# MCAT PHYSICS FORMULA SHEET

## Motion

$v_f = v_o + at$

$v_f^2 = v_o^2 + 2ad$

$d = {}^1/_2\, at^2 + v_o t$

## Planets

$F = ma$

$F = mv^2/r$

$F = G\,\frac{(m_o m_p)}{r^2}$

## Torque

$\tau = rF$

## Work

$W = Fd$

$W = \Delta KE$

$W = P\Delta V$

## Power

$P = IV = i^2R$

$P = \text{watt} = {}^J/_s = {}^W/_s = {}^E/_s$

## Energy

$E_T = U + KE$

$KE = {}^1/_2\, mv^2$

$U = mgh$

$F_f = \mu N$

## Collisions

$J = I = \Delta mv = F\Delta t$

$m_1v_1 + m_2v_2 \ldots = m_1v_1' + m_2v_2' \ldots$

${}^1/_2\, m_1v_1^2 + {}^1/_2\, m_2v_2^2 \ldots = {}^1/_2\, m_1v_1^{2'} + {}^1/_2\, m_2v_2^{2'} \ldots$

## Light

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$N = {}^c/_v$

$v_{light} = 3 \times 10^8\ {}^m/_s$

## Capacitance

$C \propto {}^A/_d$

$C = {}^Q/_V$

## Thermodynamics

$\Delta G = -NFE = -RT \ln K_{eq}$

$\Delta S = \Delta S_{products} - \Delta S_{reactants}$

$\Delta H = H_{products} - H_{reactants}$

## Electrics & Magnetism

$U = k\,\frac{qQ}{r}$

$V = k\,\frac{Q}{r}$

$F = k\,\frac{q_1q_2}{r^2}$

$V = Ed$

$V = {}^U/_q$

$E = {}^F/_q$

$i = \frac{\Delta q}{\Delta t}$

## Circuits

$V = iR$

$R_{series} = R_1 + R_2 \ldots$

$\frac{1}{R_{parallel}} = \frac{1}{R_1} + \frac{1}{R_2}$

$C_{parallel} = C_1 + C_2 \ldots$

$\frac{1}{C_{series}} = \frac{1}{C_1} + \frac{1}{C_2}$

## Springs

$F = -kx$

$U = {}^1/_2 kx^2$

## Waves

$E = hf$

$f = {}^1/_T$

$v = f\lambda$

$\lambda = 2L/N$

$\lambda = 4L/N$

$v_{sound} = 330\ {}^m/_s$

## Fluids

$A_1V_1 = A_2V_2$

$F_{bouyant} = \rho vg$

$\rho_1 + {}^1/_2\rho v^2 + \rho gh = \rho_2 + {}^1/_2\rho v^2 + \rho gh$

$P_H = \rho gh + P_o$

$P = {}^F/_A$

## Radioactive Decay

% remaining = $1/2^n$

## Newton's Three Laws

1) Inertia: a body in motion stays in motion unlessacted upon by an outside force
2) F = ma
3) Every action has an equal and opposite reaction