CQZ2 **PHYS 103** **SPRING 2011** **A**

NAME: ____

As a student at NJIT I ____________________________________, will conduct myself in a professional manner and will comply with the provisions of the NJIT Academic Honor Code. I also understand that I must subscribe to the following pledge on major work submitted for credit as described in the NJIT Academic Honor Code:
On my honor, I pledge that I have not violated the provisions of the NJIT Academic Honor Code.
Signature__________________

The exam is closed book and closed notes. Choose the answer that is closest to the given answer.

$\rho = \frac{m}{V}$; $p = \frac{F}{A}$; $p_h = \rho gh$; 1 atm = 1.013 x10^5 Pa, $F_B = \rho g V_{im}$, $A_1v_1 = A_2v_2$

Av -volume flow rate $p_1 + ½\rho v_1^2 + \rho g h_1 = p_2 + ½\rho v_2^2 + \rho g h_2$ flow in horizontal pipe: $p_1 + ½\rho v_1^2 = p_2 + ½\rho v_2^2$

$T(^0C) = \frac{5}{9}[T(^0F) - 32]$; $T(^0F) = \frac{9}{5} T(^0C) + 32$; $T(K) = [T(^0C) + 273]$; 1 m = 100 cm = 1000 mm

$L - L_0 = \alpha L_0 (T-T_0)$ $\sigma = Y\alpha (T-T_0)$ $V - V_0 = \beta V_0 (T-T_0)$; 1 Liter = 10^{-3} m^3 $V_{cube} = a^3$ $A_{circle} = \pi r^2$

Heat: $Q = mc(T - T_0)$, $Q = mL$, c - specific heat L - latent heat heat lost = heat gained

$c_{water} = 4186 \frac{J}{kg \cdot {}^0 C}$; $L_F = 3.33x10^5 \frac{J}{kg}$; $c_{ice} = 2100 \frac{J}{kg \cdot {}^0 C}$

1 hr = 3600 s $\sigma = 5.67x10^{-8}\, W/m^2K^4$ R = 8.313 J/mol·K; $Q = kA\frac{T_1 - T_2}{L} t$

$\frac{\Delta Q}{\Delta t} = e\sigma A T_1^4$ $\frac{\Delta Q}{\Delta t} = e\sigma A(T_1^4 - T_2^4)$ $n = \frac{mass}{molecular - mass}$

$PV = nRT$ $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$; $N_{av} = 6.02x10^{23}$/mol T - temp. in kelvins, $\rho = \frac{m}{V}$,

$x = A\cos(\omega t)$ $v = - \omega A\sin(\omega t)$ $\omega = 2\pi f = \frac{2\pi}{T}$ $F = kx$ period: $T_{spring} = 2\pi\sqrt{\frac{m}{k}}$; $T_{pend} = 2\pi\sqrt{\frac{L}{g}}$

$\omega = \sqrt{\frac{k}{m}}$ $f = \frac{1}{T}$ $v_{max} = A\omega$ $E = ½ mv^2 + ½ kx^2$; $E = ½ kA^2$; $E = ½ m(v_m)^2$

$v = \lambda f$; $f = 1/T$ linear mass $\mu = \frac{m}{L}$; $v = \sqrt{\frac{F}{\mu}}$ sound: v = 343 m/s $I_0 = 10^{-12}$ W/m^2

sound: $I = \frac{P}{A} = \frac{P}{4\pi r^2}$ $\beta = 10 dB \log\frac{I}{I_0}$ $f = f_0 \frac{343 m/s \pm v_D}{343 m/s \pm v_S}$

$b_2 - b_1 = 10dB\log(I_2/I_1)$ standing waves: n = 1, 2, 3 .., or n = 1, 3, 5, … 1m = 100 cm 1 kg = 1000 g

string: $\lambda = \frac{2L}{n}$ $f = \frac{v}{2L}n$ open: $\lambda = \frac{2L}{n}$ $f = \frac{v}{2L}n$ closed: $\lambda = \frac{4L}{n}$ $f = \frac{v}{4L}n$