

Name: \_\_\_\_\_

**Answer 5 out of 6 questions. Make sure to justify your answers whenever necessary.**

**1. Origin of the solar system**

- a) Which major characteristics have to be considered by any model that explains the evolution of the solar system? (5 points)
- b) Describe how the solar system formed from a cloud of interstellar dust and gas. (3 points)
- c) Name one of the observations that led to the acceptance of a heliocentric solar system and the abandonment of the Ptolemaic geocentric system. (2 points)

## 2. Continental Drift and Plate Tectonics

- a) Name five observations that led A. Wegener to postulate his theory of *continental drift*. (2.5 points)
- b) Which mechanisms are thought to be responsible for the movement of lithospheric plates, according to the theory of plate tectonics? (1.5 points)
- c) Draw a detailed sketch of a oceanic - continental plate margin. Make sure to include:
- the major plate tectonic features
  - the occurrence of earthquakes
  - rock units that are likely to be found in this environment (don't forget the ones that are formed below the surface!) (6 points)

### **3. The Interior of the Earth**

- a) Sketch a cross-section through the earth and indicate its major layers based on chemical and physical properties. (5 points)
- b) How do we know that the earth's mantle is solid? (2 points)
- c) How do we know that part of the earth's core is liquid, while some of it is solid? (3 points)

#### **4. Igneous Rocks**

- a) Why does it make good geological sense to use specimen color and crystal size as first criteria for the classification of igneous rocks? (2 points)
- b) Why does slow cooling of magma lead to large crystals? (3 points)
- c) Name the major types of magma, based on their chemical composition. (1.5 points)
- d) How does magma composition affect the style of volcanic eruptions, the shape of a volcano and the hazards associated with the eruptions? (3.5 points)

## 5. Sedimentary Rocks

- a) Which minerals are the most stable at the surface of the earth and why? (2.5 points)
- b) How do transport processes affect the physical and chemical properties of a sediment? (2.5 points)
- c) Which depositional environment led to the formation of the brightly colored sedimentary rock found to the west of Trinity's campus and in the Connecticut valley? How did geologists arrive at this interpretation? (5 points)

## 6. Rock of the Day

Describe the provided specimen as accurately as you can. Make sure you address the general rock type (igneous, sedimentary, metamorphic), cover its main features, and interpret your observations in terms of how this rock was formed and in which environment this was likely to occur. Justify your answers! (10 points)