

PHY1025 - Review Topics for Exam 2

Be sure to look at the “Summary of Terms” at the end of each chapter and to really understand what each of those terms means. Also, try to answer as many of the chapter questions as possible.

Don't forget how to do conversions (Like MPH to m/s)

Don't forget the metric prefixes – milli 10^{-3} , micro 10^{-6} , nano 10^{-9} , kilo 10^3 , Mega 10^6 , Giga 10^9

Here are some of the main topics you should be familiar with:

(NOTE: These are just some suggested items you should definitely know about.

The test will be based on these items and everything else that we covered in class!)

Chapter 7 – Work and Energy

Work, Energy, Power, Efficiency – What each one is and how they are related.

How to calculate how much work is done ($W = Fd$)

Different types of Energy

Law of Conservation of Energy – Energy is not created or destroyed, only converted from one form to another.

What is potential energy? What are some forms of potential energy?

Know all units of work, energy and power.

Simple calculations involving work, KE, GPE, power and efficiency.

What happens to KE if mass is doubled? What if velocity is tripled?

Power = rate of doing work or rate of converting energy ($P = E/t = W/t$)

Remember, power is measured in Watts (Joules/sec) or in HP (1HP = 746 Watts) and

Energy and Work are measure in Joules.

Know how to calculate the monthly electric cost of using electric equipment (as we did in class).

Chapter 8 – Rotational Motion

Rotational velocity, rotational acceleration, rotational inertia, torque – What are they and how do they relate to each other?

What factors determine the rotational inertia and the torque?

Center of mass - what is it? What is the relationship between center of mass and stability?

Centripetal force – inward force keeping things going in a circle (instead of a straight line)

Centrifugal force – apparent outward “force” – not a real force - it is really just the result of inertia (Newton's first law)

Chapter 9 - Gravity

Gravity – inverse square law – what it means and how the gravitational force varies with distance and mass

How to use the Universal Gravity formula to find “g” on a planet ($G m_{\text{PLANET}} / r^2_{\text{PLANET}}$).

What is apparent weightlessness? Think of what happens in a falling elevator.

Why do the astronauts in low Earth orbit feel apparent weightlessness?

Chapter 10 – Projectile and Satellite Motion

What is a projectile? What forces act on a projectile?

How do the horizontal and vertical motions of a projectile change with time?

What shape is the path of projectiles?

How long will a horizontal projectile take to hit the ground?

Satellites and orbits – orbital period vs. distance (the farther away it orbits, the longer the orbital period, geostationary orbits)

Circular orbits (constant speed) vs elliptical orbits (changing speed), perigee, apogee,

How do the gravitational potential energy and kinetic energy vary during an elliptical orbit? How about the total energy?

Comets (parabola, hyperbola) – Think of the wooden cone in class.

Escape speed

Formulae:

$$\text{Work} = Fd$$

$$\text{Work} = \Delta E$$

$$P = E/t = W/t$$

$$\text{GPE} = mgh$$

$$\text{KE} = \frac{1}{2} mv^2$$

$$\% \text{ Eff} = (\text{Useful Output} / \text{Total Input}) \times 100$$

$$F = Gm_1m_2 / r^2$$

$$G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$$

$$\text{Weight} = mg$$

$$g = 9.8 \text{ m/s}^2$$