

PHY131 Sample Test Question

This is a sample test. You will get participation credit in the practicals for doing this. Please print a copy of the question, answer it as you would for a test, then bring it to your practical.

Aids allowed: any

Free-form problems: To be awarded maximum credit, you must show each step in the problem-solving strategy clearly, completely and correctly. You may earn up to 2 points per step (for a total of 8 points per problem). The four problem-solving steps are:

1. Sketch and translate
 - Sketch the process described in the problem statement. Label the physical quantities and identify unknowns.
 - If the problem involves Newton's laws or the work-energy principle, identify an appropriate system.
2. Simplify and diagram
 - Identify what simplifying assumptions are necessary to solve the problem.
 - If you are using kinematics, construct a motion diagram or a position-time graph.
 - If you are using Newton's laws, construct a force diagram for the system.
 - If you are using energy or momentum, construct an appropriate bar chart.
3. Represent mathematically
 - Using your representation in Step 2, clearly apply the relevant physics model (such as Newton's second law) to relate known physical quantities to the unknown quantity for which you wish to solve.
 - Do not plug in numbers immediately.
4. Solve and evaluate
 - Rearrange the equation and solve for the unknown quantity.
 - Substitute known values for variables in your expression and include units. Clearly indicate your final answer.
 - Verify that your answer is reasonable with respect to sign, unit, and magnitude. If not, don't panic, but do justify why.
 - Check whether your final answer is consistent with your sketch, assumptions, and diagram.

Pod Number:

Written Question
(see front page for instructions)

A 1340-kg car traveling east at 13.6 m/s has a head-on collision with a 1930-kg car traveling west at 20.5 m/s. If the collision time is 0.10 s, what is the average force needed to restrain a 68-kg person in the smaller car?

Sketch and Translate:

Simplify and Diagram

Represent Mathematically

Solve and Evaluate