1. Write short, concise definitions for four of the following:

   a. geomagnetic pole

   b. upward continuation

   c. diurnal variation

   d. ferrimagnetism

   e. Curie temperature

2. Assuming Earth’s magnetic field is entirely dipolar, calculate the declination and inclination of the magnetic field in Jacksonville, FL ($\lambda = 30.0^\circ$N; $\phi = 82.0^\circ$W) if magnetic North is located at 78.5 $^\circ$N, 82.0 $^\circ$W.
3. What component of the Earth's magnetic field is most commonly measured by each during a ground magnetic survey?
   i. proton precession magnetometer
   ii. fluxgate magnetometer
   iii. alkali vapor magnetometers
   iv. gradiometers

4. Which of the above magnetometers would be considered vector magnetometers? Why?

5. Why are the large magnetic anomalies observed over sedimentary basins generally thought to arise from lithology contrasts within the basement and not from local uplifts on the basement?
6. Shown below are the aeromagnetic and geological maps of north-central Nevada. The aeromagnetic map shows two prominent anomalies (labeled A and B), one caused by a two-dimensional source and the other resulting from a three-dimensional source. Which anomaly is the 2D and which is the 3D.

7. Which of the anomaly profiles shown below is (are) incorrect? Why? North is to the right.
8. The diagrams below are total field magnetic anomaly maps associated with a buried dipole at the equator ($I = 0^\circ$), at a mid northern latitude ($I = 60^\circ$), and at the North magnetic pole ($I = 90^\circ$). In the space at the bottom of the diagrams indicate the latitude each is from. Also indicate which anomaly is also the horizontal field anomaly and which anomaly is also the vertical field anomaly. For the mid-latitude anomaly indicate the north direction.

![Diagram 1](image1.png) ![Diagram 2](image2.png) ![Diagram 3](image3.png)

9. Geologic sampling of a copper deposit in the southwestern U.S. indicates that the ore is 250 kg/m$^3$ more dense than the surrounding rock (2-3% copper ore). The density of the country rock is 3050 kg/m$^3$. A careful gravity survey indicates that gravity averaged over the $6 \times 10^5$ m$^2$ area of the prospect is 1.5 mgal. What is the total mass of the deposit?
10. Many of the airports on the Hawaiian Islands are built over areas underlain by lava tubes. The Keohole Airport on the island of Hawaii is a case in point. Geological evidence points to the existence of shallow east-west (with respect to magnetic north) trending master tube system in the vicinity of the proposed airport expansion. The tube has an average radius of 5 meters and is located 1 meter below surface. What is the magnitude of the total field anomaly directly over the center of the tube. The Earth's inducing field has a strength of 36,000 gammas and an inclination of 36° at this location in Hawaii. Susceptibility of the basalt is 0.012 cgs units.