1. Which statement best explains why stars viewed from the Northern Hemisphere appear to revolve around Polaris?
   A. Polaris rotates on its axis.  
   B. Earth rotates on its axis.  
   C. Polaris revolves around Earth.  
   D. Earth revolves around Polaris.

2. The hydrosphere covers approximately what percentage of Earth’s lithosphere?
   A. 100%  
   B. 70%  
   C. 50%  
   D. 25%

3. The deflection of prevailing winds and ocean currents in the Northern Hemisphere is called
   A. eccentricity  
   B. refraction  
   C. the Coriolis effect  
   D. the Doppler effect

4. Earth’s rate of revolution is approximately
   A. 1° per day  
   B. 15° per day  
   C. 23.5° per day  
   D. 360° per day

5. Which planet has a density that is less than the density of liquid water?
   A. Mercury  
   B. Earth  
   C. Mars  
   D. Saturn

6. The diagram below represents two planets of equal mass, A and B, revolving around a star. The planets are represented at specific positions in their orbits.

   ![Diagram of two planets orbiting a star](image)

   (Not drawn to scale)

   When both planets are at the positions represented, planet B
   
   A. can be seen at night from planet A, and planet B is moving faster in its orbit  
   B. can be seen at night from planet A, and planet B is moving slower in its orbit  
   C. cannot be seen at night from planet A, and planet B is moving faster in its orbit  
   D. cannot be seen at night from planet A, and planet B is moving slower in its orbit
7. Compared to terrestrial planets, Jovian planets have
   A. smaller equatorial diameters and shorter periods of revolution  
   B. smaller equatorial diameters and longer periods of revolution  
   C. larger equatorial diameters and shorter periods of revolution  
   D. larger equatorial diameters and longer periods of revolution

8. Clouds most likely form as a result of
   A. moist air rising, compressing, and warming  
   B. moist air rising, expanding, and cooling  
   C. dry air rising, compressing, and warming  
   D. dry air rising, expanding, and cooling

9. The dewpoint is 15°C. What is the wet-bulb temperature on a sling psychrometer if the dry-bulb temperature is 18°C?
   A. 16°C  
   B. 2°C  
   C. 3°C  
   D. 20°C

10. Which weather instrument is used to measure air temperatures recorded on a weather map?
    A. anemometer  
    B. wind vane  
    C. thermometer  
    D. barometer

11. Equal areas of which type of surface will reflect the most insolation?
    A. light gray rooftop  
    B. dark tropical forest  
    C. snow-covered field  
    D. black paved road

12. Riverhead, New York, has a smaller average daily temperature range than Elmira, New York, because Riverhead is located
    A. near a large body of water  
    B. at a lower latitude  
    C. at a higher elevation  
    D. near a large city

13. Which diagram best represents the relative wave-lengths of visible light, ultraviolet energy, and infrared energy?

   A. ![Diagram A]  
   B. ![Diagram B]  
   C. ![Diagram C]  
   D. ![Diagram D]

14. The change in life-forms in the fossil record from less complex organisms to more complex organisms over time is best explained by
    A. extinction  
    B. evolution  
    C. dynamic equilibrium  
    D. original horizontality
15. Arrows in the diagram below represent the daytime flow of air over a coastal region.

![Diagram of air flow](image)

Which process primarily transfers heat by moving air?

A. conduction  
B. convection  
C. radiation  
D. transpiration

16. The graph below shows the radioactive decay of rubidium-87.

![Graph of radioactive decay](image)

What percentage of rubidium-87 atoms will be left after four half-lives?

A. 25.0%  
B. 12.5%  
C. 6.25%  
D. 3.125%

17. Which type of tectonic plate boundary is found between the South American Plate and the Scotia Plate?

A. transform  
B. convergent  
C. divergent  
D. complex or uncertain

18. The epicenter of an earthquake was located 1800 kilometers from a seismic recording station. If the S-wave arrived at the seismic station at 10:06:40 a.m., at what time did the P-wave arrive at the same seismic station?

A. 10:03:00 a.m.  
B. 10:03:40 a.m.  
C. 10:09:40 a.m.  
D. 10:10:20 a.m.

19. A strong earthquake that occurs on the ocean floor could result in the formation of

A. a tsunami  
B. a delta  
C. an El Niño event  
D. an ocean current
20. The block diagram below represents a rapid downslope flow of saturated soil and rock layers.

What are two likely causes of this rapid downslope flow?

A. groundwater and abrasion  
B. groundwater and gravity  
C. prevailing wind and abrasion  
D. prevailing wind and gravity


Which two locations have the greatest stream velocities?

A. A and B  
B. B and C  
C. C and D  
D. D and A

22. The block diagram below represents two parallel mountain ranges.

Which two geologic processes most likely created this landscape region?

A. volcanism, followed by metamorphism  
B. faulting, followed by deposition  
C. folding, followed by erosion  
D. glaciation, followed by rifting
23. Which agent of erosion most likely moves sediments in a sand dune?

A. wind  B. glaciers  C. wave action  D. running water

24. The diagrams below represent constellations seen by an observer in New York State facing south at midnight on July 7 and January 3.

Which motion causes the observer to see different constellations at midnight on July 7 compared to midnight on January 3?

A. revolution of the constellations in their orbits  B. revolution of Earth in its orbit
C. rotation of the stars in the constellations  D. rotation of Earth on its axis
25. The topographic map below shows a portion of the Cayuta Creek that is located in New York State. Points A, B, C, and D represent locations on Earth’s surface.

Which point on the map most likely represents a location within the flood plain associated with Cayuta Creek?

A. A  B. B  C. C  D. D
26. Base your answer to the following question on the cross section below and on your knowledge of Earth science. The cross section represents processes in the water cycle. Arrows represent the movement of water. Letters A, B, C, and D represent locations on Earth’s surface.

The Water Cycle

What would most likely reduce the amount of runoff at location B?

A. infiltration occurring faster than precipitation  
B. greater condensation than evaporation

C. saturated soil below the land surface  
D. a frozen land surface
The greatest amount of transpiration and evaporation will occur most likely when the air temperature is

A. low and the humidity is low  
B. low and the humidity is high  
C. high and the humidity is low  
D. high and the humidity is high
28. Base your answer to the following question on the graphs below and on your knowledge of Earth science. The graphs show air temperatures and dewpoints in °F, and wind speeds in knots (kt) from 2:00 a.m. to 11:00 p.m. at a certain New York State location.

Which station model represents the weather data for this location at 4:00 p.m.?

A. 40
   58

B. 50
   58

C. 58
   40

D. 58
   50

29. What was the relative humidity at 8:00 p.m.?

A. 30%

B. 45%

C. 75%

D. 100%
30. Base your answer to the following question on the three bedrock outcrops below and on your knowledge of Earth science. The outcrops, labeled I, II, and III, are located within 15 kilometers of each other. Lines $AB$ and $CD$ represent unconformities. Line $XY$ represents a fault. No overturning of the layers has occurred.

Which layer is the youngest?

A. gray limestone  
B. red conglomerate  
C. brown siltstone  
D. brown sandstone

31. The unconformities at $AB$ and $CD$ resulted from

A. uplift and erosion, followed by subsidence and deposition  
B. movement along a crack between two rock layers  
C. contact metamorphism between two sedimentary layers  
D. regional metamorphism of deeply buried sedimentary rocks

32. Based on evidence shown in the diagram, which rock layer is older than fault $XY$?

A. tan conglomerate  
B. black shale  
C. brown siltstone  
D. white limestone
33. Base your answer to the following question on the cross section and data table below and on your knowledge of Earth science. The cross section shows the profile of a stream that is flowing down a valley from its source. Points A through E represent locations in the stream. The data table shows the average stream velocity at each location. The volume of water in the stream remains the same at all locations.

<table>
<thead>
<tr>
<th>Location in Stream</th>
<th>Average Stream Velocity (cm/s)</th>
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<tbody>
<tr>
<td>A</td>
<td>10</td>
</tr>
<tr>
<td>B</td>
<td>110</td>
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<tr>
<td>C</td>
<td>130</td>
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<tr>
<td>D</td>
<td>20</td>
</tr>
<tr>
<td>E</td>
<td>15</td>
</tr>
</tbody>
</table>

The average stream velocity at each location is controlled primarily by the

A. elevation above sea level  B. slope of the land  C. sediment carried by the stream  D. distance from the stream’s source

34. Which features could be formed by the stream between locations D and E?

A. meanders  B. kettle lakes  C. barrier islands  D. drumlins
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<td>1.</td>
<td><strong>Answer:</strong> B</td>
<td>21.</td>
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<td>2.</td>
<td><strong>Answer:</strong> B</td>
<td>22.</td>
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<td>3.</td>
<td><strong>Answer:</strong> C</td>
<td>23.</td>
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<td>4.</td>
<td><strong>Answer:</strong> A</td>
<td>24.</td>
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<td>5.</td>
<td><strong>Answer:</strong> D</td>
<td>25.</td>
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<td>6.</td>
<td><strong>Answer:</strong> B</td>
<td>26.</td>
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<td>7.</td>
<td><strong>Answer:</strong> D</td>
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<td>9.</td>
<td><strong>Answer:</strong> A</td>
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<td>15.</td>
<td><strong>Answer:</strong> B</td>
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<tr>
<td>16.</td>
<td><strong>Answer:</strong> C</td>
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<td>17.</td>
<td><strong>Answer:</strong> A</td>
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<td>18.</td>
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<td>20.</td>
<td><strong>Answer:</strong> B</td>
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