Please answer the questions below to the best of your ability either in the space provided. Everything should be scanned or photographed and submitted through gradescope.com.

Objective: *I can use physical properties of a material and information about entropy and energy to find the temperature of the material.*

1. 15 gold atoms with 10 quanta of energy receive one more quanta of energy from a neighboring block of gold. Gold has an atomic weight of 196.966 g/mol, a Young's Modulus of 79 GPa and an approximate radius of 144 pm.

(4) (a) What is the change in entropy of the gold when it receives the extra quanta of energy? You'll need to look at the number of microstates with 10 quanta and then the number of microstates with 11 quanta.

(2) (b) What is strength (spring constant) of the intermolecular gold springs? Because of the way that we defined the Einstein solid, you will need to take your intermolecular spring constants from Chapter 4 and multiply them by 4 (two because we have a spring on each side of the atom, and two because each spring is half the length it would be previously owing to the walls we placed).

(2) (c) What is the change in energy of the gold as it receives the quanta? Answer in joules.

(2) (d) What is the approximate temperature of the gold? This answer should be in kelvin.