

AP Physics C

Topics to Master Prior to the Fall Final Exam

These are the basic topics covered on the Fall Final, but by no means all the types of questions for each concept. I wanted to help make sure as you review you do not overlook any topics we have covered so far. I recommend purchasing the "Princeton Review" version of the AP review book. Read and study chapters 1 – 5 carefully and read 6 if you have time.

Kinematics – Standard kinematics equations (big 6), graphical analysis, calculus analysis.

Newton's 3 Laws of Motion – Understand definitions and relationships they represent.

Second Law – $F_{\text{net}} = ma$ (probably the highest frequency question on the final). Understand FBD, $\Sigma F = ma$, system of equations, etc.

Forces special –

Centripetal Force – $\Sigma F_r = ma_c = mv^2/r$

Frictional Forces – $F_f = \mu F_n$, static $<$ or $=$ to, kinetic $=$

Apparent Weight – F_n

Air Resistance – can cause terminal velocity during a fall through fluid (ie. Air), terminal velocity occurs when the force of air up equals the force of gravity down, therefore $F_{\text{net}} = 0$, $a = 0$, therefore constant velocity down from that point.

Air Resistance advanced – $F = -bv$, what does the velocity look like over time?

Atwood's Machine Problems

Pulleys with multiple ropes – just like our store sign problems, each rope carries a portion of the weight.

Torque – $rF\sin\theta = I\alpha$, like the catapult, when are torques equal or unequal, what occurs?

Mechanical Equilibrium – $F_{\text{net}} = 0$, $\tau_{\text{net}} = 0$, an object can be moving at constant velocity or still.

Conservation of Energy – lots of types of problems (rollercoasters, pendulums, springs, ramps, free falls, etc.).

Work – standard and calculus versions, non-linear spring

Power – understand units, definition and problem solving

Conservation of Momentum – both linear and angular are conserved independently (one does not turn into the other (unlike energy)).

Impulse – standard and calculus versions. Lots of questions on impulse and change in momentum.

Linear collisions – $p_i = p_f$

Glancing collisions – $p_i = p_f$ done in both the x and y directions independently

Center of mass – related to momentum, be able to locate the center of mass of complex system, understand that a linear force accelerates the center of mass in that direction. Whereas a torque will try to rotate about the center of mass if the object does not have a fixed pivot (axle).

Unit analysis – understand unit nicknames (ie. newton, joule) and be able to write units in other possible, but equivalent forms.

It seems like a short list, but remember that there are hundreds of applications for each topic. Your final will consist of 50 multiple choice questions (70 mins) and one FRQ (20 mins). The final comprises a large percent of your semester grade. The final is scored on an AP style scale approximately (75/60/45). Be sure to start studying before winter break, as with all physics material, it takes time to absorb and be able to use these problem solving techniques quickly.

Happy studying!