

**Federal State Budgetary Educational Institution of Higher Education
«North-Ossetia State Medical Academy» of the Ministry of Healthcare
of the Russian Federation**

Department of Chemistry and Physics

APPROVED

by the protocol of the meeting of the Central
coordinating educational and methodological
council on March 22, 2022. № 4

FUND OF ASSESSMENT TOOLS

by discipline « Physics and mathematics»

the main professional educational program of higher education - specialty program in the
specialty 31.05.03 Dentistry, approved on March 30, 2022

for _____ 1st year students _____

by specialty _____ 31.05.03 Dentistry _____

considered and approved at the meeting of the department from February 08, 2022, Protocol №7.

Head of department

Chemistry and physics



R.V. Kalagova

Vladikavkaz, 2022

The structure of the fund of assessment tools

1. title page
2. structure
3. review
4. passport of assessment tools
5. kit of assessment tools:
 - list of issues to prepare for the modular lessons
 - examination questions/ questions for offset
 - standards of test tasks (with title page and table of contents)

**ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ БЮДЖЕТНОЕ
ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ «СЕВЕРО-
ОСЕТИНСКАЯ ГОСУДАРСТВЕННАЯ МЕДИЦИНСКАЯ АКАДЕМИЯ»
МИНИСТЕРСТВА ЗДРАВООХРАНЕНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ**

**РЕЦЕНЗИЯ
на фонд оценочных средств**

**по дисциплине «Физика, математика»
для студентов I курса
по специальности - 31.05.03 Стоматология**

Фонд оценочных средств составлен на кафедре химии и физики на основании рабочей программы дисциплины «Физика, математика» основной профессиональной образовательной программы высшего образования – программы специалитета по специальности 31.05.03 Стоматология, утвержденной 30.03.2022 г. и соответствуют требованиям ФГОС ВО по специальности 31.05.03 Стоматология.

Фонд оценочных средств утвержден на заседании Центрального координационного учебно-методического совета.

Фонд оценочных средств включает в себя:

- вопросы к модулю,
- банк тестовых заданий (с титульным листом и оглавлением),
- билеты к зачету

Банк тестовых заданий включает в себя следующие элементы: тестовые задания, варианты тестовых заданий, шаблоны ответов. Все задания соответствуют рабочей программе дисциплины «**Физика, математика**» и охватывают все её разделы. Сложность заданий варьируется. Количество заданий по каждому разделу дисциплины достаточно для проведения контроля знаний и исключает многократное повторение одного и того же вопроса в различных вариантах. Банк содержит ответы ко всем тестовым заданиям и задачам.

Фонд оценочных средств включает в себя билеты к зачету. Количество билетов достаточно для проведения зачета и исключает неоднократное использование одного и того же билета во время зачета в одной академической группе в один день. Формулировки вопросов совпадают с формулировками перечня вопросов, выносимых на зачет. Содержание вопросов одного билета относится к различным разделам программы, позволяющее более полно охватить материал дисциплины. Сложность вопросов в билетах распределена равномерно. Замечаний к рецензируемому фонду оценочных средств нет.

В целом, фонд оценочных средств по дисциплине «**Физика, математика**» способствует качественной оценке уровня владения обучающимися общекультурными и профессиональными компетенциями.

Рецензируемый фонд оценочных средств по дисциплине «**Физика, математика**» может быть рекомендован к использованию для текущей и промежуточной аттестации на стоматологическом факультете у студентов I курса.

Рецензент:

Председатель ЦУМК естественнонаучных
и математических дисциплин, доцент



Н.И. Боцьева

Passport of the assessment tools for the discipline « Physics and mathematics »

№	Name of the controlled section (topic) of the discipline / module	Code of formed competence	Name of evaluation tool	
1	2	3	4	5
type of control			Current	Intermediate
1.	Fundamentals of mathematical analysis, probability theory and mathematical of statistics.	UC-1, ID-1	Cards for the test, test control	Questions to the module, test control
2.	Mechanics of liquids and gases. Biomechanics. Acoustics.	GPC-4, ID-3	Cards for the test, test control	Questions to the module, test control
3.	Electrical and magnetic properties of tissues and the surrounding environment	GPC-4, ID-3	Cards for the test, test control	Questions to the module, test control
4.	Optics	GPC-4, ID-3	Cards for the test, test control	Questions to the module, test control
5.	The quantum physics, ionizing radiation	GPC-4, ID-3	Cards for the test, test control	Questions to the module, test control

QUESTIONS TO MODULES

**of educational discipline “Physics and mathematics”
for Students 1 course of the 31.05.03 Dentistry**

QUESTIONS TO MODULE 1

1. Concept of derivative of function, its physical meaning.
2. Geometrical meaning of derivative.
3. General rule of differentiation of function. Formulas of differentiation.
4. Derivatives of elementary functions.
5. Differential of function. Properties of differential.
6. Rule of differentiation of composite function.
7. Primitive. Examples. The concept of the indefinite integral.
8. Table of integrals. The main properties of the indefinite integral.
9. The concept of the definite integral. The geometrical meaning.
10. The main properties of the definite integral.
11. Definition of a differential equation.
12. The order of the DE.
13. The linear differential equation.
14. Types of the solutions of the DE-s.
15. The DE of the first order with the separable variable and algorithm of its solution.
16. The main concepts of Probability Theory.
17. Definition of probability. Main theorems of probability theory.
18. Total probability formula.
19. Bernoulli and Poisson formulas.
20. Discrete random variables and their characteristics.
21. Continuous Random Variables. Distribution function and density function.
22. Numerical characteristics of Continuous random variables.

QUESTIONS TO MODULE 2

1. Sound. Kinds of sounds.
2. Spectrum of sound. Wave resistance.
3. Objective (physical) characteristics of sound. Subjective characteristics, their relationship to the objective.
4. The Weber-Fechner law. Audiometry.
5. Ultrasound, physical principles of application in medicine.
6. Phenomena of the inverse piezoelectric effect and magnetostriction.
7. Doppler effect. Formula for determining the blood flow velocity.
8. Physical basis hemodynamics. Viscosity.
9. Methods for determining the viscosity of a liquid.
10. Stationary flow, laminar and turbulent flow. Reynolds number.
11. Newton's formula, Newtonian and non-Newtonian fluids.
12. The Poiseuille formula.
13. Laws of reflection and refraction of light.
14. Limiting angle of refraction and limiting angle of total internal reflection/
15. Phenomenon of total internal reflection.
16. Methods for determining the refractive index of liquids in transmitted and reflected light (draw the ray path in a refractometer in these cases).

QUESTIONS TO MODULE 3

1. Full and useful magnification of the microscope. Beam path in a microscope. Aperture diaphragm and aperture angle.
2. Light absorption. Bouguer's law. Bouguer-Lambert-Beer law. Concentration colorimetry. Nephelometry.
3. Scattering of light. Tyndall's phenomenon. Molecular scattering, Rayleigh's law. Raman scattering.
4. Light is natural and polarized. Polarizer and analyzer. Law Malus.
5. Polarization of light with double refraction. Nicolas prism. Rotation of the plane of polarization. Bio's Law.
6. Thermal radiation. Heat radiation laws. Planck's formula.
7. Radiation of the Sun. Infrared and ultraviolet radiation and their application in medicine.
8. Heat transfer of the body. Physical foundations of thermography.
9. Luminescence, its types. Mechanism and properties of luminescence. The rule Stokes.

10. Application of phosphors and luminescence analysis in medicine.
11. Forced radiation. Inverse population of levels. The main laser elements.
12. Design and principle of operation of ruby and helium-neon lasers.
13. Properties of laser radiation. Application of laser radiation in medicine.
14. X-ray radiation. X-ray tube device. Brake X-ray radiation.
15. Characteristic X-ray radiation. Moseley's Law.
16. Primary processes of interaction of X-ray radiation with substance: coherent scattering, Compton effect, photoelectric effect.
17. X-ray diagnostics. Fluoroscopy and radiography. Modern X-ray computed tomographs.
18. The phenomenon of radioactivity. Types of radioactive decay. The basic Law radioactive decay.
19. Alpha-decay of nuclei and its features. Beta decay of nuclei, its types, features and spectrum. Gamma radiation from nuclei.
20. Interaction of ionizing radiation with matter.
21. Dosimetry of ionizing radiation. Absorbed and exposure dose. Dose rate.
22. Quantitative assessment of the biological effect of ionizing radiation. Radiation quality factor. Equivalent dose.
23. The primary effect of ionizing radiation on the body. Defence from ionizing radiation.
24. Radiation sickness, its types. Periods and symptoms of acute radiation sickness.

QUESTIONS TO OFFSET

of educational discipline “Physics and mathematics” for Students 1 course of the 31.05.03 Dentistry

23. Concept of derivative of function, its physical meaning.
24. Geometrical meaning of derivative.
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26. Derivatives of elementary functions.
27. Differential of function. Properties of differential.
28. Rule of differentiation of composite function.
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58. Interaction of ionizing radiation with matter.
59. Dosimetry of ionizing radiation. Absorbed and exposure dose. Dose rate.
60. Quantitative assessment of the biological effect of ionizing radiation. Radiation quality factor. Equivalent dose.
61. The primary effect of ionizing radiation on the body. Defence from ionizing radiation.
62. Radiation sickness, its types. Periods and symptoms of acute radiation sickness.

Стом-21 ИИ

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«North-Ossetia State Medical Academy» of the Ministry of Healthcare
of the Russian Federation**

Department of Chemistry and Physics

Standards of test tasks

in the discipline "Physics, mathematics"

the main professional educational program of higher education - specialty program in the
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by specialty _____ 31.05.03 Dentistry _____

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Vladikavkaz, 2022

Table of contents

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type of control			Current	Intermediate
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2.	Fundamentals of mathematical analysis, probability theory and mathematical of statistics.			
3.	Mechanics of liquids and gases. Biomechanics. Acoustics.			
4.	Electrical and magnetic properties of tissues and the surrounding environment			
5.	Optics			
6.	The quantum physics, ionizing radiation			