

DO NOT WRITE ON THIS EXAM – ONLY WRITE ON THE ANSWER SHEET!

Multiple Choice Questions (20 points) – for each question, please choose the best answer and circle your answer on the answer sheet (**do not write on this exam**). One point each.

1. If a radioactive element has a half-life of 16 million years, what fraction of the original amount of parent material will remain after 96 million years?
 - A. 1/2
 - B. 1/16
 - C. 1/32
 - D. 1/4
 - E. 1/64
2. Because of the heat and pressure exerted during metamorphism, daughter atoms were driven out of a mineral being analyzed for a radiometric date. The date obtained will therefore be _____ the actual age of the formation.
 - A. younger than
 - B. older than
 - C. that same as
 - D. can't be determined
 - E. none of the previous answers
3. Placing geologic events in sequential or chronological order as determined by their position in the geologic record is:
 - A. absolute dating
 - B. correlation
 - C. historical dating
 - D. relative dating
 - E. uniformitarianism
4. If a flake of biotite within a sedimentary rock (such as a sandstone) is radiometrically dated, the date obtained indicates when:
 - A. the biotite crystal formed
 - B. the sedimentary rock formed
 - C. the parent radioactive isotope formed
 - D. the daughter isotope(s) formed
 - E. none of the previous answers
5. The atomic number of an element is determined by the number of:
 - A. protons
 - B. neutrons
 - C. electrons
 - D. protons and neutrons
 - E. protons and electrons
6. Who is generally considered the father of modern geology?
 - A. Werner
 - B. Lyell
 - C. Steno
 - D. Cuvier
 - E. Hutton

7. The most commonly used time-stratigraphic unit is the:

- A. system
- B. period
- C. epoch
- D. member
- E. formation

8. According to the principle of fossil (faunal) succession:

- A. a dike is older than the sedimentary rock it cuts through
- B. time-stratigraphic units are defined by rock type
- C. fossil assemblages succeed one another in a regular and predictable order
- D. a marine regression takes place when the sea rises and invades a continent
- E. the geologic column and time scale are based on the theory of evolution

9. The principle of inclusion holds that:

- A. all aspects of the fossil record are important to deciphering Earth history
- B. Walter's law applies on to conformable sequences of strata
- C. fragments in a layer of rock are older than the layer itself
- D. an eon is made up of two or more eras
- E. concurrent range zones are useful in time-stratigraphic correlation

10. The geologic time column and relative geologic time scale were established by the 1840s based on:

- A. the theory of evolution
- B. the principle of unconformities
- C. superposition and faunal succession
- D. lithostratigraphic biozones
- E. the rate of radioactive decay

11. Which of the following is a trace fossil

- A. clam shell
- B. dinosaur bone
- C. worm burrow
- D. disconformity
- E. biozone

12. Which one of the following statements is not correct?

- A. Among other things, a guide fossil must be geographically widespread
- B. An era consists of two or more periods
- C. Biozone boundaries do not necessarily coincide with lithostratigraphic boundaries
- D. Most fossils are found in igneous and metamorphic rocks
- E. Offshore facies are superposed on the nearshore facies during a marine transgression

13. Braided stream deposit mostly

- A. sheets of sand and gravel
- B. evaporites
- C. turbidity current sequence
- D. limestone and pelagic ooze
- E. submarine fans

14. Deltas form where

- A. the shells of microscopic organisms settle from suspension

- B. rivers and streams spread across their floodplains
- C. glaciers deposit till and outwash
- D. sediment is transported through submarine canyons
- E. a fluvial system flows into a standing body of water

15. The process whereby organisms burrow through and thoroughly mix sediment is:

- A. lithification
- B. sedimentation
- C. bioturbation
- D. sorting
- E. rounding

16. Which one of the following is not a sedimentary structure?

- A. Outwash
- B. Ripple mark
- C. Mud crack
- D. Cross-bed
- E. Lamination

17. Which of the following statements is correct?

- A. Rounding refers to how nearly spherical sedimentary grains are
- B. The sand in desert dunes is poorly sorted
- C. The deep seafloor is covered by sand and gravel
- D. Cross-beds are good indicators of ancient current directions
- E. Limestone made of broken shells is called micrite

18. A sand body with a blanket geometry that has large-scale cross beds, wave-formed ripple marks, and bioturbation probably was deposited on(in):

- A. a braided stream system
- B. desert dunes
- C. inner continental shelf
- D. barrier island complex
- E. submarine fans

19. The alternating dark- and light-colored laminations that form in glacial lakes are:

- A. graded beds
- B. current ripples
- C. tidal flat muds
- D. varves
- E. tills

20. Geologists use the principle of superposition to determine:

- A. how long ago a fossil organism lived
- B. the duration of a marine regression
- C. absolute ages for geologic events
- D. whether fossil remains have been altered
- E. the relative ages of rocks in a vertical sequence

Essay Question (10 points) - please write your essay on the back of your answer sheet (**do not write on this exam**).

In a short essay explain all of the processes necessary to form sandstone (a clastic sedimentary rock) composed of well-rounded, well-sorted quartz sand and containing fossils from a shallow marine environment.

The essay must be an essay, not a list of sentences. Your essay will be graded based on content, syntax, grammar and spelling. You will lose points if I cannot understand what you have written.

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