GEOLOGY 437; Final Exam 1996 Write your name here:_____

1. Define each of the following terms being careful to note the difference between the two:

   a. Dipole versus nondipole field

   b. Apparent polar wander versus true polar wander

   c. Shadow zone versus blind zone

   d. Tidal friction and spin orbital resonance

   e. Free air anomaly and Bouguer anomaly

2. Define and explain the following terms:

   a. Geocentric axial dipole hypothesis

   b. Titanomagnetite

   c. Seismic moment

   d. Fourier transform

   e. Isostatic correction

   f. Flexural rigidity

3. Start with some continental crust in isostatic equilibrium. It is 35 km thick, the surface at 500 meters above sea level, 2700 kg/m^3, and floating in 3200 kg/m^3 mantle above a compensation depth of 100 km below sea level. Suppose we magically erode (or blast away) 20% of the crust. What is the new elevation (assume constant temperature, isostatic equilibrium)? Suppose 4 km of basalt (3000 kg/m^3) floods into the hole - what is the new elevation of the surface of the basalt?

4. Sketched below is some long wavelength (say 400 kilometer) topography developed over an old continental suture. The lithosphere to the right has effective elastic thickness of 100 kilometers, that to the left has effective elastic thickness of 5 kilometers. On the graphs provided sketch the base of the elastic layer, the Free Air Anomaly and the Bouguer Anomaly. Keep things in relative proportion, explain your thinking

Cross section:

Base of elastic layer:

Free Air Anomaly:

Bouguer Anomaly:

5. An exploration target yields the following gravity (left) and magnetic (right) anomalies. Answer the following questions as best you can (answers are not necessarily numerical):

a. Where must it be located?

b. What is the most likely shape of the source?

c. What is it's magnetization?

d. What is the density contrast?

e. What is the ratio of remanent to induced magnetization?

f. How deep is it?