1. Which characteristic of nonsedimentary rocks would provide the least evidence about the environment in which the rocks were formed?

A) structure  
B) **color**  
C) crystal size  
D) mineral composition

2. Which statement about the formation of a rock is best supported by the rock cycle?

A) Magma must be weathered before it can change to metamorphic rock.  
B) **Sediment must be compacted and cemented before it can change to sedimentary rock.**  
C) Sedimentary rock must melt before it can change to metamorphic rock.  
D) Metamorphic rock must melt before it can change to sedimentary rock.

3. Which type(s) of rock can be the source of deposited sediments?

A) igneous and metamorphic rocks, only  
B) metamorphic and sedimentary rocks, only  
C) sedimentary rocks, only  
D) **igneous, metamorphic, and sedimentary rocks**

4. Which diagram best represents a sample of the metamorphic rock gneiss? [Diagrams show actual size.]

A)  
B)  
C)  
D)
5. The diagram below represents the intensity of the shaking that occurs on different Earth surfaces during the same earthquake.

![Intensity of Shaking of Earth Surfaces](image)

The greatest earthquake hazard to homes exists when they are built on

A) hard igneous rock  
B) sedimentary rock  
C) coarse sediments  
D) silt and mud

6. Base your answer to the following question on the cross section below. Rock units are labeled 1 through 8. The line between A and A' indicates an unconformity.

![Cross Section](image)

Which characteristic of the granite intrusion provides the most evidence that it solidified deep underground?

A) very hard  
B) coarse texture  
C) light color  
D) felsic composition
7. The diagram below represents a rock consisting of granite pebbles and sand grains cemented together.

![Diagram of granite pebbles and sand grains cemented together.]

How does the age of the granite pebbles compare to the age of the rock itself?

A) The pebbles are younger than the rock.

**B) The pebbles are older than the rock.**

C) The pebbles are the same age as the rock.

D) The relative age of the pebbles cannot be determined.

8. The diagram below represents a sedimentary rock composed of pebbles and sand.

![Diagram of cracks and pebbles in a sedimentary rock.]

Which statement most accurately compares the ages of the cracks and pebbles to the age of the sedimentary rock in which they are found?

A) The cracks and pebbles are both younger than the sedimentary rock.

B) The cracks and pebbles are both older than the sedimentary rock.

**C) The cracks are younger and the pebbles are older than the sedimentary rock.**

D) The cracks are older and the pebbles are younger than the sedimentary rock.
9. The arrows in the block diagram below represent forces forming mountains in a region of Earth's lithosphere.

Metamorphic rocks that formed from these forces are represented by which lettered box in the flowchart?

A) A  B) B  C) E  D) F

10. Which lettered box could represent the rock conglomerate?

A) E  B) G  C) C  D) D
11. Rocks can be classified as sedimentary, igneous, or metamorphic based primarily upon differences in their
   A) color  B) density
   C) origin  D) age

12. The table below lists some information about the minerals graphite and diamond.

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Composition</th>
<th>Depth of Formation</th>
<th>Hardness</th>
<th>Electrical Conductor</th>
</tr>
</thead>
<tbody>
<tr>
<td>graphite</td>
<td>carbon</td>
<td>shallow</td>
<td>1</td>
<td>good</td>
</tr>
<tr>
<td>diamond</td>
<td>carbon</td>
<td>very deep</td>
<td>10</td>
<td>poor</td>
</tr>
</tbody>
</table>

Some properties of diamond are different from those of graphite because diamond
   A) has a different arrangement of atoms  B) forms larger crystals
   C) has a different composition  D) is older in geologic age

13. One difference between a breccia rock and a conglomerate rock is that the particles in a breccia rock are
   A) more aligned  B) more angular
   C) harder  D) land derived

14. The diagram below shows a sample of conglomerate rock.

15. The diagram below shows a rock with deformed structure and intergrown crystals.

The rock was probably formed by
   A) sediments that were deposited on the ocean floor
   B) heat and pressure that changed a preexisting rock
   C) volcanic lava that cooled on Earth's surface
   D) a meteor impact on Earth's surface

The oldest part of this sample is the
   A) conglomerate rock sample
   B) calcite cement
   C) limestone particles
   D) mineral vein
16. The graph below shows the depth and temperature conditions in Earth's interior under which carbon becomes either the mineral graphite or the mineral diamond.

Compared to the depth and temperature conditions under which graphite forms, describe the difference in the relative depth and relative temperature conditions under which most diamonds form.

17. Which characteristic of an igneous rock would provide the most information about the environment in which the rock solidified?

A) color  
B) texture  
C) hardness  
D) streak

18. The main difference between sedimentary and nonsedimentary rocks is the

A) means by which they are located  
B) conditions under which they are formed  
C) minerals of which they are composed  
D) locations in which they are found

19. The diagram below represents a layer of sandstone containing a vein of calcite and a crack labeled XY.

Which is oldest?

A) the calcite vein  
B) the crack labeled XY  
C) the sandstone layer  
D) the individual sand grains in the rock
20. What do all four rock samples have in common?

A) They show cleavage.
B) **They contain minerals.**
C) They are organically formed.
D) They formed on Earth’s surface.

21. Which rock is metamorphic and shows evidence of foliation?

A) 1  B) 2  C) 3  D) 4
22. Base your answer to the following question on the cross sections of three rock outcrops, $A$, $B$, and $C$. Line $XY$ represents a fault. Overturning has not occurred in the rock outcrops.

Which processes were primarily responsible for the formation of most of the rock in outcrop $A$?

A) melting and solidification  
B) heating and compression  
C) **compaction and cementation**  
D) weathering and erosion

23. Rocks are classified as igneous, sedimentary, or metamorphic based primarily on their

A) texture  
B) crystal or grain size  
C) **method of formation**  
D) mineral composition
24. The diagram below represents geological processes that act continuously on Earth to form different rock types.

Which table correctly classifies each rock type?

A) 

<table>
<thead>
<tr>
<th>Rock Type</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>sedimentary</td>
</tr>
<tr>
<td>2</td>
<td>intrusive</td>
</tr>
<tr>
<td>3</td>
<td>igneous</td>
</tr>
</tbody>
</table>

B) 

<table>
<thead>
<tr>
<th>Rock Type</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>sedimentary</td>
</tr>
<tr>
<td>2</td>
<td>intrusive</td>
</tr>
<tr>
<td>3</td>
<td>metamorphic</td>
</tr>
</tbody>
</table>

C) 

<table>
<thead>
<tr>
<th>Rock Type</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>intrusive</td>
</tr>
<tr>
<td>2</td>
<td>intrusive</td>
</tr>
<tr>
<td>3</td>
<td>sedimentary</td>
</tr>
</tbody>
</table>

D) 

<table>
<thead>
<tr>
<th>Rock Type</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>intrusive</td>
</tr>
<tr>
<td>2</td>
<td>intrusive</td>
</tr>
<tr>
<td>3</td>
<td>sedimentary</td>
</tr>
</tbody>
</table>
25. Base your answer to the following question on the geologic cross section of bedrock shown below. A through G identify rock layers and Q represents a fault. Lines W, X, Y, and Z are locations of unconformities. The rocks have not been overturned.

Which rock or feature is oldest?

A) rock A
B) rock G
C) fault Q
D) unconformity Z
26. Base your answer to the following question on the block diagrams of four rock outcrops, A, B, C, and D, located within 15 kilometers of each other. The rock layers have not been overturned.

![Outcrop Diagrams]

By which process was the quartzite formed?

A) deposition of clastic sediment
B) precipitation from seawater
C) metamorphism of sandstone
D) cementation of shells

27. Which diagram below shows an area in which fine-grained igneous rocks are most likely to be found?

A) 
B) 
C) 
D) 

28. A sedimentary rock consists of grains of sand cemented together. What is the relative age of the sand grains?

A) younger than the rock
B) older than the rock
C) the same age as the rock

29. Which igneous rock has a vesicular texture and a felsic composition?

A) pumice
B) basalt
C) granite
D) scoria
Identify the oldest bedrock shown in the diagram.
31. Base your answer to the following question on the chart below, which shows the changing climatic conditions that led to alternating glacial and interglacial periods.

The interglacial stages were most likely caused by

A) The interglacial stages were most likely caused by
B) an increase in average worldwide temperature
C) crustal plate movement
D) a large increase in the amount of snowfall

32. How would the age of sandstone fragments found in a conglomerate rock compare with the age of the conglomerate rock?

A) The sandstone fragments are younger than the conglomerate rock.
B) The sandstone fragments are older than the conglomerate rock.
C) The sandstone fragments and the conglomerate rock are the same age.
D) The sandstone fragments may be either younger or older than the conglomerate rock.
At choice 2, the student should generally select path (a) if the student observes

A) a random arrangement of mineral crystals
B) distorted structure and crystal alignment
C) bands of mineral crystals
D) layers of same-sized crystals
34. Base your answer to the following question on the photograph and cross section below and on your knowledge of Earth science. The sequence of rock types found in the walls of the Grand Canyon are shown. The names of rock formations are shown and the upper and lower boundaries of each formation are indicated by dashed lines. The rock layers have not been overturned.

If the Vishnu schist had been exposed to greater heat and pressure during metamorphism, it could have formed

A) gneiss  B) marble  C) quartzite  D) phyllite

35. The diagram below represents a sample of a rock.

This rock would be classified as metamorphic because it shows

A) distorted banding  B) an organic composition  C) a mixture of minerals  D) crystals from precipitation

36. Which diagram represents a landscape where fine-grained igneous bedrock is most likely to be found?

A)  
B)  
C)  
D)  

37. Most of the sand that makes up the sandstone found in New York State was originally deposited in which type of layers?

A) tilted  B) horizontal  C) faulted  D) folded
38. Which characteristic provides the best evidence about the environment in which a rock was formed?

A) the color of the rock
B) the size of the rock
C) the texture of the rock
D) the thickness of the rock