Due: September, 24th

Problem 1.

Three ridges A, B and C meet at a triple junction. Ridge A has a strike of 329° (N 31° W) and a spreading rate of 7 cm yr⁻¹; ridge B strikes at 233° (S 53° W) and has a spreading rate of 5 cm yr⁻¹. Determine the strike of ridge C and its spreading rate.

Problem 2.

The three plates A, B, and C (attached figure) meet at a ridge-ridge-ridge triple junction. The ridge between A and B has a half-spreading rate of 2 cm yr⁻¹. Calculate:
   a) the half spreading rates of the other two ridges and
   b) the motion of the triple junction relative to plate C.

Problem 3.

Arlonia is a planet with just two plates, A and B. Plate B comprises the lower hemisphere and plate A the upper, as shown in attached figure. Points a, b and c lie on the equator, and point d is diametrically opposite b. The zero meridian passes through point a. The pole of rotation of plate A relative to plate B is at 45°N, 0°E. The magnitude of the velocity vector is 10⁻¹⁰ radians per year. The radius of Arlonia is 3400 km.
   a) What is the nature of the plate boundary between plates A and B?
   b) State where magnetic lineations might be found and sketch the pattern that would be observed.
   c) Calculate the relative velocity between plates A and B at locations a, b, c and d.
   d) Sketch possible fault-plane solutions for earthquakes occurring at locations a, b, c and d.
   e) Discuss the possible existence of such a two-plate planet.
   f) Discuss briefly how the stability or instability of a two-plate tectonic system depends upon the pole position and/or relative size of the two plates.

Problem 4.

Summarize the geological and geophysical evidence resulting from plate tectonic activity in the following regions: (a) Iceland, (b) the Aleutian islands, (c) Turkey, (d) the Andes, (e) the Alps?

Problem 6.

Using the data in Fig 5.77, compute the approximate spreading rates in the age interval 25-45 Ma at the oceanic ridges in the S. Atlantic, S. Indian, N. Pacific and S. Pacific oceans.
Problem 2

Plate A

Plate B

Plate C

60°

150°
Problem 3

Planet Arlonia