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Principles of Geology – GEO 102
Exam 4 – 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 quiet 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 an air mass rises from Earth's surface to the upper atmosphere the

- A) Air mass cools and can hold less moisture
- B) Air mass warms and can hold more moisture
- C) Air mass cools and can hold more moisture
- D) Air mass warms and can hold less moisture
- E) None of the above

____ 2) The first atmosphere for the Earth

- A) Was a result of dinosaurs breathing.
- B) Developed as plate tectonics started and the first volcanoes began erupting.
- C) Developed from chemical weathering of the continental crust.
- D) Was present when the Earth formed.
- E) Was rich in oxygen.

____ 3) Hadley Cells

- A) Are associated with low-latitude air circulation
- B) Are associated with surface air movement from either 30°N or 30°S towards either 60°N or 60°S
- C) Are associated with mid-latitude air circulation
- D) Are associated with upper air movement from either 60°N or 60°S towards either 30°N or 30°S
- E) Are associated with high-latitude air circulation

____ 4) When the input of snow/ice is less than the output (evaporation, sublimation, melting, calving) for a glacier,

- A) The ice will move upslope (reverse of normal)
- B) The glacier will retreat
- C) The glacier will advance
- D) A and B
- E) A and C

- ____ 5) Which of the following is true
- A) Warm fronts are faster moving than cold fronts
 - B) Warm fronts bring cP air to the eastern U.S.
 - C) Temperature increases as a warm front passes
 - D) As a warm front passes humidity decreases because of the presence of mT air
 - E) None of the above are true
- ____ 6) The combined effect of the Milankovitch cycles
- A) Creates a situation where the amount of solar radiation reaching the Earth's surface is reduced
 - B) Explains plate tectonics
 - C) Classifies the various climatic areas
 - D) Explains the location of deserts.
- ____ 7) Surface air moves from _____ pressure (energy) to _____ pressure (energy)
- A) low; high
 - B) high; low
 - C) this question makes no sense, movement is based upon temperature differences not pressure.
 - D) not enough information available to answer this question
- ____ 8) Which climate classification best represents Illinois?
- A) Tropical (A)
 - B) Dry (B)
 - C) Warm Temperate (C)
 - D) Cool Temperate (D)
 - E) Polar (E)
- ____ 9) Examine figure 1 on the screen. Note where the location of the X. Which of the following best classifies the air mass?
- A) mP
 - B) cT
 - C) cP
 - D) cA
 - E) mT
- ____ 10) Wind processes and glacial processes are similar in that they
- A) Transport boulders
 - B) Are found in low-latitudes
 - C) Have a dissolved load
 - D) Their location is dictated by climatic controls
 - E) Sort the material they are transporting

- ____ 11) Wind action and stream processes are similar in that they
- A) Sort the material they are transporting
 - B) Have a competence and capacity
 - C) Have a bed load and suspended load
 - D) Transport sediment in the direction of movement
 - E) All of the above
- ____ 12) Within a desert setting, the primary agent of erosion is
- A) Water
 - B) Vegetation
 - C) Wind
 - D) Ice
 - E) Organic acids
- ____ 13) Carbon dioxide (CO₂) concentrations in the atmosphere
- A) Are solely a result of human activities
 - B) Are currently the highest they have ever been in Earth's history
 - C) Are currently the lowest they have ever been in Earth's history
 - D) Correlate with in air temperature, as concentrations increase temperature increases
 - E) Are of no concern.
- ____ 14) Hurricanes
- A) Are short in duration
 - B) Require warm water to develop and to sustain strength
 - C) Are a result of a cold front advancing upon a warm front
 - D) Occur only in the Atlantic Ocean
 - E) Form over land
- ____ 15) Which of the following is true
- A) More precipitation occurs at the Equator than at either 30°N or 30°S because air rises at the equator
 - B) At 30°N or 30°S there is more evaporation than at the Equator because dry air has descended from the upper atmosphere
 - C) Surface air masses move from 30°N or 30°S towards the equator
 - D) Upper Atmosphere air masses move from the equator towards either 30°N or 30°S
 - E) All of the above
- ____ 16) Midlatitude cyclones
- A) Are associated with a cold front advancing on a warm front
 - B) Are associated with thunderstorms
 - C) Center around a low-pressure area
 - D) Have counter clockwise air movement
 - E) All of the above

____ 17) Examine the image (figure 2) on the screen. Based upon the image, which answer best explains why there was no glaciation during the represented time period?

- A) The Earth's temperature was too hot.
- B) The was no land located within the polar regions
- C) The eccentricity of the Earth's orbit was at a minimum (most circular)
- D) Glaciation occurred, but there were not humans to produce cultural recordings.

____ 18) Which of the following provides direct evidence for climate conditions?

- A) Oxygen isotopes
- B) Cultural records
- C) Tree rings
- D) Carbon dioxide (CO₂) concentrations
- E) None of the above

____ 19) Fossil fuel emissions are small relative to natural fluxes. Why do they have so large an effect on carbon dioxide (CO₂) concentrations in the atmosphere?

- A) The emissions represent a "new" unbalanced flux to the atmosphere.
- B) Smoke stacks from power plants inject the emissions high in the atmosphere
- C) The emissions do not really have an effect on carbon dioxide (CO₂) concentrations in the atmosphere – crazy scientists are just saying this.
- D) Small additions of CO₂ to the atmosphere result in lower air temperatures.

____ 20) On figure 1, which of the following best describes the conditions for Normal?

- A) A mP air mass is bringing warm air towards Normal. It will be sunny, with no wind.
- B) A cP air mass is bringing warm air towards Normal. It may be cloudy, but no rain is expected.
- C) A mT air mass is bringing cold air towards Normal. It will be cloudy with a light rain. A strong wind blows from the north-northwest.
- D) A cP air mass is bringing cold air towards Normal. It may be cloudy, but no rain is expected. Slight wind blows from the south-southeast.

John Joyce Phalguni Sam Dom

Group Essay Questions **(10 points)**:

NAME: _____

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.