of pedagogical management.
6. Didactic principles of teaching physics. Basic professional and methodological knowledge, skills and abilities of a physics teacher.
7. Methods of teaching physics. Reference signs in physics, structural and logical systems.
8. Methods of accounting and control of knowledge, skills and abilities in physics. Basic principles in the preparation of tests. The essence of ratings and rating points.
9. The ability to manage the cognitive activity of students in solving physical problems. Goals and objectives of the use of technical means of teaching in the process of teaching physics.
10. Physical tasks as a means of training and education. Classification of problems in physics. Using the method of problem-based learning in physics lessons.
11. Opportunities for excursions, extracurricular work in physics. Organization and content of the work of physical and physical-technical circles.
12. Organization of elective classes in physics and their purpose. The possibility of forming a scientific worldview and socialization of students in the process of teaching physics. Active teaching methods used in physics classes.
13. The possibility of using a computer in physics classes. Distinctive features of education in other countries.
14. Methods of studying the main topics of the mechanics course. Method of introduction of the basic concepts of kinematics: material point, reference frame, displacement, speed, acceleration.
15. The method of introduction of the main provisions of dynamics: mass, force. The laws of conservation in mechanics, show their relation to the properties of space and time.

16. Methodological issues of the course of molecular physics. The method of forming concepts: mole, temperature. Thermodynamic characteristics (heat, work, internal energy, reversible and irreversible processes). Derive the equation of state of an ideal gas by induction.

17. Methods of forming the concepts of the course electrodynamics: electric charge, electric field, electric field strength, potential.

18. Methods of forming concepts: magnetic field, magnetic induction, Lorentz force.

19. Methods of forming the concept of proper mechanical and electromagnetic oscillations. Mathematical pendulum, oscillatory circuit. Methods of forming concepts: forced mechanical and electromagnetic oscillations. The phenomenon of resonance.

20. Methods of forming the concepts of quantum physics, quantum properties of light.

3. List of references

Main:

1. Жанабаев З.Ж., Тынгаева Ш.Б., Жолдасова Х.Б. Теория и методика обучения физике. – Алматы: Қазақ университеті, 2007. – 135 с.

2. Жанабаев З.Ж., Мукушев Б.А. Синергетика в педагогике, Алматы, 2002, 127 с.

3. Школьные учебники и учебные пособия по физике и астрономии для V11 - XI классов.

4. Каменецкий С.Е., Пурешева Н.С., Важеевская, Н.Е. и др. Теория и методика обучения физике в школе: Общие вопросы/, - М., 2000, 368 с.

5. Каменецкий С.Е., Пурешева Н.С., Важеевская Н.Е. и др. Теория и методика обучения физике в школе: Частные вопросы: Учебное пособие для студ. Высш. Пед. Учеб. Заведений – М.: Изд. Центр «Академия», 2000.

6. Карташов В. Ф. Практические работы по астрономии: Методические рекомендации и задания. - Челябинск: Изд-во ЧГПУ, 1999. - 196 с.

7. Физический практикум для классов с углубленным изучением физики/ Под ред. Ю. И. Дик, О.Ф. Кабардина, М., 1993, 208 с.

8. Периодические журналы: «Физика в школе», «Квант», «Успехи физических наук», «Информатика, физика, математика» (на каз.яз.), «Новое в жизни, науке, технике. Сер.физика».

9. Андрианов Н. К., Марленский А.Д. Астрономические наблюдения в школе. - М.: Просвещение, 1987. - 112 с.

10. Бурсиан Э.М. Задачи по физике для компьютера, М., 1991, 291с.

Additional:

1. [Закирова Н. А.](#), Гаврилова Е. П. Физика мен астрономиядан тестік тапсырмалар жинағы: 9 сынып. - Көкшетау : Келешек - 2030, 2007. - 199 б.

2. Жанабаев З.Ж., Мукушев Б.А. Синергетика в педагогике, Алматы, 2002, 127 с.

3. Оқушы анықтамасы: Физика. - Алматы : Арман-ПВ, 2005. - 408 б.

4. [Симакин М. В.](#), [Хамзина Б. Е.](#) Физикадан есеп шығарудың әдістемелік нұсқаулары: жаратылыстану-математика бағытындағы 10-сыныпқа арналған. - Көкшетау : Келешек - 2030, 2007. - 119 б.

5. Физический практикум для классов с углубленным изучением физики/ Под ред. Ю.И.Дик, О.Ф.Кабардина, М., 1993, 208 с.

6. VII - XI сыныптардың физика және астрономия бойынша мектеп оқулықтар мен әдістемелік құралдар.