

NAME _____

Principles of Geology – GEO 102
Final Exam – Fall 2003

PART I (60%)– Individual Portion (BLUE SCANTRON) Multiple choice (45-pts.) – You will have exactly 45 minutes to complete this portion. Read each question carefully. There is only one correct answer per questions. 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 (40%)– Group Portion (RED SCANTRON) Multiple choice (45-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 questions. 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. Keep this question sheet for your reference.

____ 1) Which of the following is a mineral?

- A Coal (C)
- B Liquid Water (H₂O)
- C Natural gas (CH₄)
- D Plastic
- E Table Salt (Halite NaCl)

____ 2) As tectonic plates move towards each other creating compressional stresses, the anticipated ductile (plastic) deformation would be

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

____ 3) Which of the following is true:

- A Air masses move from areas of high pressure to areas of low pressure
- B Warm air holds more moisture than cold air.
- C Water vapor transfers heat from warmer regions to colder regions
- D All of the above
- E None of the above

____ 4) An aquifer

- A may have secondary porosity and permeability.
- B Is composed of sand, gravel, or sandstone
- C has high porosity.
- D has high permeability.
- E All of the above

____ 5) Geologists believe that there exists an outer liquid core and a solid inner core because of

- A A shadow zone created by P-waves that cannot move through liquids
- B A shadow zone created by S-waves that cannot move through liquids
- C A shadow zone created by P-waves as a result of differential velocities due to a change in material
- D B & C
- E All of the above

- ___ 6) If a magma generated from a subducting plate moves up into the continental crust, the composition of the magma will become
- A Hotter
 - B Less viscous
 - C More felsic**
 - D More mafic
 - E None of the above
- ___ 7) The most important agent of erosion is
- A Gravity
 - B Groundwater
 - C Ice
 - D Running water**
 - E Wind
- ___ 8) Which of these factors does not contribute to stream velocity?
- A channel roughness
 - B stream channel size and shape
 - C stream gradient
 - D suspended sediment load**
 - E the stream's wetted perimeter
- ___ 9) The youngest oceanic crust is typically found
- A Near the edges of continents
 - B In the middle of oceanic plates
 - C At subduction zones
 - D At Mid-Ocean Ridges**
 - E None of the above
- ___ 10) As the complexity of the silicate structure increase, the ratio between Si and O (Si:O) becomes
- A Stays the same
 - B Becomes smaller (There are fewer Si for every oxygen, i.e. 1:4)
 - C It depends upon whether the mineral forms intrusively or extrusively
 - D Becomes greater (There are more Si for every oxygen, i.e. 1:2)**
- ___ 11) You have just found a large exposure of igneous rock. You interpret the rock as being part of a batholith. What type of texture would the rock have?
- A Vesicular
 - B Phaneritic**
 - C Glassy
 - D Aphanitic Porphy
 - E Aphanetic
- ___ 12) The viscosity of magma is dependent on:
- A Type of eruption
 - B Silica content**
 - C Iron content
 - D Aluminum content
 - E None of the above

13) The most common gas expelled from lava is

- A Carbon dioxide
- B Nitrogen
- C Silicon dioxide
- D Sulfur dioxide
- E Water vapor

14) In which zone would chemical weathering be most effective (Figure 1)

- A Arctic Regions
- B Temperate Regions
- C Low-latitude deserts
- D Tropics
- E Equally effective in any of the zones

15) Sediments become a sedimentary rock by being lithified, which is

- A Cementation
- B Compaction
- C Foliation
- D A & B
- E B & C

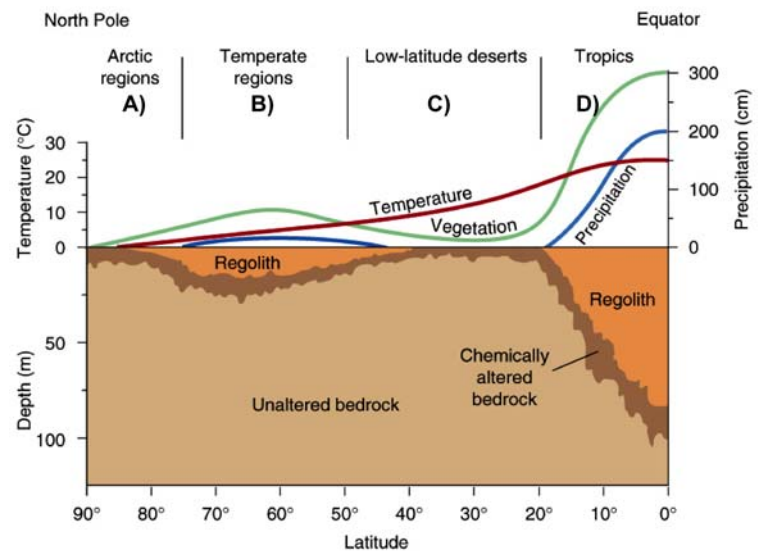


Figure 1: Role of Temp., Vegetation, and Precipitation on Weathering

16) Which sedimentary environment would produce a well-sorted, well-rounded sandstone?

- A Beach
- B Glaciers
- C Lake
- D Swamp
- E Turbidity flow

17) Which of the following CORRECTLY finish this statement: "If societies stop using fossil fuels tomorrow

- A The concentration of NO_x in the atmosphere would decrease significantly."
- B The concentration of SO_x in the atmosphere would decrease significantly."
- C The concentration of CO in the atmosphere would decrease significantly."
- D The concentration of particulate matter in the atmosphere would **not** decrease significantly."
- E ALL of the above CORRECTLY finishes the statement.

18) Fluids act as an agent of metamorphism by

- A supplying ions needed for chemical reaction
- B increasing the temperature
- C transporting the ions
- D All of the above
- E None of the above

19) Oil

- A Contributes to less than 10% of the energy used in the US
- B Is a renewable resource
- C Is organic (aquatic microorganisms) material that has escaped oxidation (decomposition)
- D Is ranked based upon its hydrogen content
- E All of the above

20) The mineralogical barrier is

- A the ring of contact metamorphism around an igneous intrusion.
- B defined by political problems between countries that limits trade.
- C the fixed cost of mining metals.
- D the elevated cost or increase in energy required to mine metals from silicates instead of other mineral families.
- E associated with Geochemically Abundant Elements (GAEs)

21) The Earth's surface/air temperature

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

22) Which of the following is a source of CO₂ to the atmosphere?

- A Burning fossils fuels
- B Volcanoes
- C Animals
- D All of the Above
- E None of the Above

23) Based upon Figure 2, the fluctuations in the concentration of CO₂ are from

- A seasonal variation in the rate of photosynthesis
- B variation in the amount of fossil fuels being burned
- C seasonal volcanic eruptions on the Hawaiian Islands
- D variations in the seasonal tides on Hawaii
- E ALL of the above

24) The human use of fossil fuels is associated with which type of rock?

- A Sedimentary Rocks
- B Metamorphic Rocks
- C Igneous rocks
- D All contribute equally.

25) Rain is

- A Naturally basic
- B Naturally acidic
- C Acidified as NO_x and SO_x concentrations increase in the atmosphere
- D A and C
- E B and C

26) Locally, the salinity of the ocean can

- A decrease as the rate of evaporation increases
- B decrease as water is frozen to form sea ice
- C increase as more water from rivers, glaciers, and groundwater enter the ocean
- D ALL of the ABOVE
- E NONE one of the ABOVE

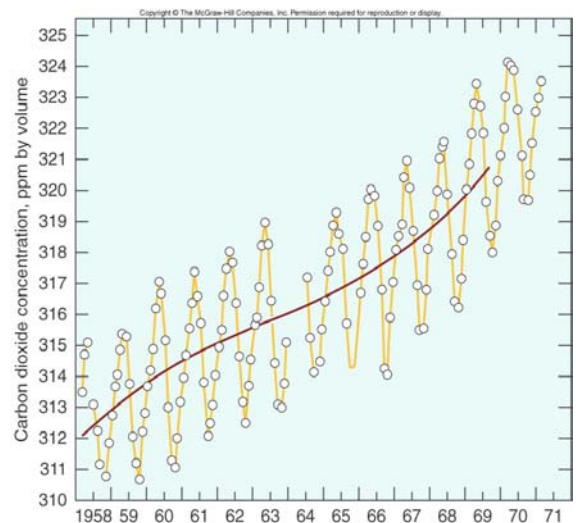


Figure 2: CO₂ concentration as measured at Mauna Loa, Hawaii

27) Circulation of ocean water is driven by

- A temperature differences
- B prevailing atmospheric winds
- C density (salinity) differences
- D ALL of the ABOVE
- E NONE of the ABOVE

28) Which of the following is NOT TRUE about coastal upwelling.

- A Coastal upwelling brings up the cold-deep water to the surface.
- B Coastal upwelling has led to the formation of phosphate deposits used in the production of fertilizers.
- C Coastal upwelling is associated with elevating the concentration of nutrients in the surface waters.
- D Coastal upwelling sends warm surface water down into the deeper ocean to mix with the cold deep waters.
- E Winds help move the warm surface waters away from the coast.

29) Deserts are

- A Are areas that can see a range of temperatures – thus deserts are not defined by temperature.
- B Areas where the rate of evaporation is higher than the rate of precipitation
- C Defined as areas that are dry
- D ALL of the Above
- E B and C

30) The building block of silicate minerals is called the _____

- A Silicon-oxygen tetrahedron
- B Silicon-oxygen octahedron
- C Aluminum-silicon tetrahedron
- D Aluminum-silicon octahedron
- E None of the above

31) Which of the following would occur in conjunction with a divergent boundary?

- A Tensional Stress
- B Reverse Faulting
- C Folding
- D Compression Stress
- E None of the above

32) _____ is the maximum particle size a stream can transport and _____ is the amount of sediment a stream can carry.

- A Competence, capacity
- B Wetted perimeter, discharge
- C Capacity, competence
- D Competence, suspended Sediment
- E Bed Load, capacity

33) A naturally occurring solid of inorganic origin with an internal structure and constant chemical composition defines a(n)

- A igneous rock
- B mineral
- C element
- D sedimentary rock
- E metamorphic rock

34) Which of the following is **NOT** a major process at convergent plate margins?

- A Oceans basins develop
- B Eruption of andesitic magma
- C Shallow, intermediate, and deep focus earthquakes
- D Development of volcanic arcs
- E Subduction zone development

35) Which of the following is **NOT** true about mechanical weathering?

- A adds to the effectiveness of chemical weathering
- B affects all types of rocks
- C changes the rock's mineral composition
- D decreases cohesion forces which leads to mass wasting
- E produces smaller pieces

36) The energy that drives the hydrologic cycle comes from

- A Fossil Fuels
- B Gravity
- C Hydroelectric Sources
- D Solar Energy
- E Wind

37) Water from the zone of aeration (Unsaturated zone) is returned to the atmosphere by plants in a process called:

- A Condensation
- B Deposition
- C Infiltration
- D Runoff
- E Transpiration

38) If ice formation is less than ice loss, a glacier will

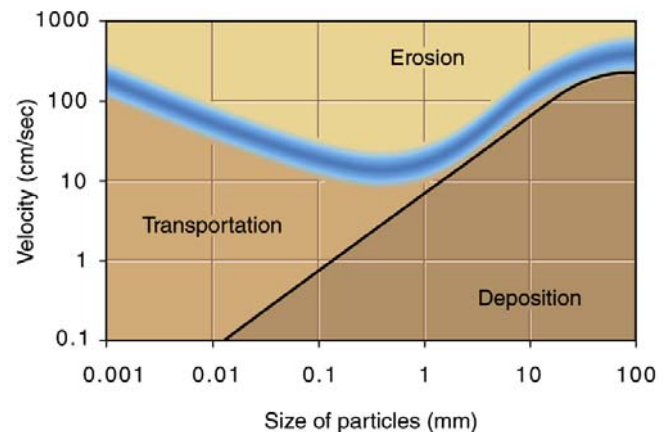
- A advance.
- B retreat.
- C remain stationary.
- D change from alpine to continental.
- E NONE of the above.

39) _____ moraines result when two glaciers merge together.

- A Terminal
- B Recessional
- C Medial
- D Lateral
- E Ground

40) Based upon the chart, which material would require the highest velocity to entrain (erode) the particle from the stream bed?

- A Clay (0.001 mm)
- B Silt (0.1 mm)
- C Sand (1 mm)
- D All three require the same velocity



- ___ 41) As an area urbanizes
- A The rate of infiltration increases.
 - B There is an decrease in the amount of runoff.
 - C **Flooding intensity and frequency increases.**
 - D Less erosion will occur.
 - E All of the Above
- ___ 42) A dam has just been built on a stream that was in equilibrium (graded). What will happen?
- A Base level will change.
 - B Erosion will occur directly below the dam.
 - C Deposition will occur directly above the dam
 - D **ALL of the ABOVE**
 - E NONE of the ABOVE
- ___ 43) Of the following, which is true concerning the following statement: “The most violent and explosive volcanoes ___”
- A Are found along convergent boundaries
 - B Have a high silica content
 - C Have magmas with high viscosities
 - D Have magmas with a high percentage of dissolved gases
 - E **All of the above**
- ___ 44) What is the primary driving force of mass wasting?
- A Earthquakes
 - B **Gravity**
 - C Mechanical weathering
 - D Running water
 - E Water content
- ___ 45) Plate Tectonics
- A is theory of plate movement
 - B explains why the oceanic crust is composed of rocks of varying ages
 - C explains why volcanoes and earthquakes occur at specific locations on the Earth
 - D **All of the above**
 - E None of the above

Before you leave please make sure to turn in your scantron.

I have enjoyed this teaching this course, and I hope that you have come away from the course feeling more knowledgeable. As I have mentioned before, I appreciate any and all feedback I receive. So, if after you have had time to reflect on the course and would like to provide me with any comments I would love to hear them.

Thanks and have a good break and enjoy the Holiday Season.

Eric