Introduction to geophysics **Isostasy Lab**

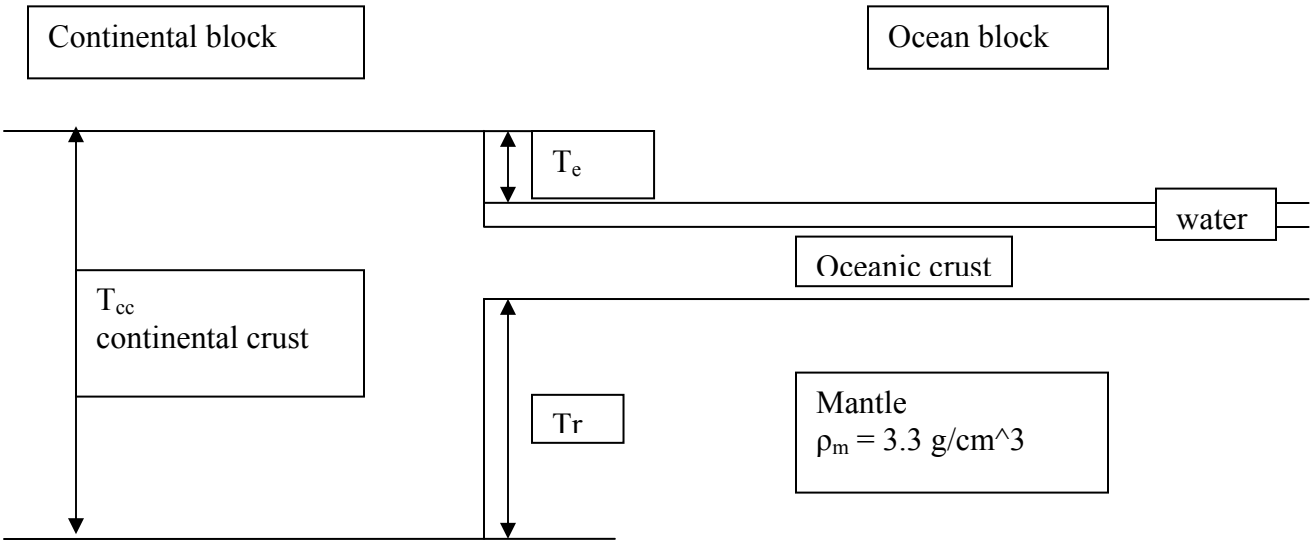
Name:_____

1. Write a MATLAB program to calculate the thickness of the mountain root (T_r) and elevation of mountain above mean sea level (T_e). Note that sea level defines zero elevation. Assume the following layer densities and layer thicknesses for problem 1.

ρ_a = 0.0 g/cm^3 air
ρ_c = 2.6 g/cm^3 crust
ρ_m = 3.3 g/cm^3 mantle
ρ_w = 1.0 g/cm^3 water

T_w = 2 km water layer
T_{oc} = 8 km ocean crust
T_{cc} = 40 km continental crust

The height equation is: $T_e + T_w + T_{oc} + T_r = T_{cc}$.



2. Write a program that instantaneously removes (erodes) 1 km of crust from the top of the 40 km continental crust. The continental crust is now 39 km thick. Recalculate the elevation of the continental crust with respect to mean sea level (T_e). How many meters did isostatic re-equilibration cause the top of the 39 km thick crust to go up or down AFTER the erosion event?

Computer answers

Report the answer to the nearest 1/10 of a km.
You should get these exact answers with YOUR code.

Just writing done these numbers will not get you any credit.
We will be grading you on your coding of the problems.

Hand in next lab:

1) your code that calculates the answers
2) the answers, clearly identified and boxed, as shown below.

==========Problem 1

Continental block root thickness = 24606.06 meters or 24.6 km
Continental elevation = 5393.94 meters or 5.4 km

==========Problem 2

Continental block root thickness = 23818.18 meters or 23.8 km
Continental elevation = 5181.82 meters or 5.2 km
Continent rebounded (went up) 0.2 km with 1 km of erosion.