Physics 10154 - Exam #5A

Points will be deducted if you don't show your work (or if some parts are incorrect) even if you get the right answer. Clearly indicate your answer with a circle or box and remember to include correct units and significant figures.

1. (30 pts) A 12.0-kg rock specimen is estimated to have a density of 2240 kg/m^3.

a) If this rock is immersed in water, how long will it take (in seconds) to fall (from rest) 3.00 meters to the bottom of a container?

b) While immersed in water, the rock is placed on a scale to measure its apparent weight. What weight shows on the scale?

2. (30 pts) 56 grams of ice at a temperature of -25°C is dropped into a 230-gram aluminum container which has an initial temperature of 65°C.

What is the final temperature of the system? If the final temperature of the system is 0, how much ice melts?

The specific heat of aluminum is 900 J/kg °C. Other constants needed are on your formula sheet.

3. (20 pts) A double-paned square window measures 34 cm on a side. The window has two panes of glass (0.75 cm thick for each pane) that sandwich a 0.50 cm layer of air between them. If the temperature outside is 42°F and the temperature inside is 68°F, determine how much money is spent to replace the heat energy lost by the window in one day.

Assume the thermal conductivity of glass is 0.85 W/m K and the thermal conductivity of air is 0.0350. Assume the cost of energy is 12 cents per kilowatt-hour. Answer to the nearest cent.

4. (20 pts) If you move 3.0 times further away from a source of sound (assume it radiates uniformly in all direction), by how many dB does the loudness change? Answer with 2 SF.