

Physical Geology

Test 1

Fall, 2003

Please enter your answer on a blue scantron. The first 10 questions are directly from the book's web site. The last 8 are from slides that we will look at together later in the test. For questions marked (T/F), put a for True, and b for false.

1. Current estimates put the age of the Earth at about: (a) 4.6 million years (b) 15 billion years (c) 15 thousand years (d) 66.4 million years (e) 4.6 billion years
2. All of science is based on the following fundamental assumption: (a) The Earth is 4.5 billion years old. (b) A series of scientific laws control nature. (c) The universe began in a Big Bang. (d) The universe is organized by mathematical rules. (e) The natural world behaves in a consistent and predictable manner.
3. What are the three types of rocks? (a) igneous, sedimentary, and metamorphic (b) minerals, soils, and gases (c) weathering, transportation, and deposition (d) igneous, sedimentary, and melted
4. Which of the following is not part of an atom? (a) proton (b) neutron (c) electron (d) molecule (e) nucleus
5. This property is the least reliable when identifying a mineral: (a) specific gravity (b) hardness (c) streak (d) luster (e) color
6. Which factors help produce the texture of igneous rocks? (a) the amount of dissolved gases in magma (b) the rate at which magma cools (c) the amount of silica present (d) all of the above (e) only b and c
7. What is the name of the process by which minerals crystallize and fall out of a melt? (a) magma mixing (b) extrusion (c) crystal settling (d) Bowen's reaction series (e) assimilation
8. The highest viscosity magma is associated with which rock type? (a) mafic (b) peridotite (c) basalt (d) andesite (e) granite
9. A large depression at the summit of a volcano is called a: (a) caldera. (b) neck. (c) lahar. (d) fissure. (e) batholith.
10. The largest intrusive igneous bodies are: (a) necks. (b) sills. (c) laccoliths. (d) batholiths. (e) dikes.
11. An impact of the trial of Galileo, a major outcome was (a) the decline of science in the Catholic countries of the time (b) an increase in the teaching of scientific creationism in schools (c) the relative advancement of science in England (d) all of the above (e) a and c only

12. Concerns about the amount of gold claimed to have been found by Bre-X were first raised by (a) Freeport McMoRan (b) pension-fund investors (c) Philippino geologists working at the mine (d) Strathcona Minerals
13. The analogy for meat and fat developed in the essay *Igneous Rocks and My Dad's Heart Attack* holds for all of the following properties of mafic and felsic rocks *except* (a) color (b) density (c) melting point (d) texture
14. In the essay on Lake Nyos, Cameroon, which of the following properties of the carbon dioxide was *not* a factor in the tragedy? (a) the carbon dioxide was denser than the ambient air (b) the carbon dioxide was dissolved in the water at the bottom of the lake (c) carbon dioxide is toxic at high concentrations. (d) carbon dioxide is used by plants for respiration, releasing oxygen
15. Which of the following explanation of the creation of the Grand Canyon is most consistent with modern geology? (a) Waters receding from a massive global flood carved the Grand Canyon in a short period of time. (b) The Grand Canyon was created by uplift and erosion processes such as we can observe occurring today. (c) A major earthquake ripped open the face of the earth, creating the gash we call the Grand Canyon. (d) Processes such as sedimentation and weathering operated differently in the past, allowing the Grand Canyon to form in the last few thousand years.
16. Which of the following is the first step in the scientific method? (a) Consult wiser men of the past to see what they say. (b) Develop a theory about the cause of various events. (c) Make an assumption about how the world works. (d) Make observations and measurements.
17. Which of the following is an example of relative dating? (a) determining age with radioactive isotopes (b) a family reunion in Arkansas (c) looking for the oldest mail at the bottom of the pile on the desktop (d) all of the above
18. Which of the following is the most brittle? (a) asthenosphere (b) inner core (c) lithosphere (d) mantle (e) outer core
19. Which of the following is like toothpaste, allowing the movement of plates above it. (a) asthenosphere (b) inner core (c) lithosphere (d) mantle (e) outer core
20. Which of the following does not mark a convergent boundary? (a) the Andes (b) the Hawaiian Islands (c) the Himalayas (d) the islands of Japan
21. If an isotope of carbon has 6 protons and an atomic mass of 12, then how many neutrons does it have? (a) none (b) 2 (c) 6 (d) 12
22. (T/F) For most elements, the number of valence electrons equals the number of protons.
23. Which of the following is *not* true about diamond and graphite. (a) Diamond and graphite have the same composition. (b) Diamond and graphite have the same type of bonds between atoms. (c) Diamonds cost more than graphite. (d) Diamond formed under more pressure than graphite. (e) Diamond is harder than graphite.
24. Which of the following is *not* true about NaCl? (a) It has ionic bonds. (b) It can be identified by taste. (c) It has a cubic crystal form. (d) It has a metallic luster. (e) It is softer than quartz.

25. Silicon and oxygen together account for 74.3% by weight of elements in the crust. Which of the following minerals is made entirely of silicon and oxygen? (a) calcite (b) diamond (c) mica (d) quartz (e) table salt
26. Which of the following types of silicate structures allows the most iron and magnesium into a mineral? (a) independent tetrahedra (b) single chains (c) double chains (d) sheet structures (e) 3-dimensional framework
27. A mineral with which of the following type of silicate structures is likely to be dark and dense? (a) independent tetrahedra (b) single chains (c) double chains (d) sheet structures (e) 3-dimensional framework
28. Which of the following is the biggest difference in causing the difference crystal sizes in rhyolite and granite? (a) amount of iron and magnesium (b) amount of silica (c) cooling rate (d) dissolved gases
29. Which of the following is likely to have formed from magma with the highest temperature of crystallization? (a) andesite (b) basalt (c) rhyolite (d) a, b, and c all crystallize at the same temperature
30. When comparing basalt and granite, which of the following is true? (a) The basalt has more magnesium and iron than the granite. (b) The granite has a higher melting point than the basalt. (c) The minerals forming them have the same types of bonds. (d) They cooled at similar rates. (e) They formed from magmas with the same viscosity.
31. Which of the following rocks is compositionally the same as an andesite? (a) diorite (b) gabbro (c) granite (d) limestone
32. (T/F) Through magmatic differentiation, a magma can yield both mafic and felsic rocks.
33. A xenophobe is someone who hates foreigners. A xenolith is (a) a foreign lithographer (b) part of a continent rifted off from the mainland, such as is happening to the Arabian Peninsula as it rifts away from Africa. (c) a piece of host rock incorporated into a magma body (d) someone who likes foreigners
34. Which of the following processes does *not* contribute to the generation of magma? (a) a decrease in heat (b) a decrease pressure (c) the introduction of volatiles (e.g. water) (d) natural radioactivity
35. Which of the following rocks is most likely to be found at the surface above a subduction zone? (a) andesite (b) diorite (c) granite (d) rhyolite
36. Which of the following is *not* true about the eruption of Mount St. Helens? (a) ash was widespread throughout the region (b) the eruption was predicted (c) a geologist died while observing it (d) lava flows filled nearby lakes (e) mudflows traveled for miles from the eruption site
37. (T/F) Hydrothermal solutions, often associated with igneous processes, often are often rich in metals.
38. (T/F) Lava plateaus are usually formed from which of the following types of material? (a) andesite (b) basalt (c) pyroclastics (d) rhyolite (e) none of the above

39. (T/F) Ash, dust, and pumice are all examples of pyroclastic materials.
40. (T/F) The most viscous magma is that with the highest silica content, all other factors remaining constant.
41. (T/F) Shield volcanoes most likely consist of basalt.
42. Which of the following is *not* true about composite cones? (a) they are formed from alternating flows and pyroclastics (b) they are formed from andesitic magma (c) they have steeper sides than shield volcanoes (d) they usually form at mantle hot spots (e) they usually have a central vent

From the slides:

43. The rocks back of the falls that I will point to are all of the following **except** (a) columnar basalt (b) mafic (c) more resistant to eroding than the rocks beneath them (d) the result of an eruption at a subduction zone
44. All of the following describe the rock shown *except* (a) extrusive (b) felsic (c) formed from magma with a high temperature of crystallization (d) rhyolite
45. The rock in this slide differs from the one on the previous slide in terms of (a) composition (b) cooling rate (c) melting point (d) silica content
46. (T/F) The rock shown is formed from a single crystal.
47. The feature I will point to represents (a) a continental arc (b) an island arc (c) the point where an oceanic plate subducts under a continental plate (d) a transform fault
48. The lava shown is all of the following *except* (a) aa (b) basaltic (c) hot (>1000 degrees C) (d) low viscosity (e) mafic
49. The feature I will point to represents melting due to all of the following *except* (a) area of increased radioactive decay (b) felsic sediment atop the oceanic plate from off of the continent (c) high water content in the top of the oceanic plate (d) increased temperature with depth
50. The chain of islands shown represents (a) an incipient oceanic rift (b) an island arc (c) the location of a mid-oceanic ridge (d) the passage of an oceanic plate over a mantle hotspot