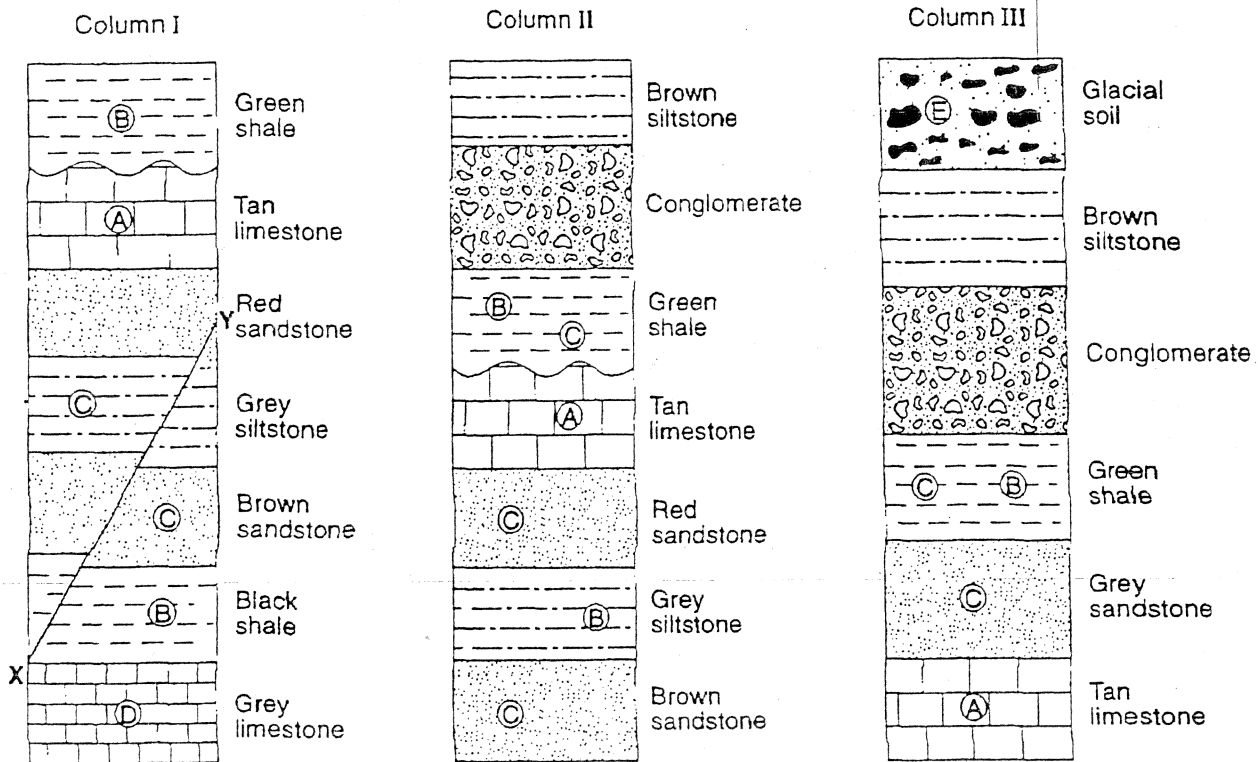


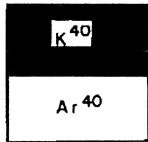
Base your answers to questions 1 through 5 on the diagram below which shows three geologic columns representing widely separated rock outcrops. Letters *A* through *E* represent fossils found in the outcrops. Line *XY* represents a fault in column I. The layers have not been overturned.

Rock Outcrops



- What is the oldest layer shown?
 (1) glacial soil (2) brown sandstone (3) tan limestone (4) grey limestone
- When did fault *XY*, located in column I, most likely occur?
 (1) before the formation of the grey limestone (3) during the formation of the black shale
 (2) during the formation of the grey siltstone (4) after the formation of the red sandstone
- Which rock would most likely be produced by the metamorphism of the grey limestone?
 (1) quartzite (2) slate (3) marble (4) gneiss
- The wavy line located between the green shale and the tan limestone layers in columns I and II most likely represents
 (1) contact metamorphism (2) a volcanic ash layer (3) a buried erosional surface (4) an igneous intrusion
- Fossil *A*, in the tan limestone layer, is a fossil of the first known coral. This tan limestone layer was most likely deposited during which geologic time interval?
 (1) Precambrian (2) Paleozoic (3) Mesozoic (4) Cenozoic

7. If a radioactive material were cut into pieces, the half-life of each piece would be
- 1) less than the original specimen's half-life
 - 2) greater than the original specimen's half-life
 - 3) the same as the original specimen's half-life
8. The element K^{40} radioactively decays to Ar^{40} . The diagram below shows a model of the relative amounts of K^{40} and Ar^{40} remaining after one half-life. Which diagram best illustrates the relative amounts of K^{40} and Ar^{40} remaining after two half-lives?



- 1) 2) 3) 4)

9. Base your answer on the diagram below which represents a cube of radioactive material (figure A) cut into eight identical cubes (figure B).

FIGURE A

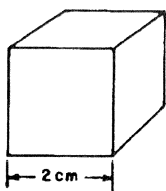
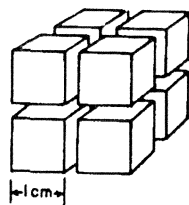


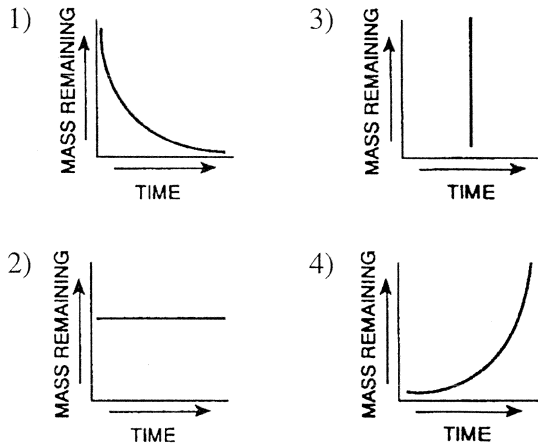
FIGURE B



Compared to the half-life of the material in figure A, the half-life of the material in each small cube in figure B is

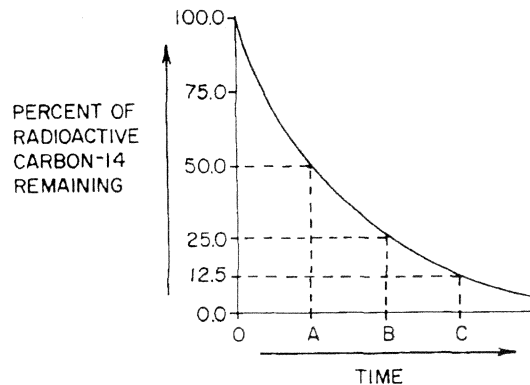
- 1) 1/8 as long
 - 2) 1/64 as long
 - 3) 8 times longer
 - 4) the same
10. Which element is used by Earth scientists for radioactive dating of rocks?
- 1) potassium-40
 - 2) plutonium-244
 - 3) silicon-28
 - 4) cobalt-60

11. Which graph best represents the relationship between the remaining mass of a radioactive element and time?



12. Radioactive elements can be used for dating rocks because the disintegration rate of radioactive elements

- 1) is not affected by the environment
 - 2) can be controlled by scientists
 - 3) is linked to the Earth's motions
 - 4) can increase with time
13. An archeologist found an ancient skeleton estimated to be 10,000 to 25,000 years old. Which radioactive isotope would be most useful for finding the age of the skeleton?
- 1) rubidium-87
 - 2) potassium-40
 - 3) carbon-14
 - 4) uranium-238
14. The graph below shows the percent remaining (not decayed) of the original amount of carbon-14 at different times (A, B, and C) during radioactive decay. How many half-lives of time are represented by point B along the time axis?



- 1) 1 half-life
- 2) 2 half-lives
- 3) 3 half-lives
- 4) 4 half-lives