

# PHYS-2010 Exam 1 Review Questions

## Dr. Luttermoser's Class

1. What is meant by the scientific method? Define concept, law, principle, model, hypothesis, and theory.
  2. What are the 4 natural forces? List them from strongest to weakest. Which act over an infinite distance?
  3. What is the primary difference between classical and modern physics. List 3 subdisciplines for each.
  4. What are the 3 unit systems of measure? Which of these unit systems is considered archaic by the scientific community? What are the 3 basic units of measurement in the SI system?
  5. Write the following numbers in scientific notation:  $3002.3$ ,  $-0.000345$ ,  $(206. \times 10^{-6}) / (-3.4 \times 10^{-8})$ , and  $(206. \times 10^{-6})^2$ .
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6. Suppose we have an equation of the form  $v = Bat/x$ , what must the units of  $B$  be if  $v$ ,  $a$ , and  $t$  are velocity, acceleration, and time respectively?
  7. Suppose we have a right-angle triangle where the opposite side of an angle is 3.4 cm and the hypotenuse is 5.67 cm. What is the magnitude of the angle in question? Without using the Pythagorean theorem, calculate the size of the adjacent side to the angle. Now check that this is correct through the use of the Pythagorean theorem.
  8. Draw a right-angle triangle and define the sine, cosine, tangent, cotangent, secant, and cosecant of an angle.
  9. Review logarithms, powers, and roots.
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10. Define the following terms: displacement, velocity (both average and instantaneous), acceleration (both average and instantaneous), and surface gravity.
  11. Know how to use the 4 equations of one-dimensional motion.
  12. For the first 3 sections of the notes, have a good understanding of Example III-6 of your notes. As well, make sure you understand how to do the Supplemental Homework Problem Set 1: Problems 1 (SV:1.55), 3 (SV:1.24), 4 (SV:1.38), 7 (SV:2.19), 8, and 9 (SV:2.47). (Here 'SV' = 'Serway and Vuille' textbook, and, for example, '1.55' means do problem 55 from Chapter 1.)
  13. Know how to add and subtract vectors both graphically and analytically.

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14. Have a complete understanding of projectile motion (you will likely get one problem on such motion). What is meant by projection angle? Know how to use the 5 equations of 2-D motion.
  15. For Section 4 of the notes, have a good understanding of Examples IV-1, IV-2, IV-3, IV-4, IV-5, IV-6, and IV-7. As well, make sure you understand how to do the Supplemental Homework Problem Set 1: 12 (SV:3.17), 13 (SV:3.22), and 14.
  16. You also will be responsible for the readings in the textbook, Chapters 1-3. Go through the examples in each chapter and learn the keywords in boldface in each chapter.
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17. What assumptions are made in classical mechanics? What is the difference between a **contact force** and a **field force**?
  18. Both in words and mathematically, what are Newton's 3 laws of motion? Define **inertia**. What is the unit of force in the SI, cgs, and English systems? Write these units in terms of their fundamental units.
  19. Make sure you understand the meaning of the terms kinematics and dynamics.
  20. Review the summary of Chapter 4 in the textbook and learn the definition of all boldface terms in this chapter.
  21. Review Examples V-1, V-2, and V-3 in the class notes. As well, make sure you understand how to do the Supplemental Homework Problem Set 1: 16, 17 (SV:4.17a), 18, 20 (SV:4.38), and 21 (SV:4.47).