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Principles of Geology – GEO 102
Exam 2 – Fall 2005

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) Mechanical weathering

- A) Changes the composition of the mineral/rock
- B) Dissolves the mineral/rock
- C) Increases the surface area on which chemical weathering can occur**
- D) Requires water
- E) Only happens to igneous rocks.

____2) With chemical weathering, _____ silicate minerals will weather the

- _____.
- A) single tetrahedron, slowest
 - B) complex, fastest
 - C) all, at the same rate
 - D) complex, slowest**

____3) Which statement concerning sedimentary rocks is NOT true?

- A) They may contain fossils
- B) Most are composed of particles and/or chemical constituents derived from weathering and erosion of other rocks
- C) They may contain structures that reveal the environment in which they were deposited
- D) They contain most of the world's energy resources.
- E) All sedimentary rocks contain large clasts derived from igneous rocks.**

____4) Sediments that are angular indicate

- A) that the sediments have traveled a great distance from the source to deposition
- B) that the sediments were deposited in a high-energy environment
- C) that the sediments had an igneous parent rock
- D) that the sediments were found in a sand dune and transported by wind
- E) Not enough information to finish the statement.**

- ____5) Two rocks, a slate and gneiss, were found near an ancient Subduction zone. Which of the rocks was buried deeper in the Subduction zone
- A) The slate
 - B) The gneiss**
 - C) There is not enough information provided
 - D) There is a problem because you would not expect to find these rocks near an ancient subduction zone
- ____6) Stress is to strain as
- A) A dent is to a collision
 - B) A collision is to a dent**
 - C) A law is to a crime
 - D) An egg is to a cake
- ____7) Which of the following would you expect to weather most rapidly?
- A) A single olivine crystal in Canada.
 - B) A single quartz crystal in Canada.
 - C) A single olivine crystal in Panama.**
 - D) A single quartz crystal in Panama.
- ____8) Two rocks of identical composition were subjected to identical stresses. One rock broke, and the other rock deformed by bending. Why?
- A) They were different densities.
 - B) They were at different temperatures.**
 - C) They had different porosity.
 - D) They were deformed at different times in earth's history.
- ____9) A normal fault is to tension stress as
- A) A strike-slip fault is to plate boundaries
 - B) A reverse fault is to compression stress**
 - C) A reverse fault is to shearing stress
 - D) A strike-slip fault is to gravitational stress
- ____10) In what geologic setting would you be most likely to find poorly sorted sediments?
- A) On beaches subject to constant wave action.
 - B) In mountain streams where energy can change rapidly.**
 - C) In lake sediments
 - D) In any setting where sediment occurs.
- ____11) Sediments become sedimentary rocks through the process(es) of
- A) Aging
 - B) Compaction
 - C) Cementation
 - D) Aging and cementation
 - E) Compaction and cementation**

- ____ 12) Sediment can be generated from
- A) Ions in solution that combine
 - B) Physical weathering of pre-existing rock
 - C) Shells from organisms
 - D) All of the above**
 - E) None of the above
- ____ 13) Which of the following would occur in conjunction with a convergent boundary?
- A) Reverse Faulting
 - B) Compression Stress
 - C) Folding
 - D) Regional Metamorphism
 - E) All of the Above**
- ____ 14) Four identical granite monuments were installed in four regions of the world. Which statement is true:
- A) The monument in the polar region will weather the fastest.
 - B) The monument in the low-latitude (desert) region will weather the fastest.
 - C) The monument in the mid-latitudes (humid, similar to Central Illinois) region will weather the fastest.
 - D) The monument in the equatorial region will weather the fastest.**
- ____ 15) Which environment would be described by the following:
- Dominant movement: water
 - Sedimentary Particles: clasts
 - Particle sizes: Ranges from cobble and gravels to fine-grained clasts (silts and clays)
 - Sorting: moderately to well
 - Rounding moderately to well
 - Structures: graded beds, fining upwards sequence.
- A) Beach
 - B) Glacier
 - C) Lagoon
 - D) Tidal Flat
 - E) Submarine fan (turbidity flow)**
- ____ 16) While oil and natural gas deposits are found near active tectonic regions, deposits are not found near mid-ocean ridges. Which response provides the best reason?
- A) There is no source rock at a mid-ocean ridge.
 - B) The temperature associated with the underlying magma is higher than the “oil window.”
 - C) There is no rock that has enough porosity to serve as a reservoir rock.
 - D) There are no structural traps to collect the oil.
 - E) All of the above.**

17) Along the eastern edge of the Rocky Mountains, deposits of oil and coal can be found. What can be inferred about the environment for the rocks in the area?

- A) The area was once a near-shore/ocean environment
- B) The area was a desert.
- C) The area was subjected to high temperature metamorphism.
- D) There is not enough information to answer this question.

Using Figures 1 and 2, answering the following:

18) You are out hiking and you come across an area of rock that has amphibolite and granulite facies. How would you classify the rock?

- A) Phyllite
- B) Igneous
- C) Slate
- D) Shale
- E) Gneiss

19) Fluids act as an agent of metamorphism by all of the following except

- A) supplying ions needed for chemical reactions
- B) Providing differential stress
- C) Increasing the temperature
- D) Transporting the ions
- E) None of the above

20) As tectonic plates move away from each other creating extensional stresses, the anticipated brittle deformation would be

- A) Reverse faulting
- B) Thrust faulting
- C) Normal Faulting
- D) Folding
- E) Jointing

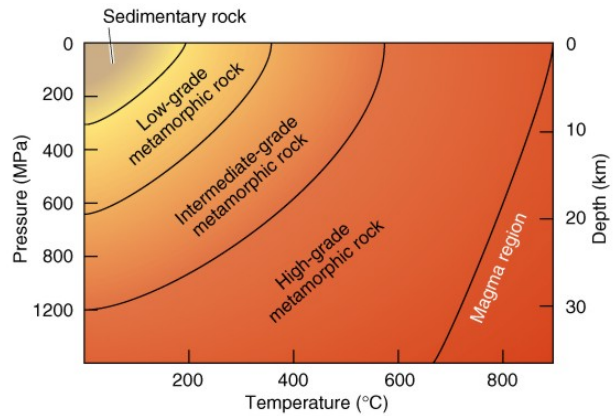


Figure 1: Metamorphic grades

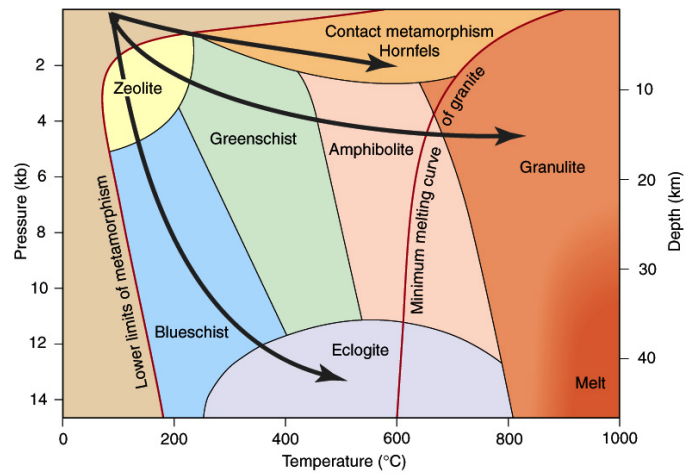


Figure 1: Metamorphic Facies

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.

1) What differences (stresses, structural, etc) would you expect in an earthquake that occurred along the west coast of California as compared to the earthquake that recently occurred in Pakistan? (5 points, Figure 4.19 may be helpful)

2) Using plate tectonics as a guide, describe how metals are concentrated to produce mineral reserves. Diagrams and pictures are encouraged. (5 points)