Planet Holloway **websheet 10.1**
AP Physics 2 - Chapter 10 Thermal Physics
You may print this out and write on it or work on your own paper.
Show all work.

1. A temperature change from 12°C to 34°C corresponds to what change in °F?

2. A rectangular metal plate (not the one in my head) with dimensions 35 cm x 15 cm is heated from 10°C to 90°C. What is the increase in area? (Coefficient of linear expansion for this metal is 1.3×10^{-6}/°C).

3. A 55 gallon fish tank is completely full of mercury, tough on the fish, but really looks cool, at a temperature of 21°C. Light from the window strikes the tank raising the temperature to a staggering 30°C. If the coefficient of volume expansion for mercury is 1.82×10^{-4}/°C, what is the amount of mercury that spills over onto the floor creating the coolest, yet deadly, puddle you've ever seen?

4. An aluminum ball of radius 4 cm ($\alpha = 2.4 \times 10^{-5}$/°C) sits atop a steel ring ($\alpha = 1.1 \times 10^{-5}$/°C) with an inside diameter of 7.998 cm when both are at 160°C. To what temperature must the system be cooled to allow the sphere to fall through the ring?

5. 3 moles of nitrogen gas are contained in an enclosed cylinder with a moveable piston. If the gas temperature is 315 K, and the pressure is 1.15×10^{6} N/m^2, what is the volume of the gas? (R = 8.31 J/mol·K)

6. A spherical air bubble originating from a scuba diver at a depth of 26 m has a diameter of 2.5 cm. What will the bubble's diameter be when it reaches the surface? (Assume constant temperature)

Answers:

1. 39.6°F

2. 1.092×10^{-5} m^2

3. 0.09 gallons

4. 140.77°C

5. 6.8×10^{-3} m^3

6. 3.83 cm