

NAME \_\_\_\_\_

Principles of Geology – GEO 102

Exam 3 – 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) As a water molecule in the hydrologic cycle
- A) You reside the longest in the ocean because it is the biggest reservoir.
  - B) You reside the longest in the atmosphere because it is the smallest reservoir.
  - C) You reside the longest in the ground water because it has a slow exchange with other reservoirs.
  - D) You reside the shortest time in surface water because it has a fast exchange with other reservoirs.
  - E) You reside the longest in the ocean due to a slow exchange with the other reservoirs.

- \_\_\_\_2) Surface currents in the ocean are a result of
- A) Fish swimming in the ocean
  - B) Water temperature differences between the equator and polar regions
  - C) The rotation of the Earth
  - D) The global air circulation – winds
  - E) Not enough information to answer this question

- \_\_\_\_3) The density of the ocean water is controlled by
- A) The salinity of the water
  - B) The temperature of the water
  - C) The amount of carbon dioxide (CO<sub>2</sub>) in the water
  - D) A and B
  - E) All of the above

- \_\_\_\_4) Surface air moves from \_\_\_\_\_ pressure (energy) to \_\_\_\_\_ pressure (energy)
- A) high; low
  - B) low; high
  - C) this question makes no sense, movement is based upon temperature differences not pressure.
  - D) not enough information available to answer this question

- \_\_\_\_5) As cold air sinks, the air mass warms and
- A) The moisture holding capacity of the air decreases
  - B) The moisture holding capacity of the air increases**
  - C) Rain will begin to fall
  - D) Water condenses and clouds will form
- \_\_\_\_6) When water goes from the ocean to the atmosphere (evaporation),
- A) Energy is released as the liquid water goes to a gas
  - B) Energy is stored as the liquid water goes to a gas**
  - C) Energy is released as the gaseous water goes to a liquid
  - D) Energy is stored as the gaseous water goes to a liquid
- \_\_\_\_7) Deep ocean water is
- A) Warmer than surface water
  - B) Less dense than surface water
  - C) Better mixed than surface water
  - D) Is controlled by surface winds
  - E) Stratified (layered) based upon variations in density**
- \_\_\_\_8) Within the hydrologic cycle, possible pathways for water to leave the surface water reservoir include
- A) Evaporation
  - B) Transpiration
  - C) Surface Runoff
  - D) Infiltration (percolation)
  - E) All of the above
- \_\_\_\_9) When water transforms from a gaseous state to a liquid state
- A) Heat energy is required (stored)
  - B) Heat energy is released**
  - C) Heat energy is not involved
  - D) None of the above
- \_\_\_\_10) A warm air mass holds \_\_\_\_\_ moisture than a cold air mass.
- A) More**
  - B) Less
  - C) The same
  - D) Cannot appropriately answer this questions since we do not know the latitude of the air mass
- \_\_\_\_11) In which region would you expect the most evaporation to occur
- A) Between the equator and 30°N (Tropic of Cancer)**
  - B) Between 30°N (Tropic of Cancer) and 60°N (Mid-Latitudes)
  - C) Between 60°N (Mid-Latitudes) and the North Pole
  - D) An equal amount of evaporation will occur in each region.

- \_\_\_\_ 12) The first atmosphere for the Earth
- A) Developed as plate tectonics started and the first volcanoes began erupting.
  - B) Developed from chemical weathering of the continental crust.
  - C) Was a result of dinosaurs breathing.
  - D) Was present when the Earth formed.
  - E) Is the same as our current atmosphere.
- \_\_\_\_ 13) A major difference between the first atmosphere and the current atmosphere is
- A) Within the first atmosphere, there was more oxygen than carbon dioxide.
  - B) The amount of nitrogen has significantly decreased.
  - C) The amount of nitrogen has significantly increased.
  - D) The first atmosphere had more carbon dioxide than oxygen.
  - E) Water vapor was not present in the first atmosphere.
- \_\_\_\_ 14) As a cold front advances, the weather will be
- A) Stormy (thunderstorms) as the advancing warm air forces the cold air up.
  - B) Cloudy with a slight chance of rain as the warm air slowly advances over the cold air.
  - C) Cloudy with a slight chance of rain as the cold air slowly advances over the warm air.
  - D) Stormy (thunderstorms) as the advancing cold air forces the warm air up.
- \_\_\_\_ 15) The salt present in the ocean
- A) Is a result of physical weathering of the continental crust.
  - B) Is primarily sodium and chloride (halite).
  - C) Is a result of chemical weathering of the continental crust.
  - D) A and B
  - E) B and C
- \_\_\_\_ 16) The main source of energy within the atmosphere is
- A) The Sun.
  - B) The gravity of the moon.
  - C) Radiation from the surface of the Earth.
  - D) Global Warming.
  - E) None of the above.
- \_\_\_\_ 17) At a high pressure zone
- A) The air temperature is always warm.
  - B) Air circulates around the zone in a counter-clockwise direction
  - C) The air is descending from higher altitudes to the surface.
- \_\_\_\_ 18) Locally, the salinity of the ocean can
- A) decrease as more water from rivers, glaciers, and groundwater enter the ocean
  - B) increase as water is frozen to form sea ice
  - C) increase as the rate of evaporation increases
  - D) ALL of the ABOVE
  - E) None of the ABOVE

\_\_\_\_ 19) The Earth's temperature

- A) is currently cooler than the average temperature over Earth's 4.5 billion year history
- B) has been constant (never fluctuated) over Earth's 4.5 billion year history
- C) is currently warmer than the average temperature over Earth's 4.5 billion year history
- D) is decreasing

\_\_\_\_ 20) Why is winter in England warmer than winter along the St. Lawrence Seaway in Canada although England is further north?

- A) Air currents (the Westerlies) move cold polar air from western Canada to the St. Lawrence Seaway
- B) The presence of glaciers in Greenland and northern Canada contribute to cold ocean water of the St. Lawrence Seaway coast
- C) The Gulf Stream moves warm water from the Gulf of Mexico and Caribbean Sea up towards northern Europe and England.
- D) All of the above.
- E) It's Canada and is supposed to be cold so they can play hockey!

John Stephen Julie Anirban Scott

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) Using your complete set of knowledge (air movement, water circulation patterns, ocean temperatures, etc. – there are other things as well), explain why hurricanes do not approach the northeastern part (New England) of the United States in a similar manner as hurricanes approach the Gulf Coast states and the Caribbean. As a suggestion I would explain how a hurricane sustains (and develops) its strength (**6 points**).

2) Although briefly discussed – provide a brief argument either for global warming or against global warming. In either case please discuss the role of carbon dioxide and global warming. (**4 points**). Your grade is not based upon whether you argue for or against global warming, but rather how you support your position and explain the role of carbon dioxide.