1. Base your answer to the following question on The diagram below represents a part of the crystal structure of the mineral kaolinite.

An arrangement of atoms such as the one shown in the diagram determines a mineral’s

A) age of formation  
B) infiltration rate  
C) physical properties  
D) temperature of formation

2. The diagram below represents a basic atomic structure that forms when oxygen and silicon unite.

This structure is called a

A) tetrahedron  
B) cube  
C) sphere  
D) cylinder

3. Which diagram best represents the silicon-oxygen tetrahedron of which talc, feldspar, and quartz are composed?

4. Base your answer to the following question on the diagram below which shows the elements found in four minerals.

<table>
<thead>
<tr>
<th>Mineral</th>
<th>O</th>
<th>Si</th>
<th>Al</th>
<th>Fe</th>
<th>Ca</th>
<th>Na</th>
<th>K</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feldspar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olivine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diamond</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Which of the four minerals shown is not a silicate mineral?

A) quartz  
B) olivine  
C) feldspar  
D) diamond

5. Which mineral bubbles when acid is placed on it?

A) Calcite  
B) Pyroxene  
C) Potassium Feldspar  
D) Garnet

6. Which sedimentary rock most likely formed as an evaporite?

A) siltstone  
B) conglomerate  
C) gypsum  
D) shale
Before the student can select either path (a) or path (b) at choice 1, the student must make a decision about:

A) mineral composition  
B) crystal size  
C) the temperature at which rocks form  
D) the appearance of the rock grains
8. Base your answer to the following question on the rock sample shown below.

The rounded pebbles of this rock have been cemented together to form

A) granite, an igneous rock
B) **conglomerate, a sedimentary rock**
C) siltstone, a sedimentary rock
D) Weiss, a metamorphic rock
9. Base your answer to the following question on the maps below, which show changes in the distribution of land and water in the Mediterranean Sea region that scientists believe took place over a period of 6 million years.

Which type of rock was precipitated from seawater as the Mediterranean Sea evaporated between 6 million years ago and 5.5 million years ago?

A) rock salt
B) basalt
C) sandstone
D) metaconglomerate

10. Which process could lead most directly to the formation of a sedimentary rock?

A) metamorphism of unmelted material
B) slow solidification of molten material
C) sudden upwelling of lava at a mid-ocean ridge
D) precipitation of minerals from evaporating water

11. Limestone, gypsum, and salt are rocks formed by the processes of

A) melting and solidification
B) evaporation and precipitation
C) erosion and deposition
D) weathering and metamorphism
12. Base your answer to the following question on the map and cross section below. The shaded areas on the map represent regions of the United States that have evaporite rock layers (layers of rock formed from the evaporation of seawater) under the surface bedrock. The cross section shows the generalized structure of the area in which the evaporite layers are found in New York State.

Each of these evaporite rocks is normally formed by

A) chemical processes  
B) cooling of lava  
C) decreased heat and pressure  
D) melting of magma

13. The fossil below was found in surface bedrock in the eastern United States.

Which statement best describes the formation of the rock containing this fossil?

A) The rock was formed by the metamorphism of sedimentary rock deposited in a terrestrial environment during the Cretaceous Period.  
B) The rock was formed by the compaction and cementation of sediments deposited in a terrestrial environment during the Triassic Period.  
C) The rock was formed by the compaction and cementation of sediments deposited in a marine environment during the Cambrian Period.  
D) The rock was formed from the solidification of magma in a marine environment during the Triassic Period.

14. Most of the sediment that is compacted and later forms shale bedrock is

A) clay  
B) silt  
C) sand  
D) pebbles
15. Base your answer to the following question on The diagram below shows three stages in the formation of a specific rock.

Stage 1
- Remains of partially decayed plants

Stage 2
- Burial produces pressure from overlying sediments.

Stage 3
- Further burial creates more pressure.

Which rock is formed as a result of these three stages?

A) limestone  
B) gneiss  
C) schist  
D) coal

16. The geologic cross section below shows several rock units of Earth’s crust. Some rock units are labeled A through E.

![Geologic cross section diagram]

Which two rock units formed from sediments deposited in horizontal layers?

A) A and B  
B) B and C  
C) C and D  
D) D and E

17. Which rock is made up of angular fragments of rock held together by a natural cement?

A) breccia  
B) scoria  
C) granite  
D) quartzite
18. Base your answer to the following question on the diagram below shows four magnified block-shaped sandstone samples labeled A, B, C, and D. Each sandstone sample contains quartz grains of different shapes and sizes. The quartz grains are held together by hematite cement.

In which sample did the quartz grains undergo the most abrasion during erosional transport?

A) A  B) B  C) C  D) D

19. Which material would most easily be carried in suspension by a slow-moving stream?

A) clay  B) silt  C) sand  D) gravel

20. The diagram below represents a geologic cross section of a location in Texas where an oil well has been drilled into the bedrock.

Oil, water, and natural gas can collect and stay in the sandstone layer because sandstone often

A) has a grain size ranging from fine to coarse (0.006 to 0.2 cm)
B) is composed mainly of grains of quartz
C) contains air spaces, making it porous and permeable
D) metamorphoses to quartzite

21. A rock that forms directly from land-derived sediments is

A) sandstone  B) dolostone
C) gabbro  D) granite

22. Particles of which size could have formed shale?

A) 0.2 cm  B) 0.02 cm
C) 0.002 cm  D) 0.0002 cm

23. Which land-derived sedimentary rock could have formed by the compaction and cementation of particles smaller than 0.0003 centimeter in diameter?

A) shale  B) siltstone
C) sandstone  D) limestone
24. Base your answer to the following question on diagram below, which shows the inferred internal structure of the four terrestrial planets, drawn to scale.

![Diagram of internal structure of terrestrial planets]

How are the crusts of Mars, Mercury, Venus, and Earth similar in composition?

25. Base your answer to the following question on the information below.

**Howe Caverns**

Many scientists believe that the formation of the rocks in which Howe Caverns is now found began millions of years ago. At that time, an ocean covered the eastern region of New York State. Hundreds of feet of calcium carbonate (CaCO₃) sediments were deposited in layers along the edge of this ocean. These layers eventually formed the sedimentary rock limestone, which makes up the walls of today’s Howe Caverns.

Much later, tectonic forces raised this region of New York State above sea level exposing the rock to weathering and erosion. These tectonic forces cracked the thick limestone, creating pathways for groundwater to infiltrate and gradually increase the size of the cracks. Eventually some of the larger cracks provided pathways for the underground stream, which carved the winding passages of Howe Caverns seen today.

Identify one method that could be used to determine that the walls of Howe Caverns are made of limestone.
26. Base your answer to the following question on the diagram and information below.

The diagram shows a cross section of a portion of Earth's crust that has undergone geological processes. Overturning of rock layers has not occurred. Point $A$ represents one location of metamorphic rock.

State the name of the inorganic sedimentary rock shown in the cross section that is composed of sediment with the greatest range in particle size.
Answer Key
Rocks I - Sedimentary

1. C
2. A
3. D
4. D
5. A
6. C
7. D
8. B
9. A
10. D
11. B
12. A
13. C
14. A
15. D
16. A
17. A
18. B
19. A
20. C
21. A
22. D
23. A
24. *Examples:* – The crusts have a silicate composition. – The crusts contain the elements oxygen and silicon.
25. – Acid test – Limestone bubbles when acid is placed on it.
26. conglomerate