Transformation Tutoring

Physics for MCAT 2015

Kinematics

Vf=vi+at

 $\Delta x = vit + 1/2at^2$

 $vf^2=vi^2+2a\Delta x$

W=Fdcosϑ

P=W/t=Fv

Simple harmonic

F=-kx: where k is the spring constant and x is the displacement

PE elastic = $\frac{1}{2}$ kx²

Torque

 $T = F \perp r - r$ is from the point of rotation to the point of application of force

Center of mass

(m1x1 + m2x2)/(m1+m2)

Fluids

Specific gravity = ρ_{obj}/ρ_{water} (1000kg/m³)

 $P_{\text{gauge}} = \rho_{\text{fluid}} *g*d$

Floating object: weight of object = Fb (force of buoyancy)

 $V_{\text{sub}}/V_{\text{total}} = \rho_{\text{obj}}/\rho_{\text{fluid}}$

 $Fb = \rho_{fluid} *g* v_{submerged}$

 $F_1/A_1 = F_2/A_2$

 $A_1V_1=A_2V_2$

F(flow rate) = Av(speed)

 $v_{\text{efflux}} = \sqrt{(2gd)}$

Electrostatics

e= 1.6*10⁻¹⁹ C

Fe= kq_1q_2/r^2 (Electrostatic Force)

 $k=9*10^9$ Nm²/C², q_1 and q_2 are charges, and r is the distance between the charges

 $E=kO/r^2$

F=aE

V=kQ/r

 $\Delta PE=qV=w=\Delta KE$

E= electric field, and V= electric potential

I=Q/t I=current (units are Amps)

R=pL/A where R=resistance, p= resistivity constant, L=length of wire, and A= cross sectional area; Mnemonic (LA)

V=IR mnemonic (IR like infrared) V=Ed P=IV mnemonic (poisonous iv)

Capacitance

C=εA/d PE=1/2 QV Q=VC mnemonic (like the tv show: qvc)

- dielectric increases C
- charge can't move through capacitor

Magnetic Force

Fb=qvB

Right hand rule:

V=thumb B=fingers Fb=palm

For negative charge, all the directions are opposite

Sound

 $Fd = fs (v \pm vd) / (v \pm vs)$

Intensity

I=P/A B=10log (I/Io)

Both ends open: $\lambda=2L/n$ One end open: $\lambda=4L/n$

-Can't travel in vacuum

- sound is longitudinal

Mirrors and Optics

+i= virtual image, upright

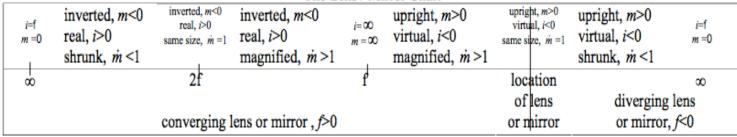
-i= real image, inverted

m= -i/o :magnification

1/o + 1/I = 1/f

Chart taken from freelanceteach.com

The Lens / Mirror Chart



This chart describes the possible properties of the image, not of the object;

but the horizontal positions in the chart represent the possible locations of the object, not of the image.

Lenses Concave and diverging Convex and converging