

Your course grade will be posted as soon as possible on "One Port."

If you would like your final course grade also sent to you by e-mail, please list your preferred e-mail address here _____.

If you would like your graded final exam returned to you, please check here _____ and pick it up at the Physics office. It should be there by noon on Monday, July 6.

I will grade all ten (10) problems. Your grade will be based on the best seven of the first eight. Problem 9 and problem 10 are optional and are each worth 5 points – partial credit will be awarded for physics discovered in your answer.

$$v_{xf} = v_{xi} + a_x t$$

Read all the words!

$$x_f - x_i = v_x t = (1/2)(v_{xi} + v_{xf}) t$$

Check all the units!

$$x_f - x_i = v_{xi} t + (1/2) a_x t^2$$

Distinguish between diameter and radius!

$$v_{xf}^2 = v_{xi}^2 + 2a_x (x_f - x_i)$$

$$\omega_f = \omega_i + \alpha t$$

$$\theta_f - \theta_i = \omega t = (1/2)(\omega_i + \omega_f) t$$

$$\theta_f = \theta_i + \omega_i t + (1/2) \alpha t^2$$

$$\omega_f^2 = \omega_i^2 + 2\alpha(\theta_f - \theta_i)$$

Conservation of angular momentum, $I_i \omega_i = I_f \omega_f$

Volume of sphere, $V = (4/3) \pi r^3$

Mass of earth, $M_E = 5.98 \times 10^{24} \text{ kg}$

Mean radius of earth, $R_E = 6.37 \times 10^6 \text{ m}$

Gravitational Constant, $G = 6.672 \times 10^{-11} \text{ N m}^2/\text{kg}^2$

Moment of inertia, I_{cm} , of cylinder/pulley/wheel, $\frac{1}{2} MR^2$

Moment of inertia, I_{cm} , of hoop, MR^2

$R = 8.31451 \text{ J/mol K}$

Energy Transfer by Conduction, $\text{Power} = k A (T_h - T_c) / L$

Energy Transfer by Radiation, $\text{Power}_{net} = \sigma A e (T^4 - T_o^4)$

Linear expansion, $\alpha \Delta T = \Delta L / L_o$

Volume expansion, $\beta \Delta T = \Delta V / V_0$

Calorimetry, $\Delta Q = 0$

Torricelli, $v^2 = 2 g h$

Bernoulli, $P_1 + (1/2)\rho v_1^2 + \rho g y_1 = P_2 + (1/2)\rho v_2^2 + \rho g y_2$

Pascal, $P_1 = P_2$, or $F_1 / A_1 = F_2 / A_2$

Continuity, $A_1 v_1 = A_2 v_2$

Pendulum, $T = 2\pi (L / g)^{1/2}$

Transverse waves, $v = (\text{Tension} / \mu)^{1/2}$

Carnot heat engine efficiency $e_c = 1 - (T_c / T_h)$

Mass on spring, $T = 2\pi (m / k)^{1/2}$

$PE_{\text{spring}} = \frac{1}{2} k x^2$

$N_A = 6.022 \times 10^{23}$ particles per mole

$v_{\text{sound}} = [331 \text{ m/s}] \{T (\text{K}) / 273 \text{ K}\}^{1/2}$

$K = ^\circ\text{C} + 273.15$

Work on the gas: $W = -P \Delta V$. Work by the gas, $W = P \Delta V$.

$\Delta U = Q + W$, Q energy to the gas by heat from environment.

Ideal gas, $PV = nRT$

Volume of sphere = $4/3 \pi r^3$

Pipe open both ends, $f_n = nv/2L$, $n = 1, 2, 3 \dots$

Pipe open one end, closed one end, $f_n = nv / 4L$, $n = 1, 3, 5 \dots$

$$f_{\text{observer}} = f_{\text{source}} \left\{ \begin{array}{l} v_{\text{sound}} + v_{\text{observer}} \text{ (if observer moving toward source)} \\ \text{or} \\ v_{\text{sound}} \text{ (if observer not moving)} \\ \text{or} \\ v_{\text{sound}} - v_{\text{observer}} \text{ (if observer moving away from source)} \\ \hline v_{\text{sound}} - v_{\text{source}} \text{ (if source is moving toward observer)} \\ \text{or} \\ v_{\text{sound}} \text{ (if source not moving)} \\ \text{or} \\ v_{\text{sound}} + v_{\text{source}} \text{ (if source is moving away from observer)} \end{array} \right.$$