

NAME \_\_\_\_\_

Principles of Geology – GEO 102  
Exam 1 – Fall 2007

**PART I (70%) – Individual Portion (BLUE SCANTRON)** Multiple choice (20-pts.) – You will have exactly 20 minutes to complete this portion. Read each question carefully. There is only one correct answer per question. Choose the best answer and write your answer on the line next to the question **AND** fill in the correct letter on the scantron. This is the closed book and non group portion.

**PART II (30%) – Group Portion (RED SCANTRON)** Multiple choice (20-pts.) and Essay (10 pts.)– Once the BLUE SCANTRONS have been collected, you may get into groups and use your notes to retake the exam. NOTE: Please be courteous to your fellow students and try to be as quite as possible. As mentioned above, there is only one correct answer per question. Although this is a group portion, you may disagree with your group. Choose the best answer by filling in the correct letter on the scantron. When you leave, turn in your **SCANTRON AND THE ANSWER TO YOUR ESSAY**.

\_\_\_\_\_ 1. Off of the coast of Peru in the Pacific Ocean, the Nazca Plate is subducting beneath the South American plate. Peru should experience deep earthquakes and andesitic volcanism. The previous statement is a form of

- A Inductive Reasoning.
- B **Deductive reasoning.**
- C Not enough information to process.

\_\_\_\_\_ 2. As a subducting plate melts, the magma rises from the plate towards the surface. Which identifies the process that occurs when the magma incorporates rock from the overlying plate?

- A **Host rock assimilation**
- B Fractional crystallization-Crystal Settling
- C Magma mixing
- D All of the above
- E None of the above

\_\_\_\_\_ 3. Which difference would you expect between oceanic-continental convergence and oceanic-oceanic convergence?

- A The type of crust subducting.
- B Deeper earthquakes along the oceanic-continental convergence.
- C More volcanoes along oceanic-oceanic convergence
- D **Different magmatic compositions: more intermediate along oceanic-oceanic convergence and more rhyolitic along the oceanic-continental convergence.**
- E Shield volcanoes at both

\_\_\_\_\_ 4. Basalt is to oceanic crust as

- A magma is to volcanoes.
- B gabbro is to continental crust.
- C obsidian is to continental crust.
- D **granite is to continental crust.**

\_\_\_\_5. It is possible for gabbro and basalt to have identical chemical compositions. They have different names because

- A they formed at different locations on the earth's surface, for example one in New York and one in China.
- B they formed from different magmas.
- C they have different mineral (grain) sizes from different cooling rates.**
- D they have different amounts of silica.

\_\_\_\_6. A group of water dowsers (people who find water using the pull on a forked branch) argue that they have a high success rate in finding water, but that it only works "if it is tested by believers." Which of the following statements best characterizes this situation?

- A This is a testable hypothesis.
- B This is scientific theory because it has proven true.
- C This is not a testable hypothesis because water dowsers are not scientists.
- D This is not a testable hypothesis because there would be no test to disprove it; essentially, it is not testable by non-believers.**

\_\_\_\_7. With a more simple silicate structure, the ratio between Si and O (Si:O) becomes

- A. Becomes smaller (There are fewer Si for every oxygen, i.e. 1:4)**
- B. Becomes greater (There are more Si for every oxygen, i.e. 1:2)
- C. Stays the same
- D. It depends upon whether the mineral forms intrusively or extrusively

\_\_\_\_8. All silicate minerals contain which two elements?

- A Oxygen and silicon.**
- B Iron and silicon.
- C Silicon and magnesium
- D Oxygen and carbon.
- E Iron and magnesium.

\_\_\_\_9. Which of the following is a mineral?

- A Natural gas (CH<sub>4</sub>)
- B Coal (C)
- C Liquid Water (H<sub>2</sub>O)
- D Plastic
- E Diamond (C)**

\_\_\_\_10. Seismic waves

- A All travel at the same speed (velocity)
- B All move all types of materials
- C Move through different density materials at different speed (velocity)**
- D Create the energy that produces earthquakes

\_\_\_\_\_ 11. Which of the following provide an observation that can be used to support the hypothesis that the Earth has a liquid outer core?

- A There is a molten rock (magma) that originates in the Earth.
- B Being composed of iron, the core has a high density.
- C The Earth's temperature increases with depth.
- D Seismic shadows zones exist for both the P-wave and S-wave; however, P-waves are observed on the opposite side of Earth from an earthquake epicenter.**

\_\_\_\_\_ 12. Which of the following would be used to support the hypothesis that the continents were once connected in a giant continent called "Pangea"?

- A The presence of fossils of the same land dwelling reptile on continents separated by oceans.
- B The geographic distribution of the *Glosseropturis* fossil
- C The location of similar rocks and mountain chains on continents separated by oceans
- D The paleoclimatic evidence
- E All of the above**

\_\_\_\_\_ 13. How does paleomagnetism support the hypothesis of sea floor spreading?

- A The paleomagnetism data tell how old the rocks are.
- B The paleomagnetism data indicate where the rock was formed on the earth.
- C The paleomagnetism data illustrate a symmetrical pattern on either side of mid-ocean ridges.**
- D The paleomagnetism data provide the composition of the rock.

\_\_\_\_\_ 14. Convergent boundaries and divergent boundaries both

- A Have segments connected by transform faults (boundaries)**
- B Have deep earthquakes
- C Generate new oceanic crust
- D Move plates towards each other
- E all of the above

\_\_\_\_\_ 15. Which of the follow observations supports the hypothesis that East Africa is undergoing rifting?

- A Eruptions of basalts is observed
- B Shallow earthquakes occur frequently
- C The continental crust is thinning
- D Large linear lakes are forming
- E All of the above**

\_\_\_\_\_ 16. Rhyolitic lava would be:

- A The most explosive**
- B The least explosive
- C The fastest moving
- D Have the lowest silica content
- E None of the above

\_\_\_\_\_17. Hot Spots

- A Occur along plate boundaries.
- B Are a results of process similar to those at a mid-ocean ridge
- C Produce similar volcanoes (both in terms of composition and structure) as those at convergent boundaries
- D Occur under/within both continental and oceanic crust**
- E None of the above

\_\_\_\_\_18. Which of the following supports the hypothesis that prior to a continental-continental collision between India and the Eurasian plates, oceanic crust was being subducted?

- A Ophiolite complexes are incorporated in the Himalayan Mountains.**
- B There are numerous shallow focus earthquakes occur.
- C Granite is present.
- D The Himalayan Mountains continue to grow
- E All of the above

\_\_\_\_\_19. You just found a porphyritic andesite (a chocolate chip cookie)

- A I am just going to eat the cookie.
- B This rock formed on the Earth's surface.
- C This rock formed on the Earth's Surface after initial starting to form in the Earth.**
- D The rock formed in the Earth's interior.
- E The rock is composed of carbonates.

\_\_\_\_\_20. At a transform boundary, energy is stored as two plates moving in opposite directions get caught on each other. When the stress exceeds the threshold of the rock, the rock breaks or ruptures, releasing the stored energy. This process refers to

- A Elastic Rebound Theory**
- B Continental Drift
- C Plate Tectonics
- D Fractional Crystallization
- E Principle of Uniformitarianism

Group Essay Questions (10 points):

NAME: \_\_\_\_\_

Persons in your Group (must be identified): \_\_\_\_\_

Answer the questions to the best of your abilities. Please be concise but provide detail. This is a group discussion, but you can deviate from your group's response. Where appropriate, draw diagrams.

**Using ALL OF YOUR KNOWLEDGE, compare and contrast volcanic arc igneous activity (either island or continental) with hot spot volcanic activity.** NOTE that this question goes beyond just composition and texture of the rock. Realize that this question is worth 10 out of 30 points for the group portion.