

Five-digit ID# _____ Section # _____

GEOL 101 (Sect. 501-509)
Dr. Grossman

Spring, 2002

TEST 1A

INSTRUCTIONS--Print your 5-digit ID#, and SECTION # on this question sheet. Print LAST NAME and initials in the proper blanks of the answer sheet. Enter your ID# on the answer sheet by shading in the correct boxes. Once you are seated, you are not permitted to leave your seat until you have completed your exam.

A. MULTIPLE CHOICE. Select the best answer (2 points each).

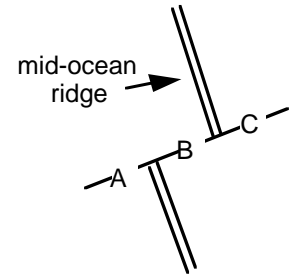
1. A scientist develops an explanation for observed data. This explanation is then subjected to testing to see if it always holds true. The explanation is called a(n) a) observation, b) theory, c) hypothesis, d) paradigm, e) none of the above.
2. The oldest terrestrial rocks have an age of about a) 4.5 billion years, b) 3.8 billion years c) 2.5 billion years, d) 540 million years, e) 250 million years.
3. The "Father of Modern Geology" is a) James Hutton, b) Aristotle, c) Dudley Hughes, d) Harry Hess, e) Alfred Wegener.
4. All of the planets listed are composed of rock EXCEPT a) Mercury, b) Venus, c) Earth, d) Mars, e) Jupiter.
5. Earth's mantle is composed of a) liquid Fe, b) solid Fe, c) granitic rock, d) Fe- and Mg-rich silicate minerals.
6. If you were studying photographs collected from satellites of other planets such as Mars, what geologic features would you look for to determine whether the planet has been tectonically active in the past? a) deep trenches, b) mountain ranges, c) volcanoes and lava flows, d) rift valleys, e) all of the above
7. The principle that states that the features of the Earth formed from a short-lived disastrous event or series of events no longer taking place today is called a) evolution, b) catastrophism, c) uniformitarianism, d) temporal superposition, e) none of the above.
8. The flattest place on the Earth's surface is the a) Texas High Plains, b) coastal plain, c) continental shelf, d) abyssal plain, e) continental rise.
9. The lithosphere is a) the rigid outer layer of the Earth (roughly 75 to 125 km thick), b) the layer of weak, plastic rock extending from a depth of about 100 km to 660 km beneath the Earth's surface, c) completely contained within the mantle, d) another name for the crust.
10. Shields are a) the nucleus of continents, b) composed of Precambrian rocks, c) often made of mountain belts that have been worn flat, d) comprised pieces of ancient continents, e) all of the above.
11. Ocean crust 5 km from a mid-ocean ridge is 100,000 years old. What is the half-spreading rate of the ridge? (1 km = 100,000 cm) a) 0.2 cm/year, b) 0.5 cm/year, c) 1 cm/year, d) 2 cm/year, e) 5 cm/year

Work area:

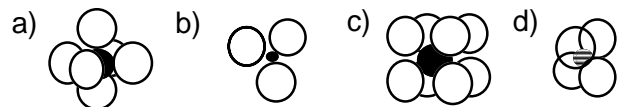
12. Which of the following geologic observations was (were) **NOT** used by Alfred Wegener to support his hypothesis of continental drift? a) same fossils found in South America and Africa, b) fit of the continents, c) polar wandering curves, d) the presence of Appalachian-type mountain belts on both sides of the Atlantic Ocean, e) tropical features like Paleozoic coral reefs, indicative of warm climates, presently at high latitudes.

13. There are about _____ MAJOR plates covering Earth? a) 4, b) 8, c) 20, d) 35.

14. At right is illustrated a mid-ocean ridge (double lines) and transform system in map view. Which segment of the single line is the transform fault? a) A; b) B; c) C; d) A and C; e) A, B, and C.

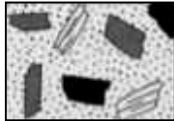


15. All of the following are direct evidence for seafloor spreading EXCEPT a) age of ocean crust increases away from the mid-ocean ridges, b) pattern of magnetic anomalies in ocean crust is symmetrical on either side of the mid-ocean ridge, c) flat-topped seamounts with coral reefs occur at 2000 m depth, d) the declination of the earth's magnetic field varies with time.
16. An example of a continent-continent convergent boundary is a) the Cascade Range, b) the Philippine Islands, c) the Himalayan Mountains, d) the Hawaiian Islands, e) Iceland.
17. What is the approximate age of the oldest ocean crust presently in the ocean? a) 100 million years, b) 200 million years, c) 540 million years, d) 2.5 billion years, e) 3.8 billion years.
18. The four most common elements in the WHOLE EARTH, listed from most to least abundant, are a) Fe, O, Si, Mg; b) Fe, Si, O, Ca; c) Si, O, Mg, Al; d) O, Si, Al, Fe.
19. Below are several structures (black = positive ion, white = negative ion). Which structure represents a coordination number of six?



20. Which of the following minerals has ionic bonds? a) quartz, b) halite, c) graphite, d) diamond, e) none of the above.
21. All of the following are true about crystals EXCEPT: a) size depends on time allowed for growth; b) atoms, ions, or molecules are arranged in a repeating pattern; c) will form smooth crystal faces if not impeded; d) width of crystal faces constant; e) angles between crystal faces constant.
22. All of the following are common rock-forming minerals EXCEPT a) pyroxene, b) garnet, c) olivine, d) feldspar, e) quartz.
23. The most common mineral in the earth's crust is a) mica, b) quartz, c) feldspar, d) hornblende, e) olivine.

24. In general, rocks are classified by texture, mineralogy, and
a) origin, b) specific gravity, c) color, d) luster.
25. As magma begins to crystallize, the first minerals to crystallize are a) rich in SiO₂ and poor in Fe and Mg, b) rich in SiO₂ and Fe and Mg, c) poor in SiO₂ and Fe and Mg, d) poor in SiO₂ and rich in Fe and Mg.
26. All of the following cause rocks to melt EXCEPT a) increase in temperature, b) addition of water, c) increase in pressure.
27. Which of the following are in the order of crystallization of Bowen's Reaction Series? **a)** olivine, pyroxene, amphibole; **b)** olivine, biotite, pyroxene; **c)** pyroxene, amphibole, olivine; **d)** Na-plagioclase, Ca-plagioclase; **e)** pyroxene, biotite, olivine.
28. The Earth's geothermal gradient averages about a) 3°C per km, b) 30°C per km, c) 100°C per km, d) 300°C per km, e) 1000°C per km.



29. The igneous texture at right is called
a) phaneritic, b) neritic, c) phanerozoic, d) porphyritic, e) none of the above.
30. Magmatic differentiation occurs a) when crystals are separated from the magma, b) when crystals continually reequilibrate with the magma.
31. Phaneritic rocks develop when a) parent rock is partially melted, b) rocks undergo fractional crystallization, c) magma cools slowly, d) magma cools quickly.
32. Partial melting of mantle material results in the formation of a) transform faults, b) ocean crust, c) continental crust, d) diorite, e) lithosphere.

B. TRUE-FALSE. Mark "A" for true, "B" for false (2 points each)

33. Slow spreading mid-ocean ridges (MORs) have a higher profile than fast spreading MORs, and thus displace more ocean water.
34. Ocean crust is much younger on average than continental crust.
35. Glass is a mineral.
36. One ion can substitute for another if they are similar in size and charge.

C. MATCHING. Choose the best association. Letters may be used more than once (1 point each).

- Match the characteristic with the plate boundary.
37. Deep-sea trench a. divergent
38. New plate being formed b. convergent
39. Aleutian Islands c. transform
40. Mid-Atlantic Ridge d. all of the above
41. San Andreas fault
42. East-African Rift
43. Earthquakes

- Match the mineral with the mineral class.
44. hornblende (amphibole) a) silicate
45. hematite b) carbonate
46. dolomite c) sulfide
d) oxide
e) halide

- Match the mineral with the silicate structure.
47. pyroxene a) framework (3-D)
48. olivine b) double chain
49. feldspar c) isolated ("single")
d) sheet
e) single chain

- Match the rock with the texture and mineral composition.
50. aphanitic; plagioclase, amphibole; minor pyroxene; little or no quartz a) basalt
51. phaneritic; quartz, plagioclase more abundant than K-feldspar; minor mica and amphibole b) peridotite
52. glass c) andesite
53. phaneritic; mostly pyroxene and olivine d) obsidian
e) granodiorite

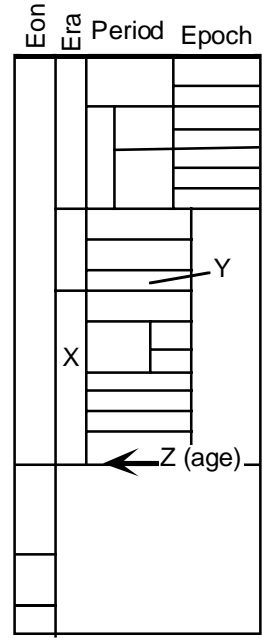
- Match the characteristic with the type of magma.
54. crystallizes at higher temperature a) mafic
55. produces basalts and gabbros b) felsic
56. more viscous
57. rich in silica

D. FILL-INS. On the lines provided on **this question sheet**, place the word or words, which best completes the sentence or provides the information needed. (each space 1.5 points each except where noted).

1. Evidence for the internal structure of Earth comes from _____
and _____.

2. Instructions: Fill in the era, period, and age as requested 2

- X. _____
Y. _____
Z. _____ million years



Extra Credit (2 points): What is the name of the volcano that erupted in the Congo (Zaire)?
