PSC2121 Exam I Review

UNITS and conversion

MASS kg (g) LENGTH m (in, ft, km) TIME s (hr, yr

SPEED (VELOCITY) m/s ACCELERATION m/s^2

FORCE (WEIGHT) N ($kg\ m/s^2$) MOMENTUM kg m/s

IMPULSE N S = $kg\ m/s^2$ WORK (ENERGY) J = N

POWER W (watt) = J/s = $N\ m/s^2$

Concepts and Laws

SCALAR vs VECTOR quantities

Ptolemy's System: Earth at center, Circular Orbits

Copernican System: Sun at center, Circular Orbits

Acceleration due to Gravity: $g = 9.8\ m/s^2$

Inverse Square Law of Gravitation: $F = G\ m_1\ m_2 / R^2$

Kepler's Laws of Planetary Motion:

1) Ellipse 2) Equal areas in equal times 3) $T^2=R^3$

Newton's Laws of Motion:

1) Inertia 2) F = ma 3) action-reaction

Conservation of Momentum: $m_1v_1+m_2v_2$ unchanged

Impulse: change in momentum = F t

Work: Force x Distance

Power: rate of doing Work

Kinetic Energy: energy of motion

Potential Energy: available or stored energy

Conservation of Energy: KE + PE unchanged

EQUATIONS

$v_{av} = s/t$ $\quad v_{av} = (v_i + v)/2$ $\quad a = (v - v_i)/t$

$v = v_i + a\,t$ $\quad s = v_i t + at^2/2$ $\quad p = m\,v$

$T^2 = R^3$ $\quad F = m\,a$ $\quad F = G\,m_1\,m_2 / R^2$

$W = F\,s$ $\quad P = W/t$

$KE = mv^2/2$ $\quad PE = m\,g\,h$