20:006 EXAM 2 FORMULAS

weight (w) = mass (m) $\times$ g, g = 10 m/s^2 | 1 m = 100 cm

atmospheric pressure = 100,000 Pa | 1 kg = 1000 grams

Pressure (P) = $\frac{\text{force (F)}}{\text{area (A)}} = \frac{F}{A}$ | Force = Pressure x Area | density = mass / volume | 1 Pa = 1 N/m^2

Buoyant force = weight of displaced water
= volume of object submerged in liters x 10 N/liter

weight of 1 liter of water = 10 N | GPE = mgh | KE = ½ mv^2

heat (Q) = mass (m) $\times$ specific heat (c) $\times$ temperature change in C

T(C) = (5/9) $\times$ [T(F) – 32] | T(F) = (9/5) T(C) + 32 | T(K) = T(C) + 273

Change in internal energy of a system
= heat absorbed by system – work done by system

$$\Delta(IE) = Q_{in} - W_{out}$$

Heat into Engine = Work done by engine + Heat discarded by engine

$$Q_{in} = W_{out} + Q_{out}$$

$$\text{eff (Engine efficiency)} = \frac{\text{work done by engine}}{\text{heat into the engine}} = \frac{W_{out}}{Q_{in}}$$

$$\text{frequency } (f) = \frac{1}{\text{period } (T)} \qquad \text{period } (T) = \frac{1}{\text{frequency } (f)}$$

spring force (N) = spring constant k (N/m) $\times$ stretch or compression in m

Period (T) of a mass/spring system $T = 2\pi\sqrt{\frac{m}{k}}$

"golden rule" $v_{wave} = \lambda f$ | Period of a pendulum $T = 2\pi\sqrt{\frac{L}{g}}$

Rotational momentum = rotational inertia × rotational speed