

FINAL EXAM.

MAY 15-22, 2022

WHO NEEDS TO TAKE THE EXAM

If a student has attended less than 80 % of our classes or submitted less than 80% of homeworks, I will look at the result of this exam to decide whether I would recommend them for taking Physics 2 next year. Therefore, if a student with attendance or homework submissions below 80% wishes to attend Physics 2, they should take this exam. If a student has both attendance and assignments submitted above 80%, they can still take this exam for a self-check. I will grade all the exams and provide feedback (by emailing the parents) to everyone who submits it.

In order to reduce possible confusion about the need to take this exam, I have communicated parents of each student regarding their situation and whether it is necessary to take the exam to check if they are ready to move to Physics 2.

RULES

You have one week to solve the exam, please bring the solutions to our last class on May 22. You could use any materials you like (your own notes and my handouts for the class should be entirely sufficient), but the solution should be your own. Please show all your work, not only the answers. If you have questions about how the problems are formulated, please write me an email at frenklakh@schoolnova.org. Do not worry if you can not solve all the problems, show all your work and hopefully it will be enough to move to Physics 2. Good luck!

PROBLEMS

1. A block of mass 5 kg is suspended from a massless spring with spring constant 30 N/cm. a) Find the elongation of the spring if the block is at rest. b) Now the system is moving vertically with some acceleration and the spring is elongated by 3 cm with respect to the unstretched one. Find the value of acceleration and tell whether it is up or down.
2. A rock is thrown from the ground upwards with initial velocity 50 m/s. a) What maximal height will the rock reach? b) At what height is rock's kinetic energy E_{kin} equal to its potential energy E_{pot} ?
3. 3 moles of nitrogen N_2 are heated at constant pressure 100 kPa from 0°C to 50°C .
 - a) Find the volume of the nitrogen at 0°C and at 50°C .
 - b) Find the work done by the nitrogen in this process.