

Документ подписан простой электронной подписью

Информация о владельце:

ФИО: Кубанов Сергей Исмаилович

Должность: и.о. декана медико-биологического факультета

Дата подписания: 20.10.2026 10:11:25

Уникальный программный ключ:

bbc0243907972fc80f279c67afb4501106151a7d

MINISTRY OF SCIENCE AND HIGHER EDUCATION

RUSSIAN FEDERATION

Federal State Autonomous Educational Institution of Higher Education

NORTH-CAUCASUS FEDERAL UNIVERSITY

APPROVED

Assoc. Prof. Kubanov S.I.

PhD in Medical Sciences

Dean

Faculty of Medicine and Biology

ASSESSMENT TOOLS FUND FOR THE DISCIPLINE

Physics

- Specialty: 31.05.01 General Medicine
- Mode of training: Full-time
- Year of commencement of studies: 2026
- Delivered in Semester 3

Introduction

1. Intended for carrying out current control of academic performance progress and intermediate attestation in the discipline of Physics for students of the specialty (majoring in) 31.05.01 General Medicine.

2. The ATF is an appendix to the program of the discipline (module) Physics

3. Developer(s): Stanislav Kunikin, chairman (Full Name, Position)

4. Expert examination of the ATF has been completed.

Expert group:

Chairperson: Kubanov S.I., Associate Professor of the Department of Surgery, Orthopedics, and Traumatology

Committee members: Ivchenko G.S., Acting Head of the Department of Internal Medicine Propaedeutics

Kotelevets S.M., Professor of the Department of Internal Medicine Propaedeutics

Employer organization representative: Vilensky I.L., Chief Physician of Independent CDL, LLC

Expert conclusion – the ATF allows evaluating the level of competency levels and is recommended to be employed in the educational process.

5. The validity period for the ATF shall be determined by the period of implementation of the educational program.

1. Description of Evaluation Criteria at Various Stages of Their Formation, Description of Evaluation Scales

Levels of formation of competence(s), indicator(s)	Descriptors			
	Minimum level not achieved (Unsatisfactory) 2 points	Minimum level (Satisfactory) 3 points	Intermediate level (Good) 4 points	High level (Excellent) 5 points
Competency PC-13				
Learning outcomes for the discipline Physics: Indicator: ID-1	Students will write cogent essays and technical reports on projects	Students will be able to solve problems using their knowledge and skills in physics	Students will be able to solve problems using their knowledge and skills in physics	Students will be able to collect, analyze, and explain data from physics experiments
Learning outcomes for the discipline Physics: Indicator: ID-2	Students will know basic concepts of physics.	Students will know basic concepts of physics.	Students will know basic concepts of physics.	Students will know the concepts of physics
Learning outcomes for the discipline Physics: Indicator: ID-3	Students will be able to read and discuss primary literature in at least one field of physics	Students will be able to design and carry out simple experiments	Students will write cogent essays and technical reports on projects	Students will be able to collect, analyze, and explain data from physics experiments

The evaluation of the competency formation level in the discipline is carried out on the basis of the Regulations on conducting current control of academic progress and intermediate attestation of students in higher education educational programs – Bachelor’s programs, Specialist’s programs, Master’s programs – at the Federal State Autonomous Educational Institution of Higher Education NORTH-CAUCASUS FEDERAL UNIVERSITY in its current edition.

ASSESSMENT TOOLS FOR CHECKING THE LEVEL OF COMPETENCY DEVELOPMENT

Task Number	Correct Answer	Content of the Question	Competency
1.	B	1. A body moves with constant velocity. Its acceleration is: A) Equal to velocity B) Zero C) Increasing linearly D) Equal to displacement	PC-13
2.	C	2. A stone is thrown vertically upward with initial speed v_0. At the highest point,	PC-13

		its velocity and acceleration are: A) $v = 0, a = 0$ B) $v = v_0, a = -g$ C) $v = 0, a = -g$ D) $v = v_0, a = 0$	
3.	B	3. The slope of a velocity–time graph represents: A) Displacement B) Acceleration C) Jerk D) Speed	PC-13
4.	C	4. A car starts from rest and accelerates uniformly at 2 m/s^2 for 5 s. The distance it covers is: A) 10 m B) 20 m C) 25 m D) 50 m	PC-13
5.	B	5. Newton’s second law states that: A) Every action has an equal and opposite reaction B) $\vec{F} = m\vec{a}$ C) A body at rest stays at rest unless acted upon D) Energy is conserved in an isolated system	PC-13
6.	C	6. A 2 kg object experiences a net force of 10 N. Its acceleration is: A) 20 m/s^2 B) 12 m/s^2 C) 5 m/s^2 D) 0.2 m/s^2	PC-13
7.	C	7. The gravitational force exerted by Earth on a person standing on its surface is called: A) Tension B) Friction C) Weight D) Normal force	PC-13

8.	C	8. In the absence of external forces, the total momentum of a system: A) Decreases over time B) Increases over time C) Remains constant D) Becomes zero	PC-13
9.	C	9. A 60 kg person jumps from a boat (120 kg) with a horizontal speed of 3 m/s relative to the water. The boat recoils with a speed of: A) 3.0 m/s B) 2.0 m/s C) 1.5 m/s D) 0.75 m/s	PC-13
10.	C	10. In a perfectly elastic collision: A) Only momentum is conserved B) Only kinetic energy is conserved C) Both momentum and kinetic energy are conserved D) Neither is conserved	PC-13
11.	C	11. The condition for a rigid body to be in static equilibrium is that both the net force and the net torque must be: A) Maximum B) Equal in magnitude C) Zero D) Constant but nonzero	PC-13
12.	C	12. Hooke's law states that stress is: A) Inversely proportional to strain B) Independent of strain C) Directly	PC-13

		proportional to strain (within the elastic limit) D) Proportional to the square of strain	
13.	B	13. Young's modulus has the same units as: A) Force B) Pressure C) Energy D) Strain	PC-13
14.	C	14. According to Pascal's principle, pressure applied to an enclosed fluid is transmitted: A) Only to the bottom of the container B) Only in the direction of the applied force C) Equally in all directions D) Only to the walls of the container	PC-13
15.	B	15. Blood flows through an artery that narrows to half its cross-sectional area. By what factor does the blood speed increase (assuming incompressible flow)? A) $1.5\times$ B) $2\times$ C) $4\times$ D) $8\times$	PC-13
16.	C	16. An object floats in a fluid. The buoyant force equals: A) The object's volume B) The fluid's density C) The weight of the fluid displaced by the object D) The object's weight minus the fluid's weight	PC-13

17.	B	17. According to Bernoulli's principle, where the velocity of a fluid increases, the pressure: A) Increases B) Decreases C) Remains constant D) Becomes zero	PC-13
18.	C	18. In simple harmonic motion, the acceleration is: A) Constant in magnitude B) Proportional to velocity C) Proportional to displacement and opposite in direction D) Always zero at maximum displacement	PC-13
19.	B	19. The audible frequency range for a healthy human ear is approximately: A) 0–100 Hz B) 20 Hz – 20,000 Hz C) 100 Hz – 10,000 Hz D) 1,000 Hz – 100,000 Hz	PC-13
20.	B	20. The intensity level of sound in decibels is defined as $\beta = 10\log_{10}(I/I_0)$, where $I_0 = 10^{-12}\text{W/m}^2$. If the intensity doubles, the level increases by approximately: A) 2 dB B) 3 dB C) 10 dB D) 20 dB	PC-13
21.	C	21. Heat transfer through a metal rod with no bulk motion of matter is called: A) Convection B) Radiation C) Conduction	PC-13

		C) Conduction D) Advection	
22.	B	22. The amount of heat required to raise the temperature of 1 kg of a substance by 1 K is called: A) Latent heat B) Specific heat capacity C) Thermal conductivity D) Enthalpy	PC-13
23.	C	23. At a phase transition (e.g., melting), the temperature of a pure substance: A) Continuously increases B) Continuously decreases C) Remains constant D) Oscillates periodically	PC-13
24.	C	24. The normal core body temperature of a healthy human is approximately 37 °C. Expressed in kelvin, this is: A) 273 K B) 300 K C) 310 K D) 373 K	PC-13
25.	B	25. Two point charges of the same sign are placed near each other. The force between them is: A) Attractive B) Repulsive C) Zero D) Depends only on distance	PC-13
26.	B	26. Ohm's law for a section of a circuit states that: A) $V = IR^2$ B) $V = IR$	PC-13

		C) $V = I/R$ D) $V = R/I$	
27.	C	27. The electric field inside an ideal conductor in electrostatic equilibrium is: A) Maximum at the center B) Uniform and nonzero C) Zero D) Proportional to the charge on the surface	PC-13
28.	C	28. The speed of light in vacuum is approximately: A) 3×10^6 m/s B) 3×10^7 m/s C) 3×10^8 m/s D) 3×10^9 m/s	PC-13
29.	C	29. When light passes from air into glass, its frequency: A) Increases B) Decreases C) Remains unchanged D) Becomes zero	PC-13
30.	B	30. The minimum angle of incidence in a denser medium at which light undergoes total internal reflection is called the: A) Dispersion angle B) Critical angle C) Brewster angle D) Polarization angle	PC-13

2. Description of the Evaluation Scale

Within the framework of the rating system, students' academic progress in each discipline is evaluated during current control and intermediate attestation. The rating system for assessing students' knowledge is based on the use of a combination of control activities to check the covered material (checkpoints), optimally located throughout the entire time interval of studying the discipline. The principles of the rating system for assessing students' knowledge are based on the requirements described in the Regulations on the organization of the educational process based on the rating system for assessing students' knowledge at NCFU.

3. Criteria for Evaluating Competencies

The grade **Excellent** shall be awarded to a student if the theoretical content of the course has been mastered completely, without gaps; the material is presented exhaustively, consistently, clearly, and logically; the student freely copes with tasks, questions, and other types of knowledge application; uses additional material in the answer; all tasks provided for by the program are completed, and the quality of their execution is evaluated by a number of points close to the maximum; analyzes the obtained results; demonstrates independence when performing tasks.

The grade **Good** is to be awarded to a student if the theoretical content of the course is mastered completely, the necessary practical competencies are mainly formed, all educational tasks provided for by the training program are completed, and the quality of their execution is sufficiently high. The student firmly knows the material, presents it competently and strictly on the merits of the matter, without allowing significant inaccuracies in answering the question.

The grade **Satisfactory** is awarded to a student in case the theoretical content of the course has been mastered in part only, but the gaps are not of a significant nature, most of the tasks provided for by the program are completed, but contain errors, the student allows inaccuracies and insufficiently correct wording when answering the question, and violations of logical sequence are observed in the presentation of the program material.

The grade **Unsatisfactory** is awarded to a student if they do not know a significant part of the program material, allow significant errors, perform practical works with great difficulty and uncertainty, the necessary practical competencies are not formed, most of the educational tasks provided for by the training program are not completed, and the quality of their execution is evaluated by a number of points close to the minimum.