1. Seismic studies of the Moon have helped scientists to make inferences about
   (1) water erosion on the Moon
   (2) weathering on the Moon's surface
   (3) radioactivity of the Moon's surface rocks
   (4) the Moon's interior

2. The analysis of seismic data from an earthquake shows that some locations received both P-waves and S-waves, but other locations received only P-waves. What is the best inference that can be made from these observations?
   (1) A zone of liquid rock exists within the Earth.
   (2) Iron in some rocks prevents S-waves from traveling.
   (3) Some seismographs are more sensitive than others.
   (4) S-waves are very weak.

3. The rock between 2,900 kilometers and 5,200 kilometers below the Earth's surface is inferred to be
   (1) an iron-rich solid
   (2) an iron-rich liquid
   (3) a silicate-rich solid
   (4) a silicate-rich liquid

4. From the top of the stiffer mantle to the center of Earth, the rock material is inferred to be
   (1) solid all the way to the center of the inner core
   (2) solid, then liquid to the center of the inner core
   (3) solid, then liquid, then solid again to the center of the inner core
   (4) solid, then liquid, then gaseous to the center of the inner core

5. In 8 minutes, an earthquake P-wave travels a total distance of
   (1) 2,100 km  (3) 6,600 km
   (2) 4,700 km  (4) 11,300 km

6. Which part of Earth's interior is inferred to have convection currents that cause tectonic plates to move?
   (1) rigid mantle  (3) outer core
   (2) asthenosphere  (4) inner core

7. Compared to Earth's oceanic crust, Earth's continental crust is
   (1) thinner and composed of granite
   (2) thinner and composed of basalt
   (3) thicker and composed of granite
   (4) thicker and composed of basalt

8. What are the four most abundant elements, by volume, in the Earth's crust?
   (1) oxygen, potassium, sodium, and calcium
   (2) hydrogen, oxygen, nitrogen, and potassium
   (3) aluminum, iron, silicon, and magnesium
   (4) aluminum, calcium, hydrogen, and iron

9. Compared to the continental crust of central North America, the oceanic crust of the Mid-Atlantic Ridge is
   (1) younger  (3) less dense
   (2) thicker  (4) more felsic

10. Compared to continental crust, oceanic crust is
    (1) less dense, more mafic, and thinner
    (2) less dense, more felsic, and thicker
    (3) more dense, more felsic, and thinner
    (4) more dense, more felsic, and thicker

11. The source of energy for the high temperatures found deep within the Earth is
    (1) tidal friction
    (2) incoming solar radiation
    (3) decay of radioactive materials
    (4) meteorite bombardment of the Earth
12. What is the relationship between density, temperature, and pressure inside the Earth?
   (1) As depth increases, density, temperature, and pressure decrease.
   (2) As depth increases, density and temperature increase, but pressure decreases.
   (3) As depth increases, density increases, but temperature and pressure decrease.
   (4) As depth increases, density, temperature, and pressure increase.

13. Approximately how far below the Earth’s surface is the interface between the mantle and the outer core?
   (1) 5 to 30 km    (3) 2,900 to 3,000 km
   (2) 700 to 900 km (4) 5,000 to 5,200 km

14. Which conditions normally can be found in Earth’s asthenosphere, producing a partial melting of ultramafic rock?
   (1) temperature = 1,000°C; pressure = 10 million atmospheres
   (2) temperature = 2,000°C; pressure = 0.1 million atmospheres
   (3) temperature = 3,500°C; pressure = 0.5 million atmospheres
   (4) temperature = 6,000°C; pressure = 4 million atmospheres

15. Many scientists infer the composition of the Earth’s core to be similar to the composition of
   (1) metallic meteorites
   (2) Moon rocks
   (3) the mantle
   (4) the oceanic crust

16. Scientists have inferred the structure of Earth’s interior mainly by analyzing
   (1) the Moon’s interior
   (2) the Moon’s composition
   (3) Earth’s surface features
   (4) Earth’s seismic data

17. The diagrams below show cross sections of exposed bedrock. Which cross section shows the least evidence of crustal movement?

   (1)  
   (2)  
   (3)  
   (4)  

18. Rock strata containing fossils of shark’s teeth are found at an elevation of 5,000 meters. Which process most likely caused the shark’s teeth to be located at this elevation?
   (1) crustal subsidence
   (2) ocean floor spreading
   (3) crustal uplift
   (4) continental glaciation

19. A seismic station recorded an earthquake with an epicenter distance of 4,000 kilometers. If the origin time of the earthquake was 11:00 a.m., what time did the P-wave arrive at the seismic station?
   (1) 10:53 a.m.    (3) 11:07 a.m.
   (2) 11:05 a.m.    (4) 11:12 a.m.

20. A seismic station 4,000 kilometers from the epicenter of an earthquake records the arrival time of the first P-wave at 10:00:00. At what time did the first S-wave arrive at this station?
   (1) 9:55:00    (3) 10:07:05
   (2) 10:05:40    (4) 10:12:40

Due Date: _______
21. Base your answer to the following question on the diagram below, which shows models of two types of earthquake waves.

Model A best represents the motion of earthquake waves called
(1) *P*-waves (compressional waves) that travel faster than *S*-waves (shear waves) shown in model *B*
(2) *P*-waves (compressional waves) that travel slower than *S*-waves (shear waves) shown in model *B*
(3) *S*-waves (shear waves) that travel faster than *P*-waves (compressional waves) shown in model *B*
(4) *S*-waves (shear waves) that travel slower than *P*-waves (compressional waves) shown in model *B*

22. Which statement correctly compares seismic *P*-waves with seismic *S*-waves?
(1) *P*-waves travel faster than *S*-waves and pass through Earth's liquid zones.
(2) *P*-waves travel faster than *S*-waves and do not pass through Earth's liquid zones.
(3) *P*-waves travel slower than *S*-waves and pass through Earth's liquid zones.
(4) *P*-waves travel slower than *S*-waves and do not pass through Earth's liquid zones.

23. What usually causes tsunamis?
(1) hurricanes
(2) high-pressure weather systems
(3) undersea earthquakes
(4) the collision of ocean currents

24. On which plate is the Hawaii Hot Spot located?
(1) South American (3) Nazca
(2) Antarctic (4) Pacific

25. When the seafloor moves as a result of an underwater earthquake and a large tsunami develops, what will most likely occur?
(1) Deep-ocean sediments will be transported over great distances.
(2) No destruction will occur near the origin of the earthquake.
(3) The direction of the tsunami will be determined by the magnitude of the earthquake.
(4) Severe destruction will occur in coastal areas.

26. Contact zones between tectonic plates may produce trenches. One of these trenches is located at the boundary between which plates?
(1) Australian and Pacific
(2) South American and African
(3) Australian and Antarctic
(4) North American and Eurasian
27. A seismic station received the $P$-waves generated by an earthquake but did not receive the $S$-waves. Which statement best explains the absence of the $S$-waves?

(1) The earthquake was too weak to produce $S$-waves.
(2) The earthquake's epicenter and focus were at the same location.
(3) The $S$-waves were absorbed by a fluid layer as they traveled toward the seismic station.
(4) The $S$-waves were reflected away from the seismic station when they reached the Moho interface.

28. The diagrams below represent seismograms of the same earthquake recorded in four different locations. Which seismogram was recorded closest to the epicenter of the earthquake?

(1) $P$ $S$

(2) $P$ $S$

(3) $P$ $S$

(4) $P$ $S$

29. Base your answer to the following question on the diagram below, which represents seismic stations $A$, $B$, and $C$. The distance from each station to an earthquake's epicenter is plotted.

The epicenter is closest to point

(1) $D$
(2) $E$
(3) $F$
(4) $G$

30. Which best describes a major characteristic of both volcanoes and earthquakes?

(1) They are centered at the poles.
(2) They are located in the same geographic areas.
(3) They are related to the formation of glaciers.
(4) They are restricted to the Southern Hemisphere.

31. According to the plate tectonics theory, the Peru-Chile Trench and the Andes Mountains formed along the west coast of South America because the South American Plate

(1) collided with the Nazca Plate
(2) collided with the North American Plate
(3) slid away from the Nazca Plate
(4) slid away from the North American Plate
32. Base your answer to the following question on the earthquake seismogram below.

![Seismogram](image)

When did the first P-waves arrive at this seismic station?

1. 3 minutes after an earthquake occurred 2,600 km away
2. 5 minutes after an earthquake occurred 2,600 km away
3. 9 minutes after an earthquake occurred 3,500 km away
4. 11 minutes after an earthquake occurred 3,500 km away

33. The diagram below shows the collision of an oceanic plate and a continental plate.

![Collision Diagram](image)

Collisions between oceanic plates and continental plates are thought to result primarily from

1. hot liquid magma in the inner core
2. convection currents in the mantle
3. volcanic eruptions along coastlines
4. meteor impacts in the ocean basins

34. According to tectonic plate maps, New York State is presently located

1. at a convergent plate boundary
2. above a mantle hot spot
3. above a mid-ocean ridge
4. near the center of a large plate

Due Date: _______
35. The diagram below shows some features of Earth's crust and upper mantle.

(Not drawn to scale)

Which model most accurately shows the movements (arrows) associated with the surface features shown in the diagram?
36. The diagram below represents a cross section of the Atlantic Ocean from the eastern coast of South America to the western coast of Africa along the Equator.

At what point would evidence of a rising convection current in the mantle most likely be found?

(1) A  (3) C  
(2) B  (4) E  

37. Which information indicates that new seafloor rock is forming along a mid-ocean ridge and then moving horizontally away from the ridge?

(1) Most volcanoes are located under ocean water.
(2) Seafloor rock is older than continental rock.
(3) Fossils of marine organisms can be found at high elevations on continents
(4) The age of seafloor rock increases as the distance from the mid-ocean ridge increases.

38. Which statement best supports the theory that all the continents were once a single landmass?

(1) Rocks of the ocean ridges are older than those of the adjacent sea floor.
(2) Rock and fossil correlation can be made where the continents appear to fit together.
(3) Marine fossils can be found at high elevations above sea level on all continents.
(4) Great thicknesses of shallow-water sediments are found at interior locations on some continents.

39. Base your answer to the following question on the information and diagram below.

At intervals in the past, the Earth's magnetic field has reversed. The present North magnetic pole was once the South magnetic pole, and the present South magnetic pole was once the North magnetic pole. A record of these changes is preserved in the igneous rocks that formed at mid-ocean ridges and moved away from the ridges.

The diagram below represents the pattern of normal and reversed magnetic polarity in the igneous rocks composing the ocean crust on the east side of a mid-ocean ridge.

Which diagram below best shows the pattern of normal and reversed polarity on the west side of the mid-ocean ridge?

(1)  
(2)  
(3)  
(4)  

Due Date:  Natale-Stewart
40. Which statement best supports the theory of continental drift?
   (1) Basaltic rock is found to be progressively younger at increasing distances from a mid-ocean ridge.
   (2) Marine fossils are often found in deep-well drill cores.
   (3) The present continents appear to fit together as pieces of a larger landmass.
   (4) Areas of shallow-water seas tend to accumulate sediment, which gradually sinks.

41. Which evidence supports the theory of ocean floor spreading?
   (1) The rocks of the ocean floor and the continents have similar origins.
   (2) In the ocean floor, rocks near the mid-ocean ridge are cooler than rocks near the continents.
   (3) The pattern of magnetic orientation of rocks is similar on both sides of the mid-ocean ridge.
   (4) The density of oceanic crust is greater than the density of continental crust.

42. Which evidence causes most scientists to believe that seafloor spreading occurs at the mid-Atlantic Ridge?
   (1) Oceanic crust is oldest at the ridge.
   (2) Large sedimentary folds exist in the mantle near the ridge.
   (3) Oceanic crust on both sides of the ridge is less dense than continental crust.
   (4) Oceanic crust on both sides of the ridge shows matching patterns of reversed and normal magnetic polarity.

43. Which map best represents the general pattern of magnetism in the oceanic bedrock near the mid-Atlantic Ridge?

   ![Diagram of oceanic bedrock magnetism](image_url)
44. A seismic station in Gainesville, Florida, recorded the arrival of the first P-wave at 1:30:00 (1 hour, 30 minutes, 00 seconds) and the first S-wave from the same earthquake at 1:34:30. 
   a) Determine the distance, in kilometers, from Gainesville to the epicenter of this earthquake. 
   b) State what additional information is needed to determine the location of the epicenter of this earthquake.

45. Tectonic plate boundaries may be classified as divergent, convergent, or transform. For each location listed in the data table below, place an X in the proper column to indicate the type of plate boundary at that location.

<table>
<thead>
<tr>
<th>Location</th>
<th>Type of Plate Boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Divergent</td>
</tr>
<tr>
<td>East Pacific Ridge</td>
<td></td>
</tr>
<tr>
<td>Aleutian Trench</td>
<td></td>
</tr>
<tr>
<td>West side of the South American Plate</td>
<td></td>
</tr>
<tr>
<td>San Andreas Fault</td>
<td></td>
</tr>
</tbody>
</table>

Due Date: __________

Natale-Stewart