

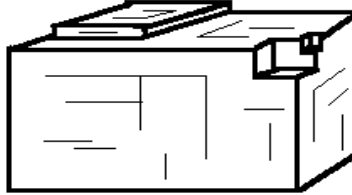
Earth Science January Exam 2017 **TAN EXAM No Corrections**

Please PRINT your name, school, area, and which test you are taking onto the scan-tron.

Choose the answer that best completes the statements or questions below and fill in the appropriate response on the scantron. If you change an answer, be sure to completely erase your first choice.

1. The block of galena, shown below, displays how many directions of cleavage?

- A) 3 B) 6 C) 9 D) 12



Mohs Scale of Hardness		
Talc	1	graphite
Gypsum	2	finger nail (2.5) halite 2.5 copper (3.5)
Calcite	3	
Fluorite	4	iron nail 4.5
Apatite	5	knife (5.5)
Orthoclase	6	glass (<6)
Quartz	7	pyrite 6.5 streak plate 7
Topaz	8	
Corundum	9	
Diamond	10	

2. Galena can be scratched by calcite, but not by gypsum. Using the Moh's hardness scale determine its hardness.

- A) 2 B) 2.5 C) 3 D) 3.5

3. Diamond and native gold are

- A) chemical elements C) mixtures
B) chemical compounds D) suspensions

4. If each of the mineral samples from the following table have a mass of 10 grams, which will be the largest?

- A) quartz C) galena
B) pyrite D) chalcocite

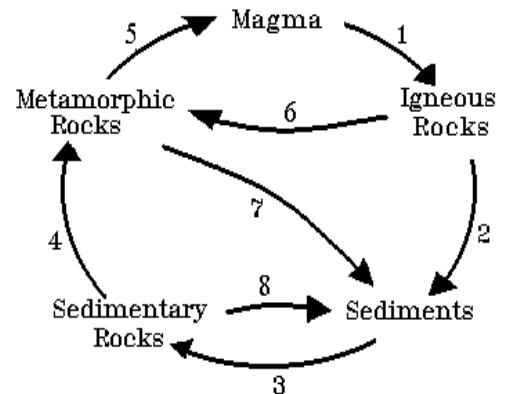
Density of Minerals	
Mineral	Density
Chalcocite	5.5 - 5.8
Galena	7.58
Quartz	2.65
Pyrite	5.01

5. The material from which all rock originally formed is

- A) magma B) lava C) sediment D) crystals

6. Using the rock cycle below, which number represents the process of crystallization is

- A) 1
B) 2
C) 5
D) 7



7. In the diagram of the rock cycle (above), the process of weathering is represented by

- A) 2, only C) 2 and 7, only
B) 7, only D) 2, 7, and 8

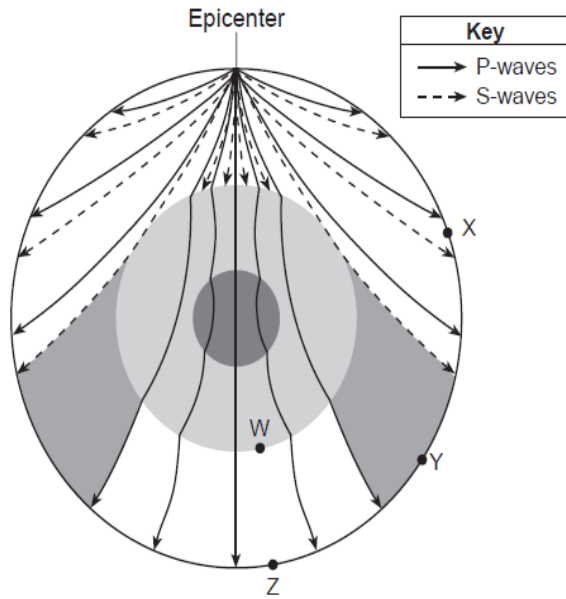
8. In the diagram of the Rock Cycle (above), the number which represents the process of melting is

- A) 1 B) 2 C) 5 D) 6

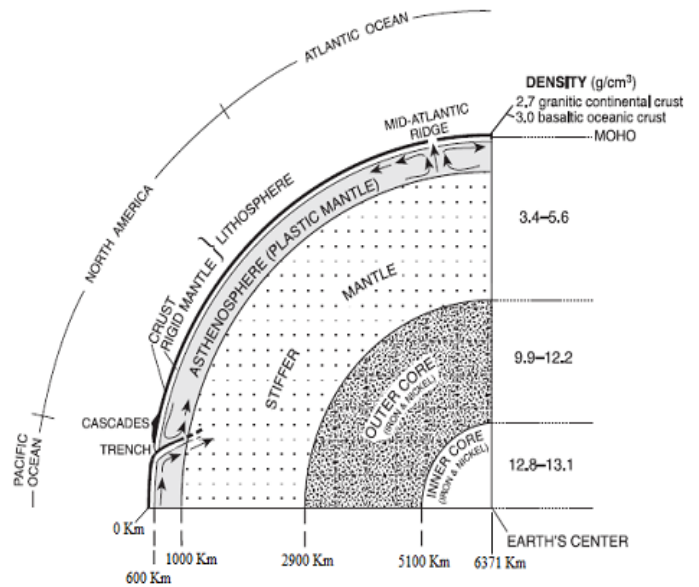
9. Sediment found at a certain point along the shores of the Delaware River in Cape May County is composed of mixed sand and pebbles. If the sediments are buried, compressed, and cemented, the rock that will form is

- A) conglomerate B) breccia C) shale D) sandstone

The cross section below represents the pattern of seismic wave movement away from an earthquake. Point W represents a location at the boundary between two layers of the Earth's interior. Points X, Y, and Z represent seismic stations on the Earth's surface. Use the drawings below for questions # 10, 11, and 12.



Inferred Properties of Earth's Interior



10. Which set of data best describe the depth below the Earth's surface and density of the Earth's interior at location W?

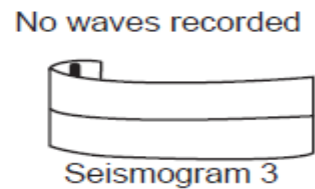
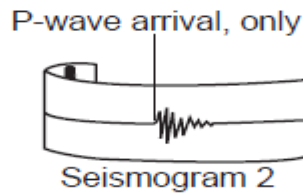
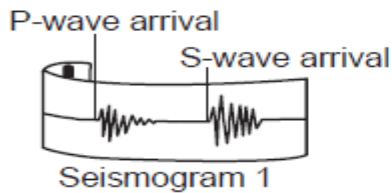
- A) 600 Km Depth : Density 3.4 g/cm^3 to 5.6 g/cm^3 .
- B) 1000 Km Depth: Density average 4.5 g/cm^3 .
- C) 2900 Km Depth : Density 5.6 g/cm^3 to 9.9 g/cm^3 .
- D) 5100 Km Depth : Density 11.1 g/cm^3 .

11. What is the reason that no S-waves were received directly by some seismic stations?

- A) An interior Earth layer absorbs S-waves
- B) Earth's mantle reflects S-waves
- C) S-waves travel slower than P-waves
- D) S-waves travel only on the Earth's surface

12. The diagram below represents the seismograms of this earthquake recorded at stations X, Y, and Z. Which table best matches each seismic station with its likely seismogram?

Seismograms



A)	
Seismic Station	Seismogram
X	1
Y	2
Z	3

B)	
Seismic Station	Seismogram
X	3
Y	2
Z	1

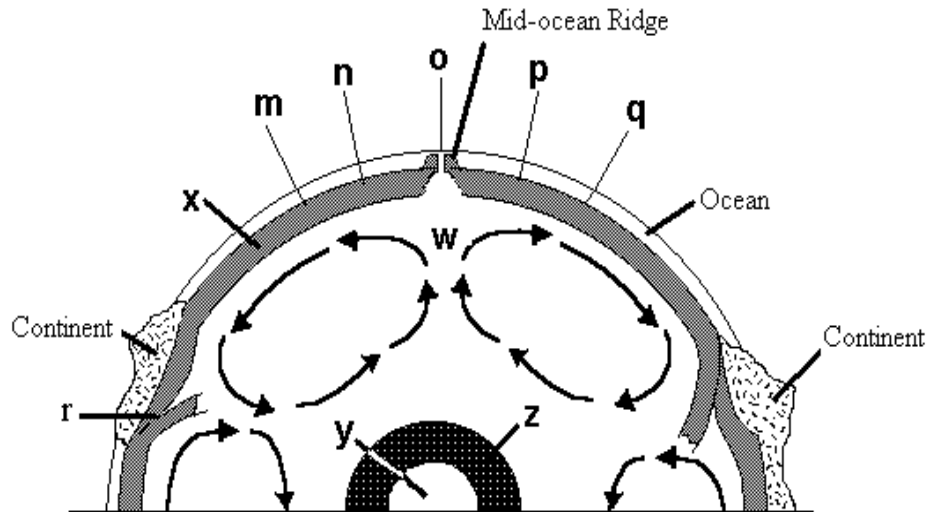
C)	
Seismic Station	Seismogram
X	2
Y	3
Z	1

D)	
Seismic Station	Seismogram
X	1
Y	3
Z	2

The diagram below represents a tectonic cross-section through the earth. Use it with questions 13, 14, 15.

13. The driving force for the motion of tectonic plates is thought to be convection at

- A) w
- B) z
- C) o
- D) y



14. Zone z within the earth is believed to be

- A) a solid rock called peridotite
- B) solid metal, probably iron and nickel
- C) semi-liquid or plastic rock, rich in olivine
- D) liquid metal, probably iron and nickel

15. The youngest ocean crust is closest in location to

- A) m
- B) n
- C) o
- D) p

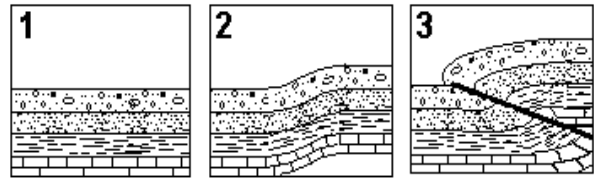
16. For the last 200 million years the continents on opposite of the Atlantic Ocean have

- A) been drifting closer together
- B) been drifting apart
- C) remained the same distance apart.

17. The magnitude of an earthquake is often measured on the Richter Scale. An earthquake having a magnitude of 7.6 produces more ground motion than one with a magnitude of 6.6 by a factor of

- A) 1
- B) 10
- C) 100
- D) 1000

The three diagrams below show a sequence of events that occurred in a rock formation. Number 1 occurred first, followed by 2 and 3. Use these diagrams with questions # 18, 19, 20.




Conglomerate **Shale**
Sandstone **Limestone**

18. Which of the statements below is illustrated by this sequence?
- A) Igneous intrusions cause metamorphism of surrounding rocks.
 - B) Younger rock layers are always found on top of older layers.
 - C) A layer of rock can sometimes be older than the layer beneath it.
 - D) Faults nearly always produce valleys.

19. In diagram #2 above, the fold that has developed in the bed of rock is known as

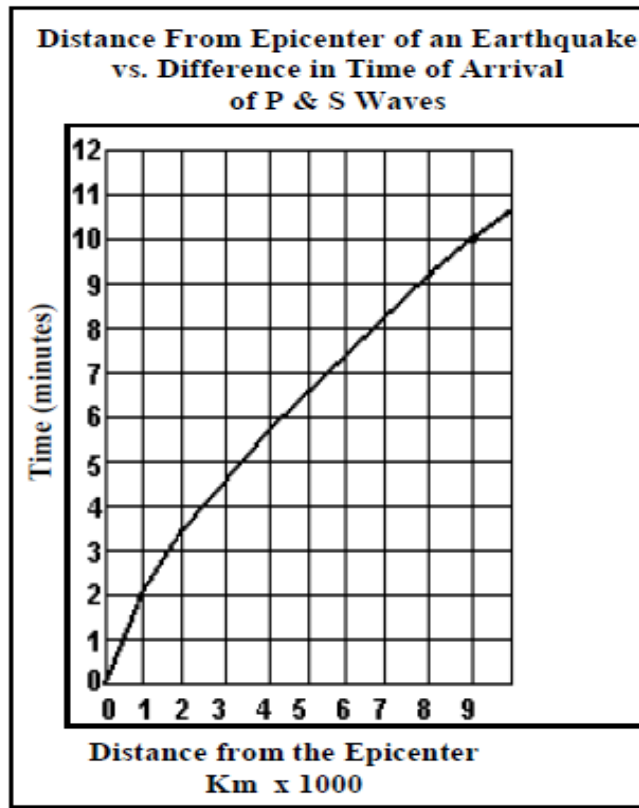
- A) an anticline B) a monocline C) a syncline D) a lithocline

20. In diagram #3 above, the fault that has developed is

- A) a normal fault B) a reverse fault C) a transform fault D) a thrust fault

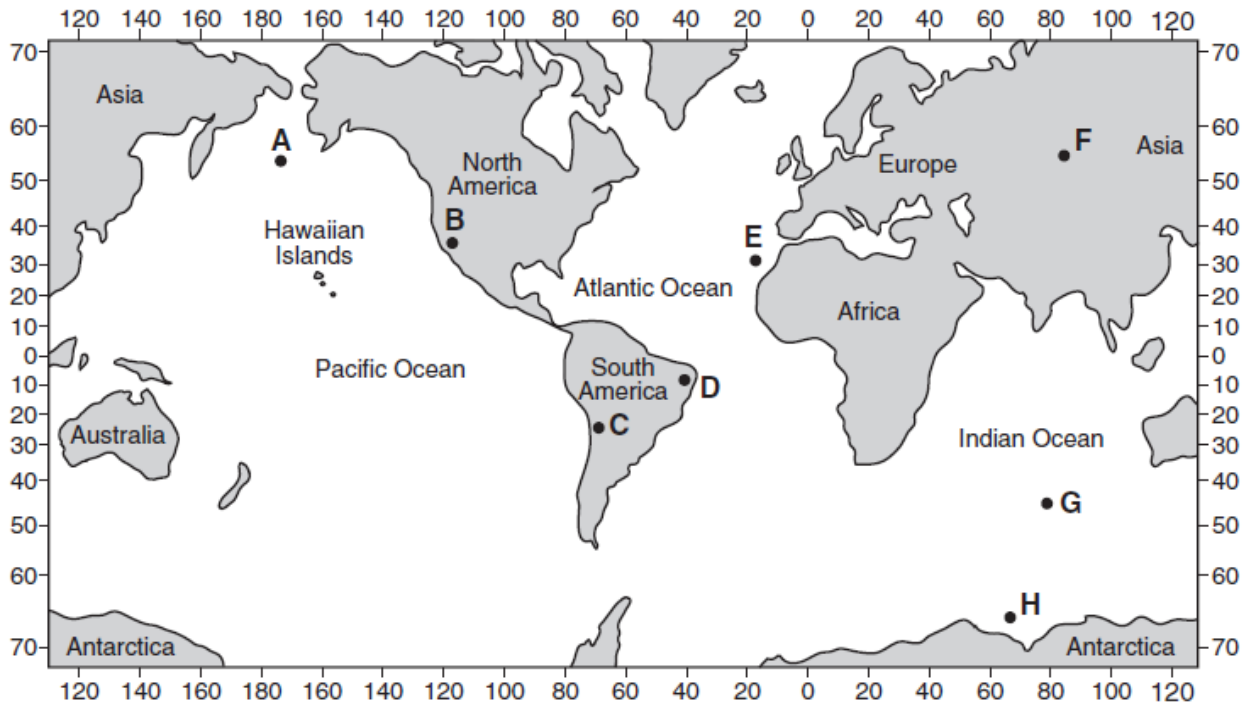
21. A seismograph in Denver records the arrival of earthquake tremors. The p-wave arrives at 08:27:11. The s-wave is recorded at 08:34:41. The seismologists checks the tables and concludes that the distance to the earthquake is _____

- A) 6.0 kilometers
- B) 6,000 kilometers
- C) 8.5 kilometers
- D) 8,500 kilometers



22. Molten rock which is in the Earth's crust is known as
 A) intrusive B) extrusive C) lava D) magma

Use the world map for questions 23 and 24. Note the places marked with letters on the map.

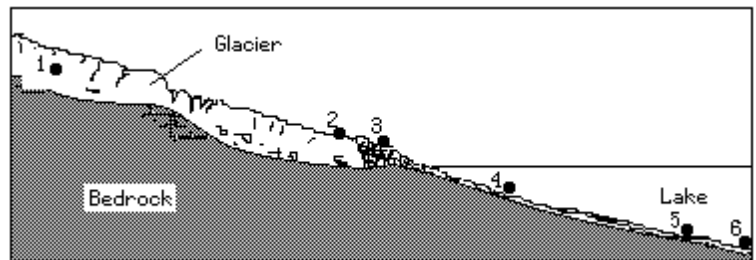


23. On the map above which lettered places are considered part of the “ring of fire?”
 A) A, B, and C B) D, E, and F C) G, H, and F D) D and E

24. Which lettered location is most likely **not** going to experience a volcano?
 A) D B) E C) F D) G **poorly worded**

The diagram below represents a glacier moving out of a mountain valley. Use the diagram with # 25 and 26.

25. Deposits of unsorted sediments most probably would be found at
 A) position 5
 B) position 6
 C) position 3
 D) position 4



26. An ice interface between deposition and erosion by the ice is most likely located at
 A) positions 1 and 2 B) positions 2 and 3 C) positions 3 and 4 D) positions 4 and 5

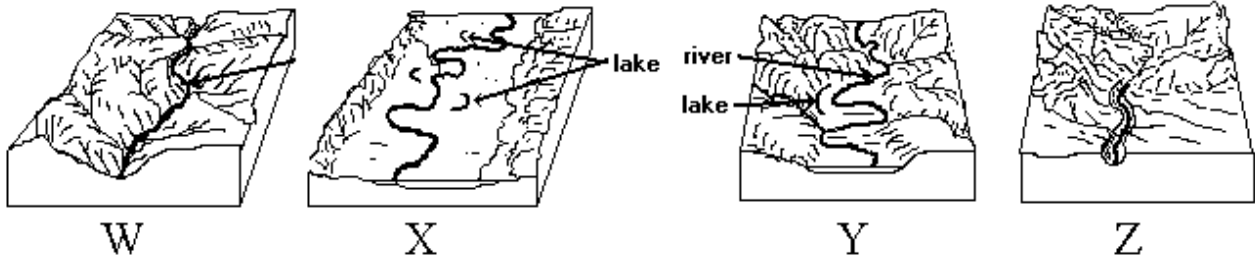
27. Large depressions (100 m in diameter & 20 to 30m deep) can be found in the terminal moraine of the Pleistocene glaciers that covered part of New Jersey. These holes, left by melting blocks of ice, are known as
 A) sinks B) cols C) kettles D) tarns

28. Because of its broad valley and meandering course, the developmental age of the Mississippi River would be classified as
 A) young B) mature C) old D) senile

29. Which cross section best represents a valley shape where a rapidly flowing stream is cutting into the bedrock in a mountainous area?



The four diagrams, below, show different stages in the development of river erosion and landforms. Use them with questions 30, 31, 32.



30. In which order should the diagrams be placed to show the most likely sequence of river and landscape development?

- A) W, Z, X, Y B) X, Z, Y, W C) Y, X, W, Z D) Z, W, Y, X

31. In which block diagram, is the river cutting downward most rapidly?

- A) W B) X C) Y D) Z

32. The lakes shown on diagrams X & Y are known as

- A) tarns B) oxbow lakes C) paternoster lakes D) finger lakes

33. A type of rock which makes a good aquifer because it usually has good porosity and permeability is

- A) granite B) sandstone C) shale D) gneiss

34. Which sediment listed below is the least permeable?

- A) Clay B) Silt C) Sand D) Pebbles

35. A student performed a laboratory activity in which water was poured slowly into four cups containing equal volumes of loosely packed sediment samples. The contents of the cups are below. All particles were spherical in shape and uniform in size within a container. After the water level reached the surface of each sample, the student determined the amount of water that had been added. **Bad question**

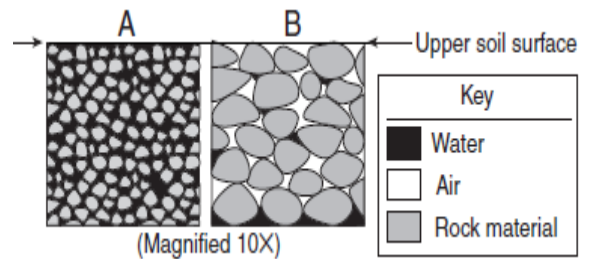
- I. Contained sand II. Silt III. Pebbles IV. Mixture of sand, clay, and pebbles.

The results of the activity should have indicated that approximately equal amounts of water were added to the cups of

- A) silt and pebbles, only
 B) sand, silt, and pebbles, only
 C) pebbles and the mixture, only
 D) sand, pebbles, and the mixture, only

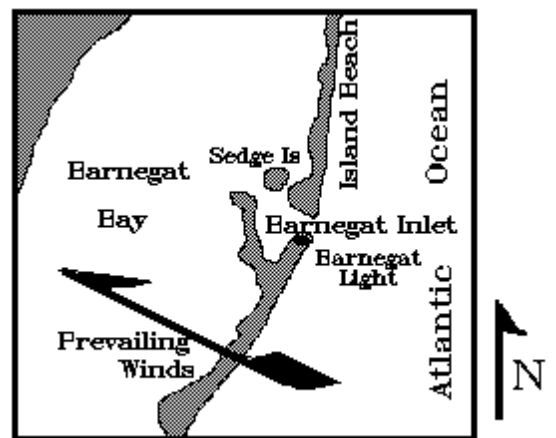
36. The diagram below shows two soil samples A and B. Both became saturated with water after a rainstorm. After 10 minutes after the storm the soils appeared as in the diagram below. Which statement best explains the observed change in the water content of the two soil samples?

- A) the permeability of B is greater than the permeability of A
- B) the surface runoff of B is greater than the surface runoff of A
- C) the capillarity of B is greater than the capillarity of A
- D) the porosity of B is greater than the porosity of A

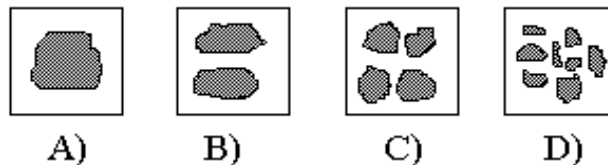


The map below shows Island Beach at Barnegat Bay and the direction of the prevailing winds. Use it with questions 37, 38, 39

- 37. The prevailing onshore winds at Barnegat Bay are from the
 - A) south
 - B) southeast
 - C) north
 - D) northwest
- 38. The dunes on Island Beach will migrate toward the
 - A) north
 - B) northwest
 - C) south
 - D) southeast
- 39. Island Beach at Barnegat Bay is vulnerable to hurricanes because
 - A) the storm surge is often higher than the islands
 - B) they are always on the side of the storm which has the highest wind speed
 - C) hurricanes usually hit the island during high tides
 - D) all of the above



40. The four limestone samples shown below have the same composition, structure, mass, and volume. Under the same climatic conditions, which will weather fastest?



41. Of the substances listed below, which has the greatest effect on the weathering of rocks is

- A) nitrogen
- B) oxygen
- C) water
- D) hydrogen

42. The wearing away of rocks by solid particles carried by wind, water, and other forces is called

- A) exfoliation
- B) Abrasion
- C) Oxidation
- D) leaching

43. A good index (or guide) fossil for use in identifying the sequence or age of rock formations has the following characteristics:

- A) lived for a short period of time over a small area.
- B) lived for a long period of time over a small area.
- C) lived for a short period of time over a wide area.
- D) lived for a long period of time over a wide area.

44. A fossilized species of graptolite was found in an outcrop of black shale near Schenectady, New York. Referring to the table below, which of the following might be an approximate age for the rock formation?

Period	Index Fossil
Pennsylvanian	Tree fern
Mississippian	Crinoid
Devonian	Brachiopod
Silurian	Trilobite
Ordovician	Graptolite

GEOLOGIC TIME			
Eras	Periods	Epochs	Began (ybp)
Cenozoic	Quarternary	Holocene	10t
		Pleistocene	1.6m
	Tertiary	Pliocene	5.3m
		Miocene	23.7m
		Oligocene	36.6m
		Eocene	57.8m
		Paleocene	66.4m
Mesozoic	Cretaceous		144m
	Jurassic		208m
	Triassic		245m
Paleozoic	Permian		286m
	Pennsylvanian		320m
	Mississippian		360m
	Devonian		408m
	Silurian		438m
	Ordovician		505m
	Cambrian		570m
preCambrian			4.5b

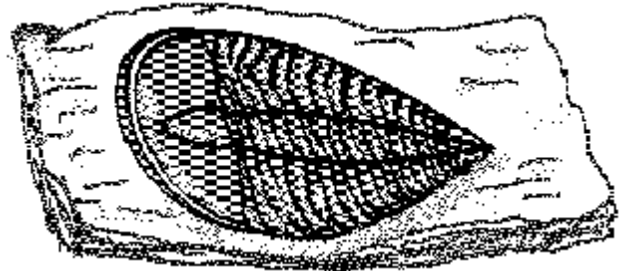
- A) 294 million years B) 339 million years C) 417 million years D) 500 million years

45. Dinosaurs roamed New Jersey about 200 million years ago, during the (time scale above)

- A) Ordovician/Silurian Periods
 B) Miocene/Eocene Epochs
 C) Triassic/Jurassic Periods
 D) preCambrian/Cambrian Periods

46. The fossil illustrated below was a dominant form of animal life on earth in the ancient seas during which Era?

- A) pre-Cambrian Era
 B) Paleozoic Era
 C) Mesozoic Era
 D) Cenozoic Era



47. Based upon the geology time table above which Era is the oldest?

- A) Paleozoic C) Cenozoic
 B) Precambrian D) Mesozoic

48. The contour interval of the topographic map below is

- A) 2 feet
- B) 10 feet
- C) 20 feet
- D) 100 feet

49. The elevation of Cripple Creek at the edge of the map above is about

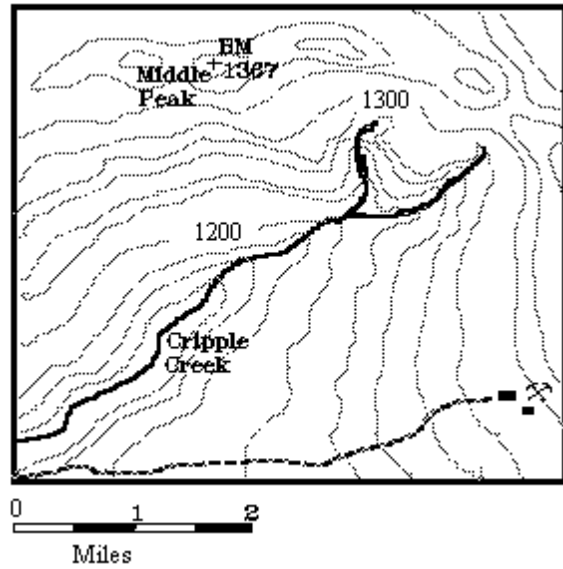
- A) 1100 feet
- B) 1200 feet
- C) 1140 feet
- D) 1260 feet

50. At the bottom of the map is a road to a mining camp (lower right side of map). What is the length of the road to the mining camp?

- A) 3 miles
- B) 4.5 miles
- C) 5.5 miles
- D) 6 miles

51. What direction is Cripple Creek flowing?

- A) south
- B) east
- C) northeast
- D) southwest

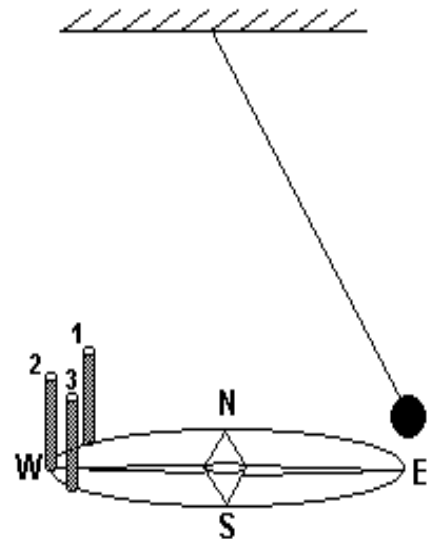


52. Measuring the angular height of the star, Polaris, above the horizon will tell you your location's

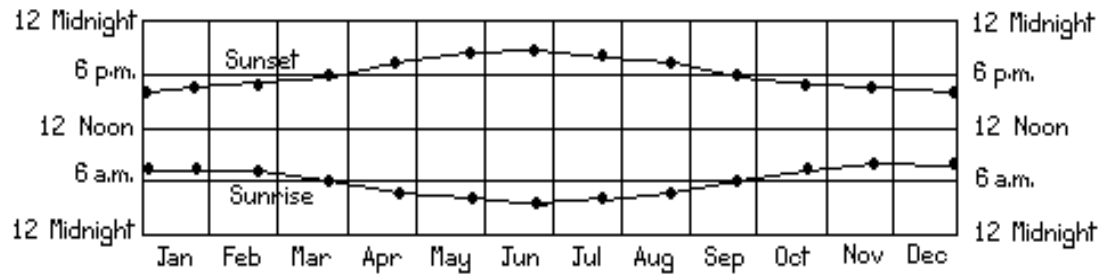
- A) longitude
- B) latitude
- C) right ascension
- D) declination

53. Your class room has a heavy pendulum suspended from the ceiling and is free to swing in any direction. There are three pegs set on the floor. Peg #2 is directly west of the pendulum. Peg #1 is north of peg #2, and peg #3 is south of peg #2. If the pendulum is pulled directly east and released, it will knock down peg #2. After swinging for a several minutes, it will

- A) continue to swing between pegs #1 and #3
- B) it will knock down peg #1
- C) it will knock down peg #3



Use the graph below for questions # 54, 55, 56



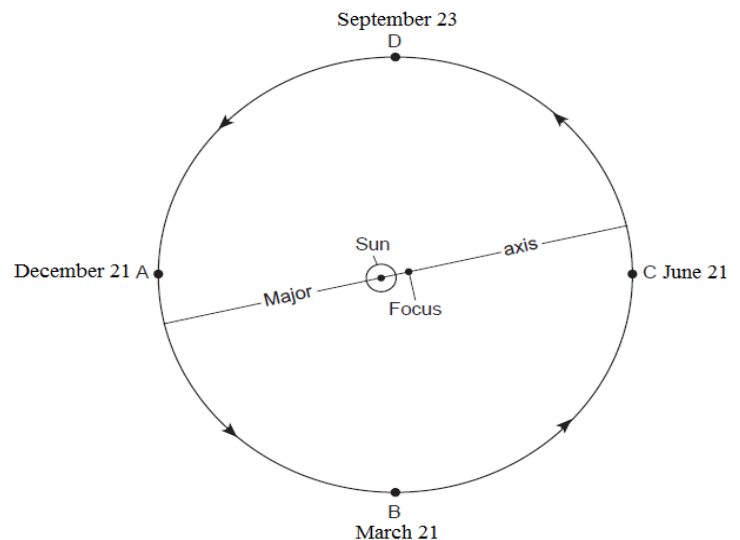
54. The daily change in the time of sunrise and sunset primarily is due to the
- 23.5° tilt of the earth's axis
 - sun's apparent angular diameter
 - changes in the distance from the earth to the sun
 - changes in the earth's orbital speed
55. According to the graph the number of hours of daylight on September 1 was about
- 7
 - 8
 - 12
 - 14
56. At which location could the observations from which the graph was constructed be made?
- mid-latitude in the Southern Hemisphere
 - mid-latitude in the Northern Hemisphere
 - the equator
 - the north pole
57. When you observe a full moon, the brightest areas on the moon are
- maria
 - plains
 - seas
 - mountains
58. Why does the Moon's gravity have a greater effect on Earth's ocean tides than the Sun's gravity?
- The Sun is composed of gases
 - The Sun's gravity influences more planets
 - The Moon has a greater mass
 - The Moon is much closer to the Earth

The diagram represents Earth's revolution around the Sun. Points A, B, C, and D represents Earth's positions in its orbit on the first day of the four seasons. The major axis and foci (the center of the Sun and the other focus) of Earth's orbit are shown.

59. Approximately how many days does it take the Earth to travel from position A to position C?
- 91 days
 - 182 days
 - 274 days
 - 365 days

60. Since the Earth has an elliptical orbit, the
- distance between the Sun and Earth varies
 - distance between the Sun and the other focus varies
 - length of the Earth's major axis varies
 - length of the Earth's period of revolution varies

61. At positions A, B, C, and D the north end of the Earth's axis of rotation is pointing toward
- Betelgeuse
 - Polaris
 - the center of the Milky Way
 - the center of our solar system.



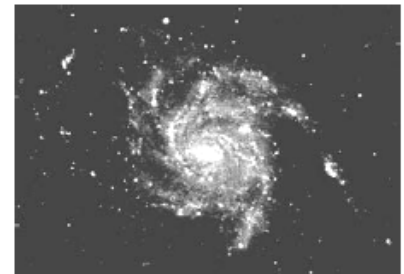
62. Which planet has completed less than one orbit of the Sun in the last 100 years?

- A) Mars
- B) Mercury
- C) Neptune
- D) Uranus

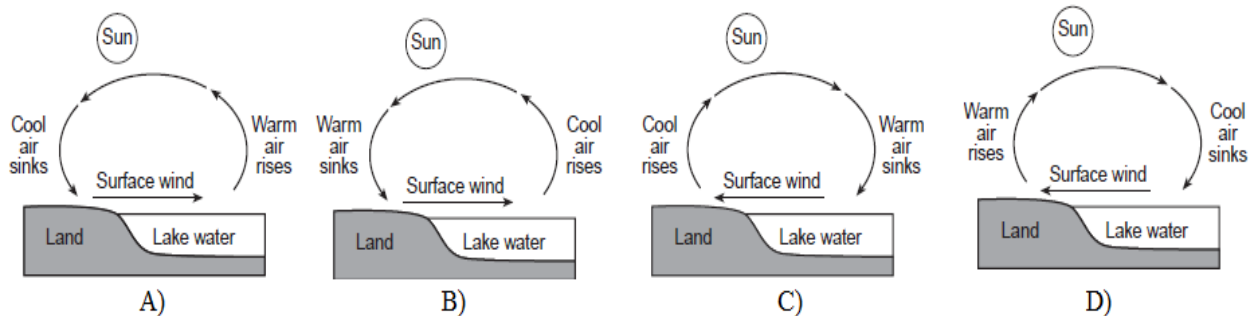
Planetary Data				
Planet	Diameter (km)	Distance from Sun (km)	Revolution (Earth time)	Rotation (Earth time)
Mercury	4,880	57.9 million	88 days	58.6 days
Venus	12,100	108 million	224.7 days	247 days
Earth	12,756	150 million	365.26 days	23h 56m
Mars	6,787	228 million	687 days	24h 37m
Jupiter	142,000	778 million	11.86 years	9h 51m
Saturn	120,000	1.43 billion	29.46 years	10h 14m
Uranus	51,800	2.87 billion	84.01 years	11h
Neptune	49,500	4.50 billion	164.8 years	16h

63. The photograph below shows a feature of the universe as seen through a telescope. This feature is best described as

- A) a galaxy
- B) an asteroid
- C) a comet
- D) a star

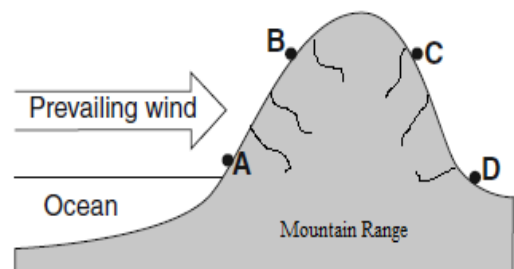


64. Which cross section best represents how surface winds form by mid afternoon near a shoreline on a hot summer day?

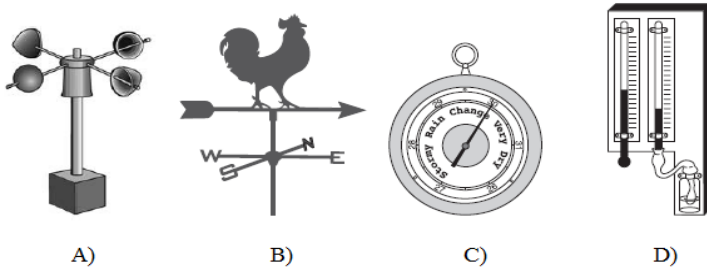


65. The cross section below represents a prevailing wind flow that causes different climates on the windward and leeward sides of a mountain range. Compared to the temperature and moisture of the air rising on the windward side, the temperature and moisture of the air descending at the same altitude on the leeward side will be

- A) warmer and drier
- B) warmer and more moist
- C) cooler and drier
- D) cooler and more moist



66. Which weather instrument below is designed to measure relative humidity?



67. Which weather variable generally decreases when wind speed is increasing, clouds are thickening, and visibility drops?

- A) relative humidity B) dew point C) precipitation D) air pressure

68. The distance from Chicago to Trenton is about 800 miles. On average, a cold front attached to a low over Chicago should reach New Jersey in about (cold fronts travel about 35mph) how many hours?

- A) 17 hours B) 23 hours C) 35 hours D) 42 hours

69. Close spacing of isobars on a weather map is a good indicator of

- A) low visibility C) high air temperatures
B) low dew point temperatures D) high wind velocity

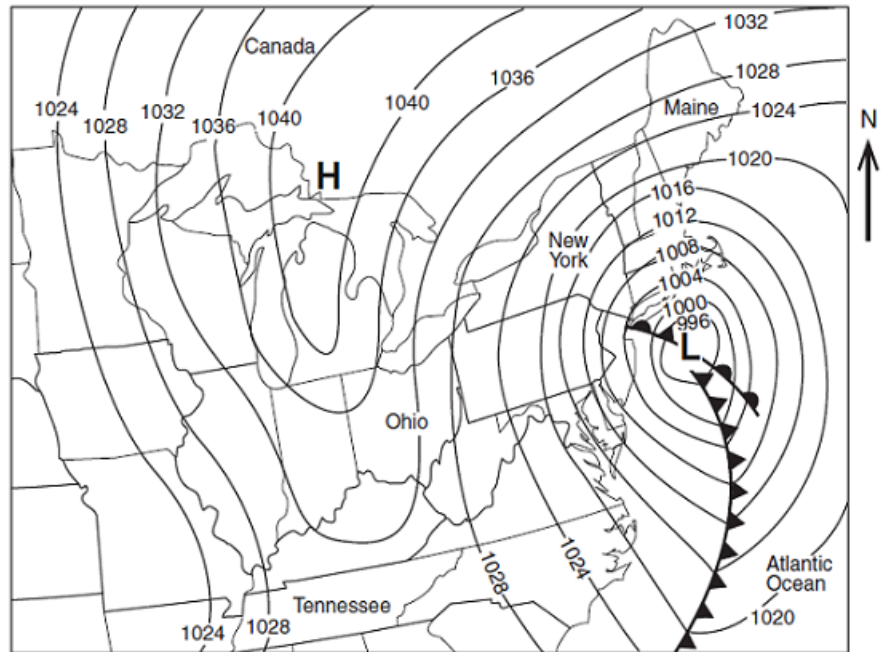
Use the weather map below with questions 70, 71, 72

70. The high-pressure system is most likely the center of a

- A) continental polar air mass that originated in central Canada
B) maritime polar air mass that originated over the Gulf of Mexico
C) continental tropical air mass that originated in the Arctic region
D) maritime tropical air mass that originated over the Atlantic Ocean

71. The region in the north eastern portion has cloudy skies and snow. What is the reason for this?

- A) Air above this region is sinking and cooling, while water vapor is evaporating.
B) Air above this region is sinking and warming, while water vapor is evaporating.
C) The air above this region is rising and cooling, while water vapor is condensing
D) Air above this region is rising and warming, while water vapor is condensing.



72. If this low pressure weather system follows a typical storm path, then you would expect it to move

- A) Northwest B) Northeast C) Southwest D) Southeast

NEW JERSEY SCIENCE LEAGUE
EARTH SCIENCE EXAM ANSWER KEY **TAN TEST** **No Corrections**

DATE: January 12, 2017

1	A	19	B	37	B	55	D
2	B	20	D	38	B	56	B
3	A	21	B	39	A	57	D
4	A	22	D	40	D	58	D
5	A	23	A	41	C	59	B
6	A	24	C	42	B	60	A
7	D	25	C	43	C	61	B
8	C	26	B	44	D	62	C
9	A	27	C	45	C	63	A
10	C	28	C	46	B	64	D
11	A	29	D	47	B	65	A
12	D	30	D	48	C	66	D
13	A	31	D	49	C	67	D
14	D	32	B	50	B	68	B
15	C	33	B	51	D	69	D
16	B	34	A	52	B	70	A
17	B	35	B	53	C	71	C
18	C	36	A	54	A	72	B

Test Specifications

Since some earth science courses in New Jersey start with geology, others with astronomy, and still others with meteorology, each of the four tests will include the following topics. Over time, this provides an equal opportunity to everyone. The number in parentheses indicates the number of questions for that topic. The number per topic occasionally varies by one or two, but usually does not.

Minerals (4)	Sun (2)
Rocks (2)	Moon (2)
Earth Structure (3)	Sun-Moon-Earth System (3)
Plate Tectonics (4)	Solar System (2)
Faults/Folds/Seismology (4)	Stars (2)
Vulcanism (2)	Galactic Systems (1)
Glaciation/Deserts (2)	Cosmology (1)
Rivers: Erosion & Deposition (4)	
Ground Water/Caves (3)	Insolation/Temperature/Air Masses (3)
Ocean Shore Line/Currents/Salinity(3)	Atmospheric Pressure/Highs/Lows (3)
Weathering/Mass Wasting (3)	Moisture in the Atmosphere (2)
Historical Geology (4)	Frontal Systems (3)
Map Reading: Road/Topo/Geologic (4)	Interpreting Weather Maps (3)
Geodesics/Time/Map Projections (3)	

Dates for 2017 Season

Thursday January 12, 2017 Thursday February 9, 2017

Thursday March 9, 2017 Thursday April 13, 2017

All schools must complete the April exam and mail in the results by April 28th, 2017

New Jersey Science League

PO Box 65 Stewartsville, NJ 08886-0065

phone # 908-213-8923 fax # 908-213-9391 email: newjsl@ptd.net

Web address: <http://entnet.com/~personal/njscil/html/>

What is to be mailed back to our office?

PLEASE RETURN THE AREA RECORD AND ALL TEAM MEMBER SCANTRONS (ALL STUDENTS PLACING 1ST, 2ND, 3RD, AND 4TH).

If you return scantrons of alternates, then label them as ALTERNATES.

Dates 2018 Season

Thursday January 11, 2018 Thursday February 8, 2018

Thursday March 8, 2018 Thursday April 12, 2018

Please PRINT your name, school, area, and which test you are taking onto the scan-tron.

Choose the answer that best completes the statements or questions below and fill in the appropriate response on the scantron. If you change an answer, be sure to completely erase your first choice.

1. Hardness is an important property used to identify minerals. According to Mohs Scale, which of the following lists of minerals is arranged in order of **increasing** hardness?

- A) corundum, apatite, gypsum, Topaz
- B) gypsum, apatite, Topaz, corundum
- C) apatite, gypsum, Topaz, corundum
- D) Topaz, corundum, apatite, gypsum

Mohs Scale of Hardness		
Talc	1	graphite
Gypsum	2	finger nail (2.5) halite 2.5
Calcite	3	copper (3.5)
Fluorite	4	iron nail 4.5
Apatite	5	knife (5.5)
Orthoclase	6	glass (<6)
Quartz	7	pyrite 6.5 streak plate 7
Topaz	8	
Corundum	9	
Diamond	10	

2. You are looking at a yellow mineral which shows three directions of cleavage. You cannot scratch it with your finger nail, but you can scratch it with a copper penny. Of the minerals in the table below, it is

- A) selenite
- B) halite
- C) calcite
- D) fluorite

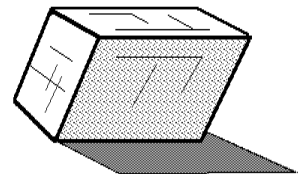
Hardness	Cleavage	Mineral
2	1	selenite
2.5	3	halite
3	3	calcite
4	3	fluorite
7	none	quartz

3. The mass of a sample of galena is determined to be 76 grams. When it is dropped into a graduated cylinder containing 265.0 ml of water, the volume increased to 275.0 ml. Determine the density of the galena.

- A) 0.14 cm³/g
- B) 7.6 g/cm³
- C) 76 g/cm³
- D) 760 g cm³

4. The mineral fragment shown below displays how many directions of cleavage?

- A) none
- B) two
- C) three
- D) six



5. A mineral's streak is most like

- A) a scratch on glass
- B) a reflection from a mirror
- C) a pencil mark
- D) a reflection from rippled water

6. The chemical element that is most common in minerals of the earth's crust is

- A) aluminum
- B) iron
- C) oxygen
- D) silicon

7. The Watchung Mountains in New Jersey are old lava flows. The predominant type of rock, therefore, is most likely to be which of the following

- A) granite
- B) basalt
- C) gneiss
- D) gabbro

8. Metamorphosed sandstone is called

- A) schist
- B) slate
- C) marble
- D) quartzite

9. Intrusive rocks usually cool slowly, thus their crystals are
 A) small B) large C) perfectly formed D) euhedral

Question #10 and #11 use the Rock Cycle diagram below.

10. In the diagram of the Rock Cycle below, what number represents the formation of magma?

- A) 1 B) 2 C) 3 D) 5

11. In the same diagram of the Rock Cycle, unconsolidated sediments are represented by the number

- A) 2 B) 3 C) 4 D) 5

12. Glass is chemically related to what mineral?

- A) quartz B) pyrite C) halite D) Fluorite

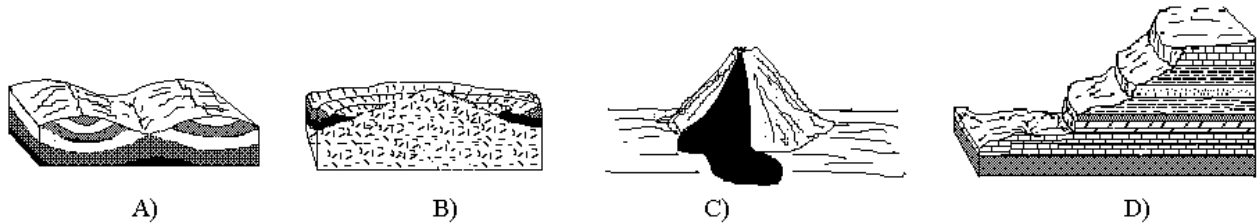
13. The diameter of the earth is about

- A) 2,000 miles B) 4,000 miles
 C) 8,000 miles D) 24,000 miles

14. The evidence that the outer core of the earth is liquid comes from

- A) deep oil wells B) deep mines C) earthquakes D) geysers

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

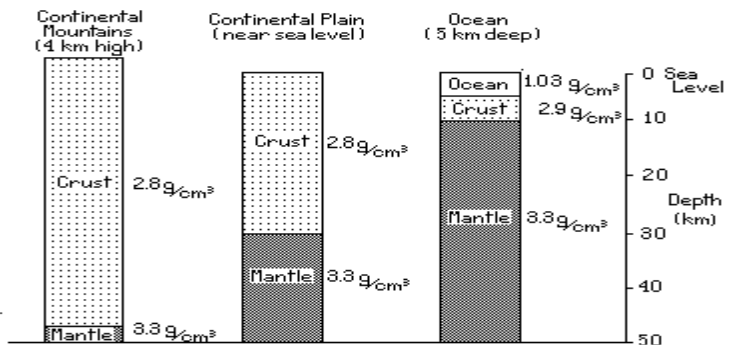


16. Which structure above in #15 most resembles the structure you would expect to see in the Grand Canyon?

The diagram below shows a column of rock to a depth of 50 km below sea level at three different locations. Use it with questions 17, 18, 19.

17. In which group are the layers of the Earth arranged in order of **increasing** average density?

- A) mantle, crust, ocean water
 B) crust, mantle, ocean water
 C) ocean water, mantle, crust
 D) ocean water, crust, mantle



18. Which material is most likely to be found 20 km below sea level at the continental mountain location?

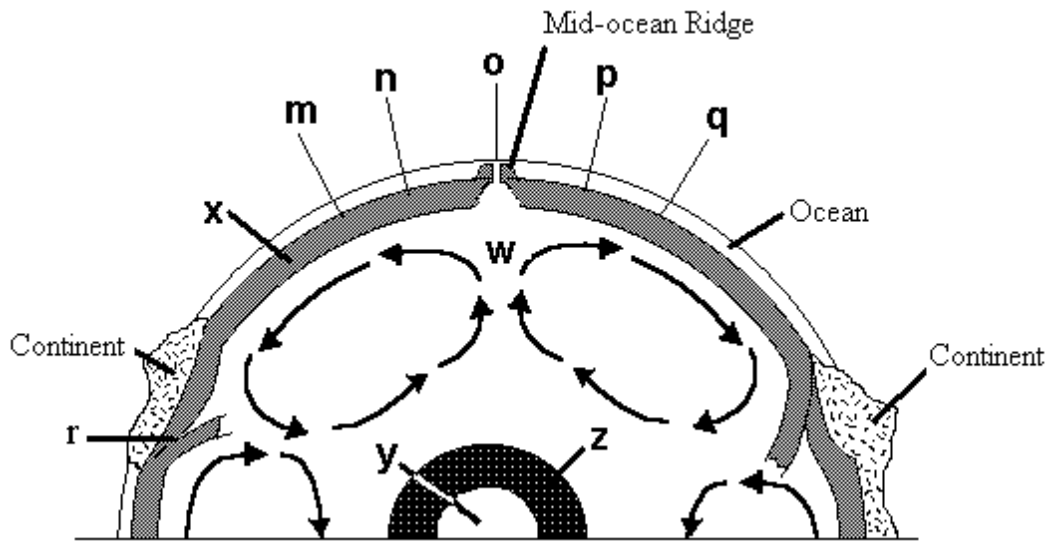
- A) basalt B) granite C) shale D) limestone

19. Which statement about the Earth's mantle is confirmed by the diagram?

- A) the mantle is liquid
 B) the mantle has the same composition as the crust
 C) the mantle is located at different depths below the Earth's surface
 D) the mantle does not exist under continental mountains

20. The feature produced when two crustal plates carrying continents on the converging edges collide is a
 A) mountain range B) trench C) mid-oceanic ridge D) island arc
21. Crustal plates are destroyed at
 A) transform faults B) mid-oceanic ridges C) oceanic trenches D) rift valleys
22. On the average, crustal plates move in one year a distance of about
 A) 5 cm B) 0.5 meters C) 1 meter D) 1 km
23. Volcanic islands that are part of island arcs, such as Japan, are formed where
 A) crustal plates are created B) crustal plates are destroyed
 C) crustal plates separate D) continental plates collide
24. The Andes Mountains on the west coast of South America include a large number of volcanoes. The area is subject to severe earthquakes. The cause of both is
 A) a rift zone B) a subduction zone C) a line of hot spots D) a terminal moraine

The diagram below represents a tectonic cross-section through the earth. Use it with questions 25 and 26

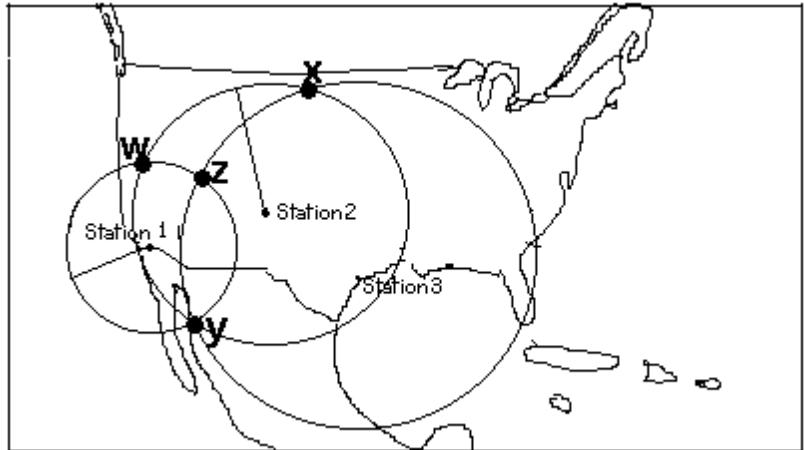


25. The earth is most likely composed of granite at
 A) the ocean floor B) a continent C) location w D) location y
26. The ocean floor at location letter m would most likely have the same magnetic orientation as at location
 A) n B) o C) p D) q
27. Plate Tectonic Theory holds that the continents came together to form the super continent, Pangea, about 200 million years ago. In which geologic era did this take place? **Geologic time chart found in question #52**
 A) preCambrian B) Cenozoic C) Mesozoic D) Paleozoic

28. The map below shows the United States and Mexico. Three different earthquake stations have picked up the waves from an earthquake. Four different locations W, X, Y, and Z have been marked on the map.

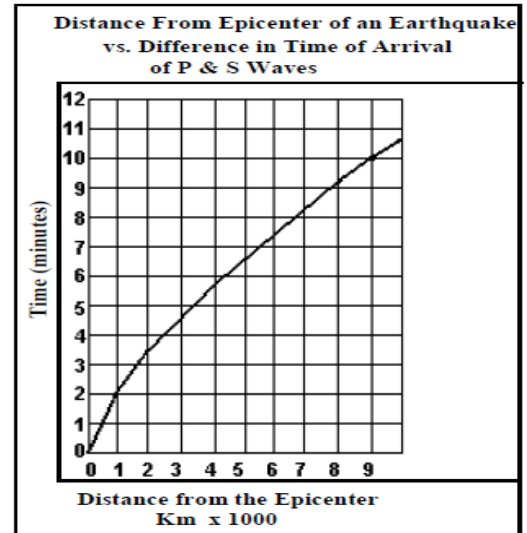
Which location on the map represents the epicenter of the earthquake?

- A) W
- B) X
- C) Y
- D) Z



29. A seismograph at the Lamont-Dougharty Geophysical Observatory in Alpine, NJ records the arrival of earthquake tremors. The p-wave arrives at 07:35:53. The s-wave is recorded at 07:32:23. The seismologists check the tables, and concludes that the distance to the earthquake is _____ kilometers?

- A) 2 kilometers
- B) 2000 kilometers
- C) 1000 kilometers
- D) 3,300 kilometers



30. The data table below shows the origin and depths of all large-magnitude earthquakes over a 20 year period.

According to these data most of these earthquakes occurred within the Earth's _____

- A) Lithosphere
- B) Asthenosphere
- C) stiffer mantle
- D) outer core

Depth Below Surface in Km	Number of Earthquakes
0-33	27788
34-100	17585
101-300	7329
301-700	3167

31. Basalt which has formed from the eruption of a volcano is

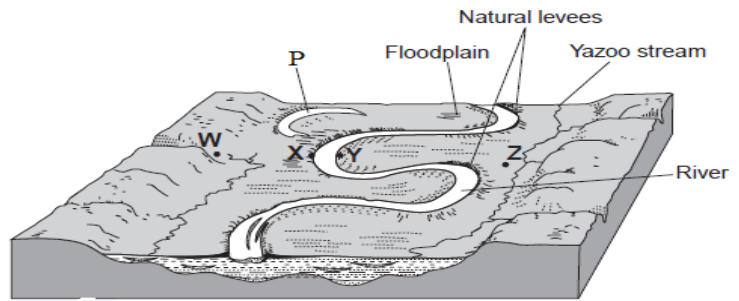
- A) intrusive
- B) extrusive
- C) nui nui
- D) talus

32. In New Jersey the Palisades are intrusive while the Watchung Mts. are extrusive. Both were produced by magma with the same or similar composition. The rocks of the Palisades and Watchung Mts. are respectively
 A) basalt and diabase B) diabase and basalt C) basalt and granite D) granite and basalt

33. Which statement (s) is(are) always true about deserts?
 I. Deserts are hot
 II. Deserts are hot and have small amounts of precipitation
 III. Deserts have small amounts of precipitation.
 A) I only B) II only C) III only D) I and II.

34. Most of the world's major deserts are located about 30° north or south latitude. They lie beneath the
 A) equatorial low pressure belt C) subtropical high pressure belt
 B) temperate low pressure belt D) subpolar high pressure belt

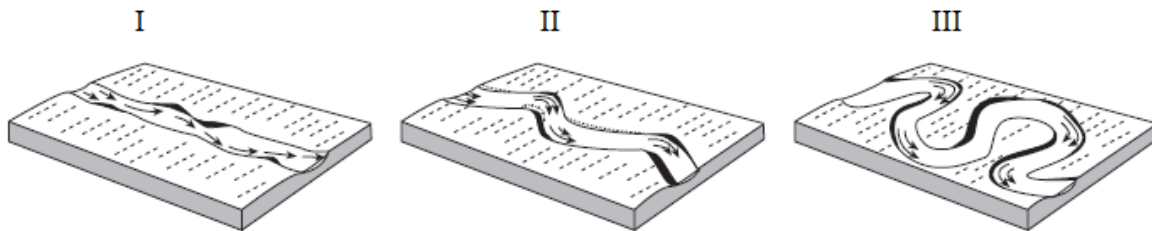
The diagram below represents the landscape features associated with a meandering river. Letters W, X, Y, and Z are locations in the floodplain associated with the river. Use this with #s 35, 36, 37, 38, 39



35. Of the lettered locations which has the greatest erosion?
 A) W
 B) Y
 C) X
 D) Z

36. On the map a lake is marked with the letter P. This type of lake is called _____?
 A) tarns B) oxbow lakes C) paternoster lakes D) finger lakes

37. The diagrams below represent stages in the formation of the meandering river.



Which sequence of letters best represents the usual changes over time in the river?
 A) I → II → III B) I → III → II C) III → I → II D) III → II → I

38. The natural levees are ridges of sediment that slope away from the riverbank toward the floodplain. Which process most likely formed these levees?
 A) weathering of the soil on the riverbanks
 B) erosion on the inside curves of the meanders
 C) deposition by the Yazoo stream
 D) deposition when the river overflowed its banks.

39. During transport by this river, what will most likely happen to a particle, such as a small stone?
 A) more rounded B) more dense C) heavier D) larger

40. A layer of porous and permeable rock through which water flows is
 A) artesian B) a water table C) an aquifer D) a perched water table

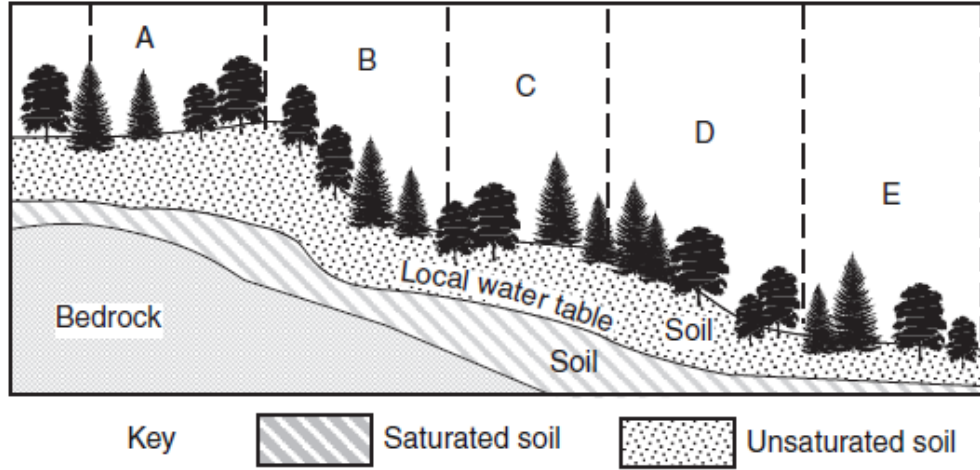
41. The substance which is dissolved in water and is mostly responsible for dissolving limestone to form caverns is
 A) tannic acid B) nitrogen C) carbon dioxide D) oxygen

42. When ground water dissolves limestone to form a cavern and the roof of the cavern collapses, the structure formed is a

- A) sink hole B) kettle hole C) kame D) esker

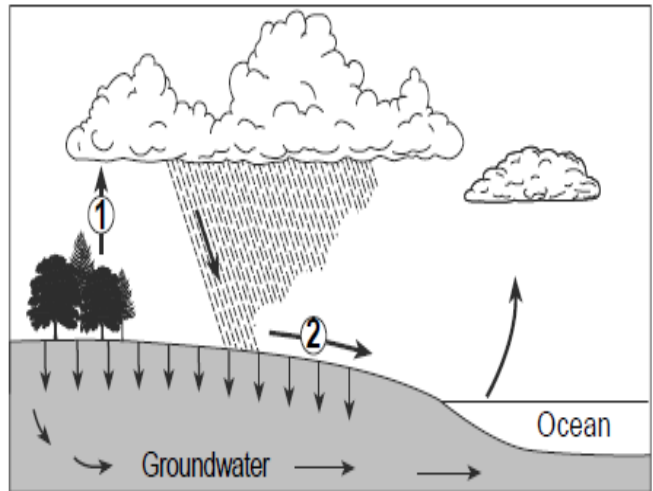
43. A farmer wants to drill a well for water for his cows in the field. His field has been divided into the sections below. Where could the well be drilled in order to have the **greatest natural pressure** on the water?

- A) A only
 B) B and C
 C) E only
 D) D only



44. The diagram below represent processes in the water cycle. Which processes in the water cycle are identified by the numbered arrows?

- A) process 1 is transpiration: process 2 is runoff
 B) process 1 is precipitation: process 2 is runoff
 C) process 1 is condensation: process 2 is infiltration
 D) process 1 is evaporation: process 2 is infiltration



45. The photographs below show the same coastal location at two different times during the same day. Which statement best explains the cause for the higher water level at 6:52 pm?



People on Beach
12:40 p.m.



People Boating
6:52 p.m.

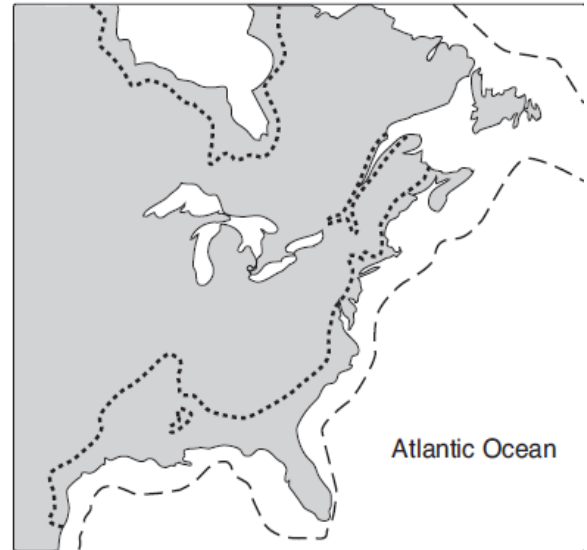
Source: thehopewellrocks.ca (adapted)

- A) Earth's rotation causes a deflection of surface ocean currents
 - B) Earth's tilted axis causes different amount of insolation during the day.
 - C) The Moon exerts a gravitational pull on the rotating Earth
 - D) The Moon rotates on its axis as the same rate that it revolves around the Earth..
46. The Greenhouse Effect is probably causing sea level to rise. The main direct cause of the rising sea level is
- A) melt water from the melting ice caps
 - B) isostatic rise of the sea floor
 - C) isostatic sinking of the continents
 - D) thermal expansion of sea water
47. Most of Earth's surface ocean current patterns are primarily caused by
- A) the force of gravity
 - B) the impact of precipitation
 - C) prevailing winds
 - D) river currents
48. Which is the best example of **physical weathering**?
- A) The transportation of sediment by a stream or river
 - B) The cracking of rock by freezing and thawing of water
 - C) The effect of acid rain on limestone
 - D) The formation of a sandbar along the side of a stream
49. The wearing away of rocks by solid particles carried by wind, water, and other forces is called
- A) exfoliation
 - B) Abrasion
 - C) Oxidation
 - D) leaching

The map below shows part of the coastline of North America. Use the map with questions # 50 & 51. The solid line represents the present coastline. The key with a — — — — represents the coast line 18,000 years ago. The future coast line being represented by - - - - - .

50. Which statement below best explains why 18,000 years ago the coastline was at a different location than it is today?

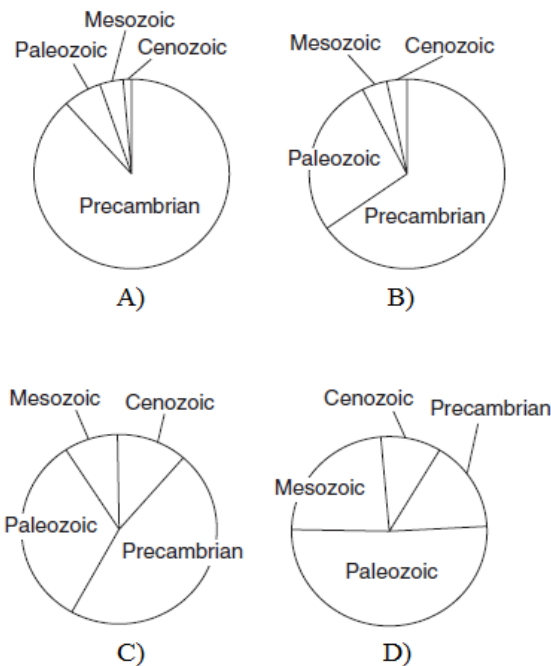
- A) The climate of the Earth was extremely hot and dry.
- B) A large amount of the Earth's water was stored in large continental sheets of ice.
- C) The east coast of North America was being subducted under the Eurasian Plate.
- D) North America had just separated from Africa, and the Atlantic Ocean was forming.



51. What assumption is being made about the future position of the coastline?

- A) the total amount of global precipitation will decrease
- B) the thickness of the ozone layer will decrease
- C) the concentration of carbon dioxide in the Earth's atmosphere will increase
- D) The rate of uplift of North American continent will increase.

52. Which graph best represents the relative length of time of the major intervals of Earth's geologic history?

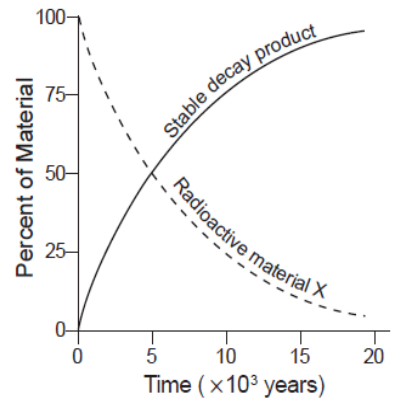


GEOLOGIC TIME			
Eras	Periods	Epochs	Began (ybp)
Cenozoic	Quaternary	Holocene	10t
		Pleistocene	1.6m
	Tertiary	Pliocene	5.3m
		Miocene	23.7m
		Oligocene	36.6m
		Eocene	57.8m
Paleocene	66.4m		
Mesozoic	Cretaceous		144m
	Jurassic		208m
	Triassic		245m
Paleozoic	Permian		286m
	Pennsylvanian		320m
	Mississippian		360m
	Devonian		408m
	Silurian		438m
	Ordovician		505m
	Cambrian		570m
preCambrian			4.5b

The graph below represents a radioactive substance, X and the resulting stable decay product.

53. What is the approximate half-life of radioactive substance X?

- A) 5,000 years
- B) 10,000 years
- C) 50,000 years
- D) 100,000 years



54. Material X can only be used to date young geologic material because X

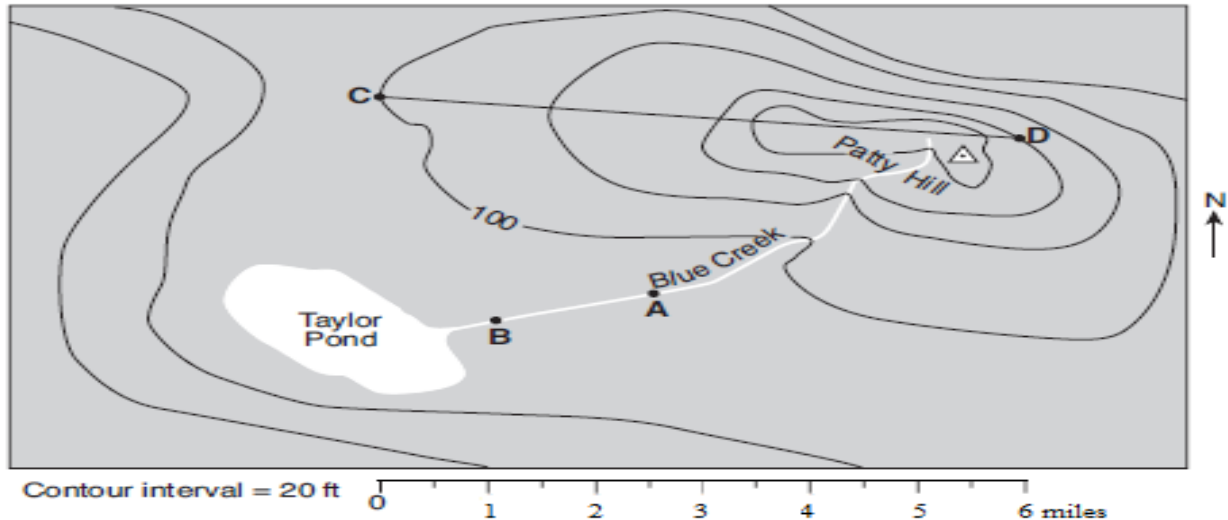
- A) has a relatively short half-life
- B) never existed in older rocks
- C) has only recently become radioactive
- D) has only recently been discovered

55. If substance X were heated, the length of its half-life would

- A) increase
- B) remain the same
- C) decrease
- D) decrease while heating and increase while cooling.

Use the map below for questions ____ to _____. Points A, B, C, and D are locations on the map.

The top of Patty Hill is marked with a dot in the middle of a triangle.



56. What is the approximate elevation at the top of Patty Hill?

- A) 160 ft
- B) Less than 160 ft
- C) 180 ft
- D) more than 160 ft

57. What is the direction of Taylor Pond from the top of Patty Hill?

- A) North East
- B) South East
- C) North West
- D) South West

58. Which side of Patty Hill is the steepest?

- A) North
- B) South
- C) West
- D) East

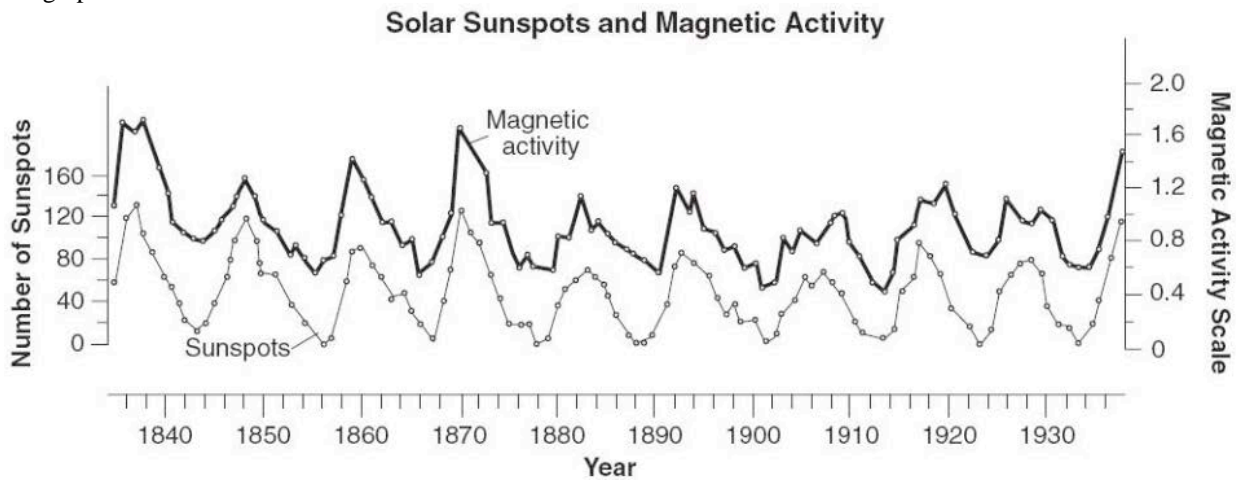
59. What is the approximate gradient from point C to the top of Patty Hill?

- A) 10 ft/mile
- B) 5.5 ft/mile
- C) 60 ft/mile
- D) 6 ft /mile

60. A student placed a block of wood at point A. 15 minutes later it arrived at point B. What is the approximate speed of the river in miles per hour?

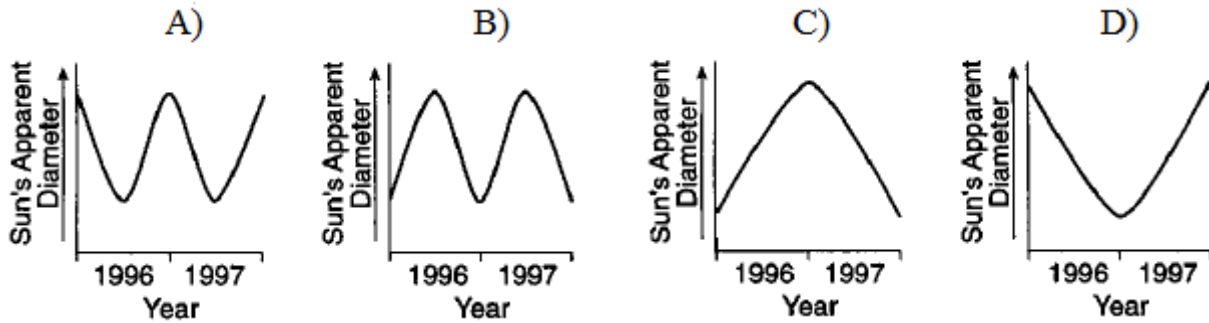
- A) 0.1 miles/hour
- B) 6 miles/hour
- C) 12 miles/hour
- D) 14 miles/hour

61. The graph below shows changes in the Sun's magnetic activity and changes in the number of sunspots over a period of approximately 100 years. Sunspots are dark, cooler areas within the Sun's photosphere that can be seen from Earth. The graph indicates the years having the greatest number of sunspots. Which statement below correctly interprets the graph?

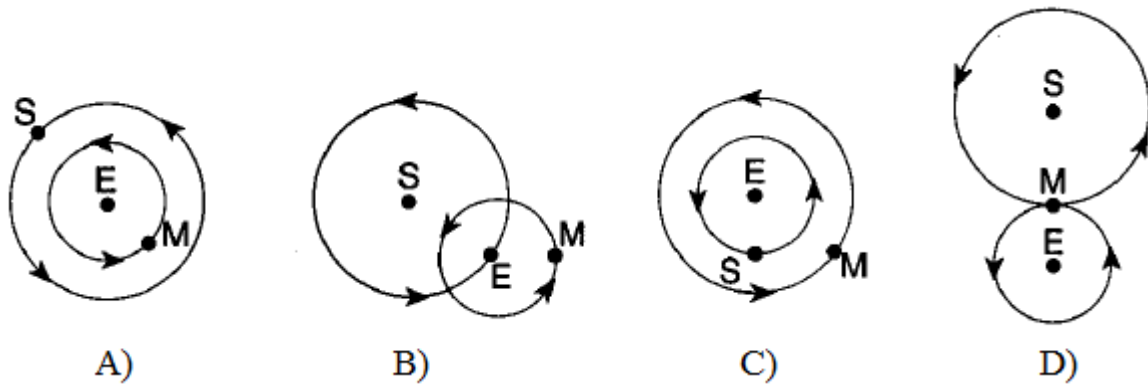


- A) randomly and unpredictably
- B) precisely at the beginning of each decade
- C) in a cyclic pattern, repeating approximately every 6 years
- D) in a cyclic pattern, repeating approximately every 11 years

62. An observer on Earth measured the apparent diameter of the Sun over a 2 year time period. Which graph below best represents the Sun's apparent changing diameter during the 2 years?

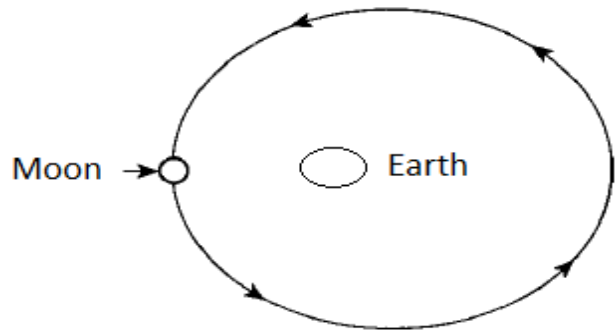


63. Which diagram below best represents a portion of the heliocentric model of our solar system?
E = Earth, S = Sun, M = Moon.



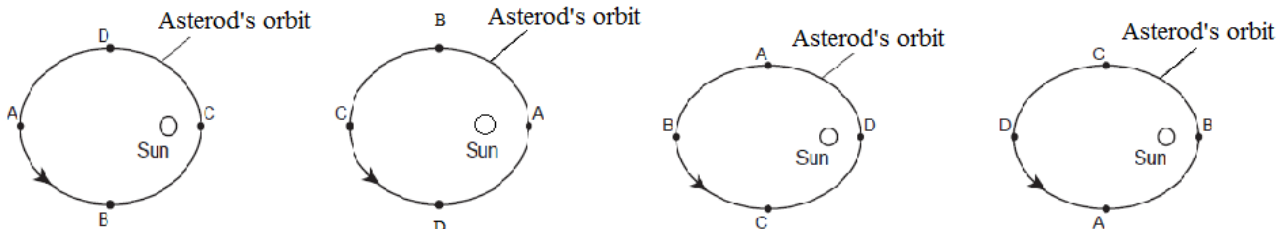
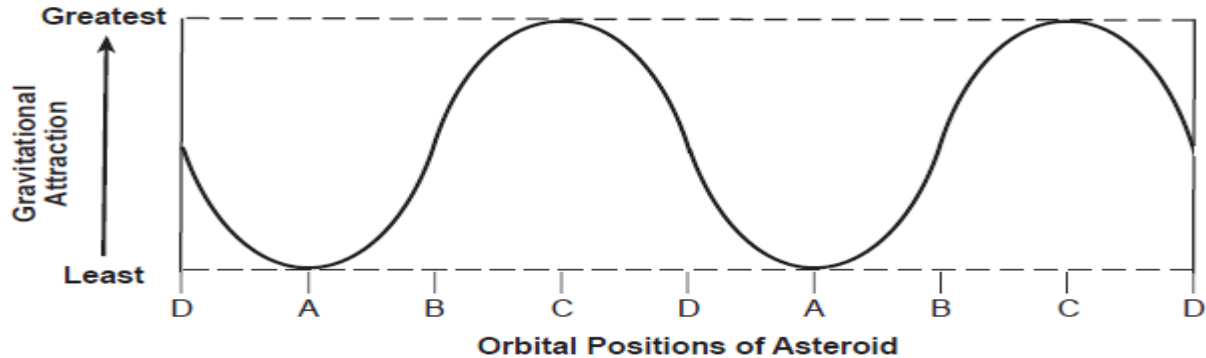
64. The diagram below represents the moon revolving around the Earth in an elliptical orbit. As the Moon makes one **complete revolution** around the Earth starting at the position shown, how will the gravitational attraction between the Moon and Earth vary?

- A) decrease, then increase
- B) increase, then decrease
- C) remain the same
- D) steadily decrease



The graph below shows the varying amount of gravitation attraction between the Sun and an asteroid in our solar system. Letters A, B, C, and D are four positions in the asteroid's orbit around the Sun.

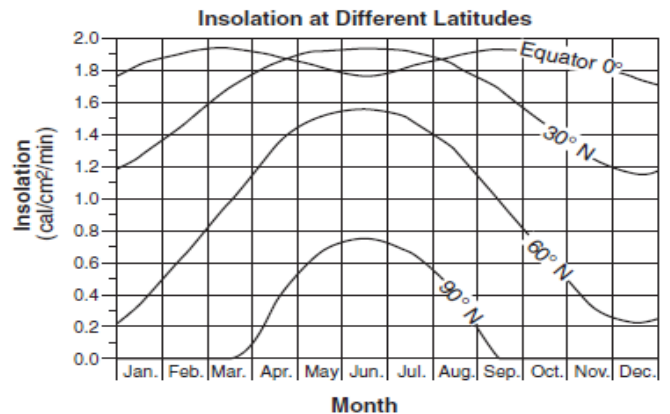
65. Which diagram best represents the positions of the asteroid in its orbit around the Sun?



The graph below shows the amount of insolation during one year at four different latitudes on Earth.

66. Which statement describes how insolation varies?

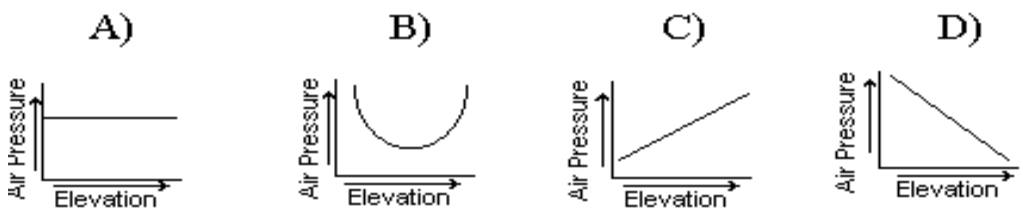
- A) varies with latitude and time of day
- B) varies with latitude and time of year
- C) varies with longitude and time of day
- D) varies with longitude and time of year.



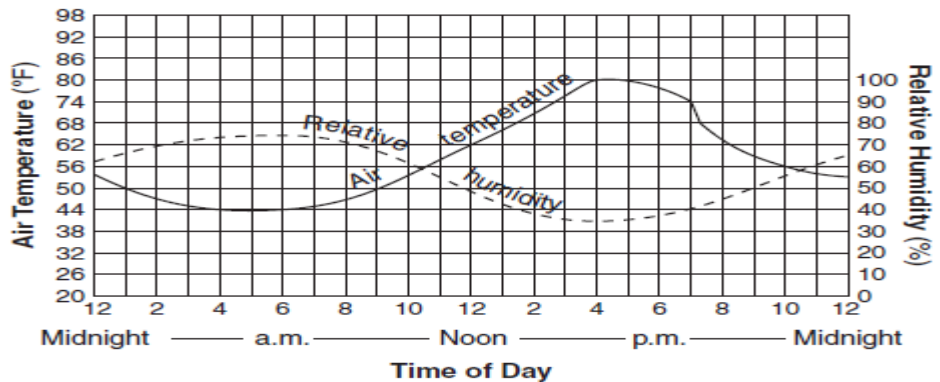
67. Why is insolation less during June at the equator than during March or September?

- A) the Sun's vertical rays are north of the equator in June.
- B) there are more clouds during June than the other months.
- C) the wind blows the insolation away from the equator during June.
- D) the daylight period is longest in June at the equator.

68. A weather balloon is release into the atmosphere on a calm day. Which graph best represents the relationship between pressure and elevation as the balloon rises?



The graph below shows air temperature and relative humidity at a location during a 24 hour period. Use with #69 & 70



69. From 12 noon to 4 pm what was the approximate change in relative humidity?

- A) 15%
- B) 30%
- C) 20%
- D) 40%

70. As the difference between dew point temperature and the air temperature decreases the probability of precipitation

- A) decreases
- B) remains the same
- C) increases
- D) is not possible.

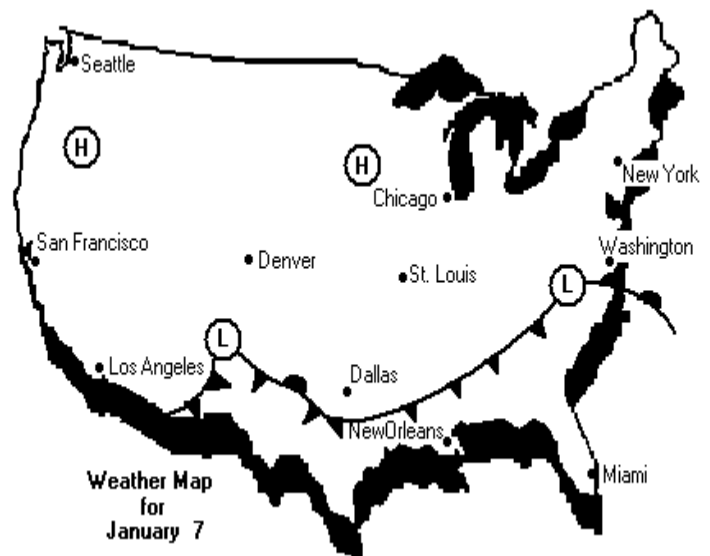
Use the weather map below for questions # 71 and 72.

71. According to the weather map below, Chicago, close to the Great Lakes, should be experiencing high winds out of the

- A) north east
- B) south east
- C) south west
- D) north west

72. If Chicago, Denver, and St. Louis are all under the same continental polar air mass, then the temperatures in Denver and St. Louis should be

- A) about the same as in Chicago
- B) warmer than in Chicago
- C) colder than in Chicago



NEW JERSEY SCIENCE LEAGUE **No Corrections**
 EARTH SCIENCE EXAM ANSWER KEY **TAN TEST**

DATE: February 9, 2017

1	B	19	C	37	A	55	B
2	C	20	A	38	D	56	D
3	B	21	C	39	A	57	D
4	C	22	A	40	C	58	A
5	C	23	B	41	C	59	A
6	C	24	B	42	A	60	B
7	B	25	B	43	C	61	D
8	D	26	D	44	A	62	A
9	B	27	C	45	C	63	B
10	A	28	C	46	D	64	A
11	B	29	B	47	C	65	A
12	A	30	A	48	B	66	B
13	C	31	B	49	B	67	A
14	C	32	B	50	B	68	D
15	C	33	C	51	C	69	A
16	D	34	C	52	A	70	C
17	D	35	C	53	A	71	D
18	B	36	B	54	A	72	A

Test Specifications

Since some earth science courses in New Jersey start with geology, others with astronomy, and still others with meteorology, each of the four tests will include the following topics. Over time, this provides an equal opportunity to everyone. The number in parentheses indicates the number of questions for that topic. The number per topic occasionally varies by one or two, but usually does not.

Minerals (4)	Sun (2)
Rocks (2)	Moon (2)
Earth Structure (3)	Sun-Moon-Earth System (3)
Plate Tectonics (4)	Solar System (2)
Faults/Folds/Seismology (4)	Stars (2)
Vulcanism (2)	Galactic Systems (1)
Glaciation/Deserts (2)	Cosmology (1)
Rivers: Erosion & Deposition (4)	
Ground Water/Caves (3)	Insolation/Temperature/Air Masses (3)
Ocean Shore Line/Currents/Salinity(3)	Atmospheric Pressure/Highs/Lows (3)
Weathering/Mass Wasting (3)	Moisture in the Atmosphere (2)
Historical Geology (4)	Frontal Systems (3)
Map Reading: Road/Topo/Geologic (4)	Interpreting Weather Maps (3)
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Dates for 2017 Season

Thursday January 12, 2017 Thursday February 9, 2017

Thursday March 9, 2017 Thursday April 13, 2017

All schools must complete the April exam and mail in the results by April 28th, 2017

New Jersey Science League

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What is to be mailed back to our office?

PLEASE RETURN THE AREA RECORD AND ALL TEAM MEMBER SCANTRONS (ALL STUDENTS PLACING 1ST, 2ND, 3RD, AND 4TH).

If you return scantrons of alternates, then label them as ALTERNATES.

Dates 2018 Season

Thursday January 11, 2018 Thursday February 8, 2018

Thursday March 8, 2018 Thursday April 12, 2018

Earth Science March 9, Exam 2017 **TAN EXAM Corrections:**

Please PRINT your name, school, area, and which test you are taking onto the scan-tron. Choose the answer that best completes the statements or questions below and fill in the appropriate response on the scantron. If you change an answer, be sure to completely erase your first choice.

1. Galena breaks along three different flat planes to form cubes. This property of minerals is called
 A) cleavage B) rupture C) fracture D) rift

2. An unidentified mineral is softer than calcite, exhibits a metallic luster and cubic cleavage. This mineral most likely is

- A) galena
- B) pyrite
- C) halite
- D) pyroxene

Mohs Scale of Hardness		
Talc	1	graphite
Gypsum	2	finger nail (2.5)
Calcite	3	halite and galena = 2.5 copper (3.5)
Fluorite	4	iron nail 4.5
Apatite	5	knife (5.5) pyroxene 5.5-6.5
Orthoclase	6	glass (<6)
Quartz	7	pyrite 6.5 streak plate 7
Topaz	8	
Corundum	9	
Diamond	10	

3. Some of the properties of diamond are different than graphite because diamond:

Data Table

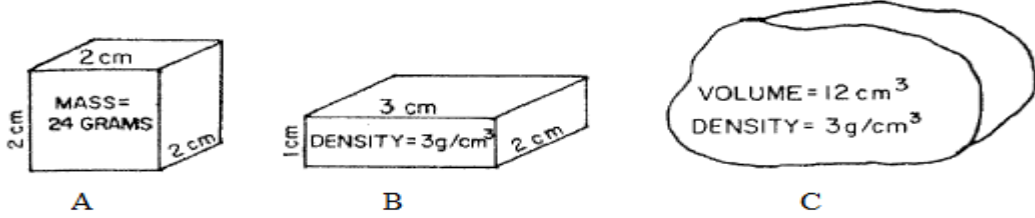
Mineral	Composition	Depth of Formation	Hardness	Electrical Conductor
graphite	carbon	shallow	1	good
diamond	carbon	very deep	10	poor

- A) has a different arrangement of atoms
- B) diamond is a poor conductor of electricity
- C) forms larger crystals
- D) has a different chemical composition

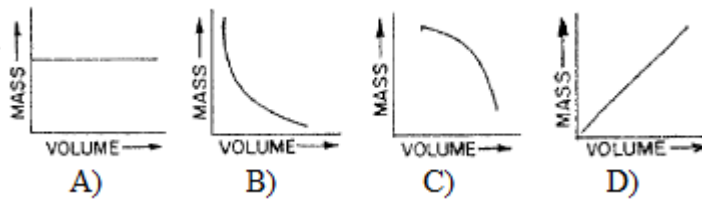
4. Moh's scale of hardness is in #2 above. Which statement is best supported by the scale?

- A) A fingernail will scratch calcite, but not quartz.
- B) A fingernail will scratch quartz, but not calcite
- C) A piece of glass can be scratched by quartz, but not by calcite.
- D) A piece of glass can be scratched by calcite, but not by quartz.

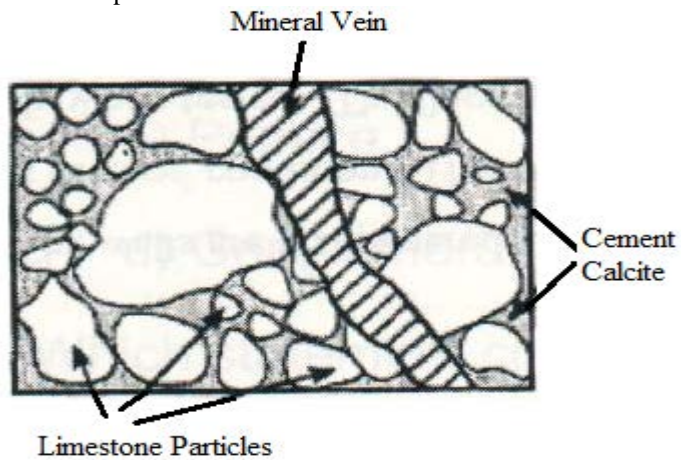
The diagrams below represent three samples of the same substance. Each has a different size and shape. Use the diagrams for questions # 5, 6, and 7.



5. What order of letters ranks the substance by volume from the smallest to the largest?
 A) C, A, B B) B, A, C C) A, B, C D) B, C, A
6. What is the mass of sample B?
 A) 2 g B) 4 g C) 6 g D) 18 g
7. Which graph best represents the relationship between the volume and mass of the substance?



8. Which mineral is most frequently found in both granitic continental crust and basaltic oceanic crust?
 A) olivine B) quartz C) potassium feldspar D) plagioclase feldspar
9. The three major groups of rocks are:
 A) igneous, sedimentary and plutonic C) igneous, sedimentary and metamorphic
 B) sialic, basic and mafic D) plutonic, intrusive, and extrusive
10. When subjected to heat and pressure by deep burial, limestone becomes
 A) marble B) phyllite C) schist D) gneiss
11. The diagram below is of a conglomerate rock. Which of the labeled parts is the oldest?



- A) the limestone particles
 B) the mineral vein
 C) the calcite cement
 D) the conglomerate rock itself

12. Which process would form sedimentary rock?
 A) cooling of molten magma with the Earth's crust
 B) re-crystallization of unmelted material within the Earth's crust
 C) cooling of lava flow on the Earth's surface
 D) precipitation of minerals as seawater evaporates.

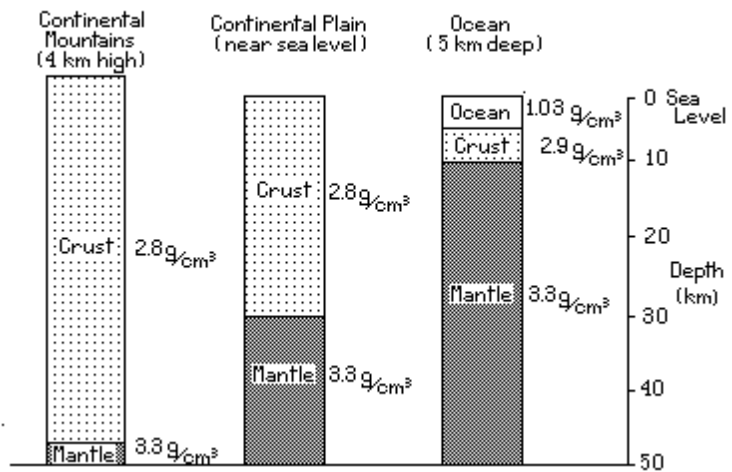
13. The ocean floor is made mostly of
 A) granite B) basalt C) sand D) coral

14. All of the rocks which make up the continents, taken together, resemble most closely
 A) granite B) basalt C) limestone D) shale

15. The diameter of the earth is about
 A) 2,000 miles (3220 km) C) 8,000 miles (12880km)
 B) 4,000 miles (6440 km) D) 24,000 miles (38640km)

The diagram below shows a column of rock to a depth of 50 km below sea level at three different locations. Use it with questions 16 and 17.

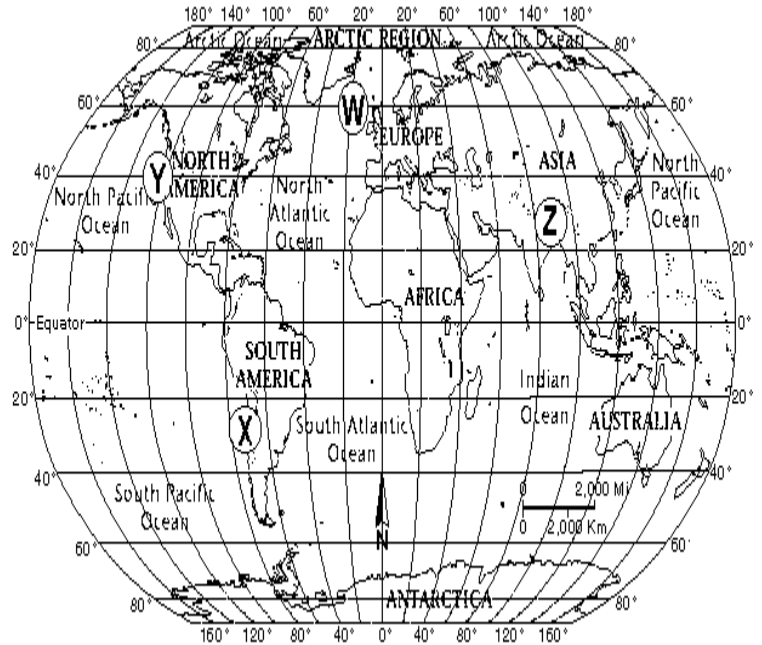
16. Compared with the oceanic crust the continental crust is
 A) thinner and less dense
 B) thinner and more dense
 C) thicker and less dense
 D) thicker and more dense



17. The division of the Earth's interior into crust and mantle, as shown in the diagram, is based primarily on the study of
 A) radioactive dating B) seismic waves C) volcanic eruptions D) gravity measurements

The world map, below, has four locations identified as W, X, Y, Z. Use the map with questions 18 and 19.

18. A volcano in the Chilean Andes Mountains erupts. Letter X on the map. The tectonic cause is
- A) the subduction of a plate carrying ocean floor.
 - B) collision of two plates carrying continents on their leading edges.
 - C) one plate sliding laterally along the edge of another.
 - D) two plates moving away from each other.



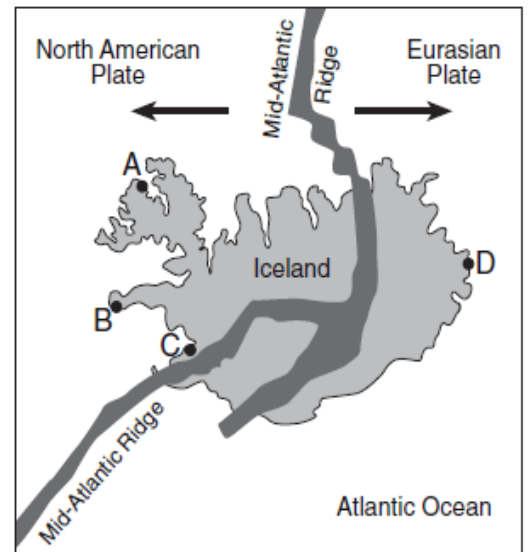
19. In 1986 the Baseball World Series in San Francisco was delayed by a major earthquake on a branch of the San Andreas fault, letter Y. The tectonic cause was
- A) the subduction of a plate carrying ocean floor.
 - B) collision of two plates carrying continents on their leading edges.
 - C) one plate sliding laterally along the edge of another.
 - D) two plates moving away from each other.

20. Each year, on the average, North America moves away from Europe due to seafloor spreading by about
- A) 0.5 centimeters
 - B) 5 centimeters
 - C) 5 meters
 - D) 5 kilometers

Use the drawing below of a map of Iceland for questions 21 and 22. Iceland is located on the Mid-Atlantic Ridge. There are four locations marked with letters A, B, C, and D.

21. Most of the igneous rock has a fine-grained texture. This texture is due to
- A) rapid cooling of the molten rock
 - B) high density of the molten rock
 - C) the many faults in the bedrock
 - D) the high pressure within the molten rock

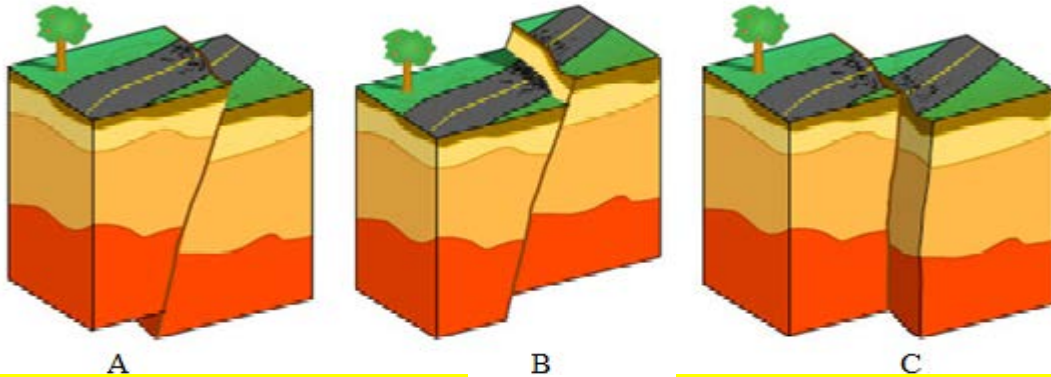
22. Which one of the four labeled sections has the youngest bedrock?
- A) A
 - B) B
 - C) C
 - D) D



23. Mid-ocean ridges (rifts) normally form where tectonic plates are
 A) converging B) stationary C) diverging D) sliding past each other

24. A crack or break in the earth's crust along which movement of the two surfaces has taken place is known as
 A) an earthquake B) a fissure C) a fault D) cleavage

25. In the diagram below are three types of faults with letters A, B, and C. What are the names of these faults according to the order in the diagram? All full credit. Diagram left out. Key has letter D.



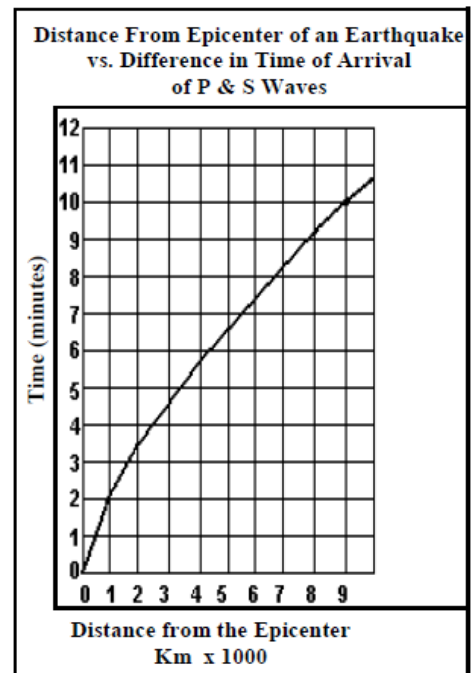
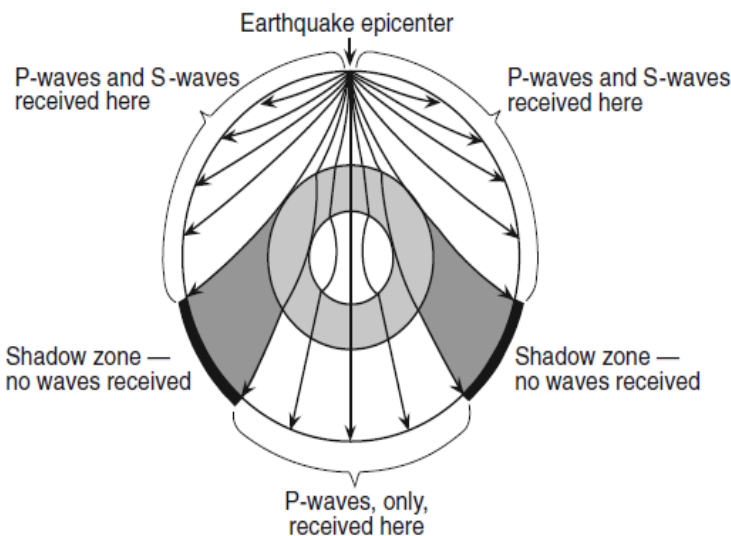
A) Normal Reverse Strike-slip
 B) Strike-Slip Normal Reverse

C) Reverse Strike-slip Normal
 D) Reverse Normal Strike-slip

Base your answers to questions # 26 and 27 on the cross section below. The cross section shows the paths of seismic waves traveling from an earthquake epicenter through different layers of the Earth's interior.

26. P-waves or S-waves are **not** received in the shadow zone because
 A) P-waves are absorbed and S-waves are refracted by the Earth's outer core.
 B) P-waves are refracted and S-waves are absorbed by the Earth's outer core.
 C) Both P-waves and S-waves are refracted by the Earth's outer core.
 D) both P-waves and S-waves are absorbed by the Earth's outer core.

27. A seismographic station records a travel time difference of 3 minutes between P-waves and S-waves of an earthquake. Approximately how far is the seismic station from the epicenter of the earthquake?
 A) 1000 km B) 1500 km C) 3200 km D) 4800 km



28. At which location would seismic measurements indicate that the Earth's crust is thickest?
A) The Gulf of Mexico B) The Mississippi Valley C) The Rock Mountains D) Lake Erie

29. Crater Lake, in Oregon, is in a caldera. A caldera forms
A) as a crater in a shield volcano
B) when a volcano collapses into the magma chamber
C) when a volcano explodes
D) as a crater in a cinder cone

30. The type of rock commonly formed by solidification of lava from volcanoes around the Pacific rim is
A) basalt B) diabase C) gabbro D) andesite

31. If a sheet or band of basalt cuts through several beds of sedimentary rock, the sheet or band of basalt is a
A) dike B) laccolith C) sill D) batholith

32. Which one of the following is **not** a common gas in magma?
A) sulfur dioxide B) carbon dioxide C) water vapor D) methane

33. The photograph below shows scratched and grooved bedrock with boulders on its surface. The scratches and grooves were most likely caused



A) alternating thawing and freezing of water cracked the bedrock
B) flooding from a nearby lake covered the bedrock.
C) A glacier dragged rocks over the bedrock
D) rocks from a landslide slid along the bedrock

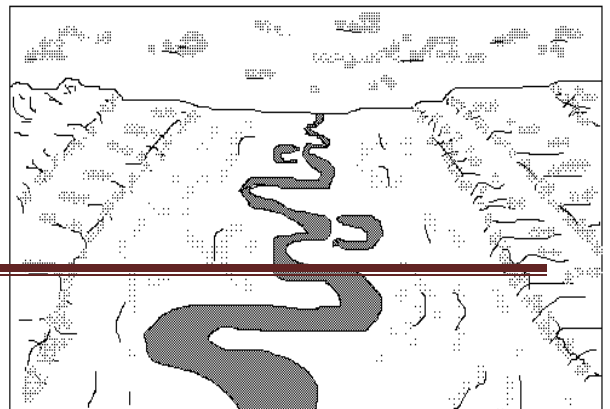
Source: www.nr.gov.nl.ca

34. The only large ice sheets found on earth's surface (actually on the ground) today are located on
A) Antarctica B) Greenland C) Alaska D) A and B only

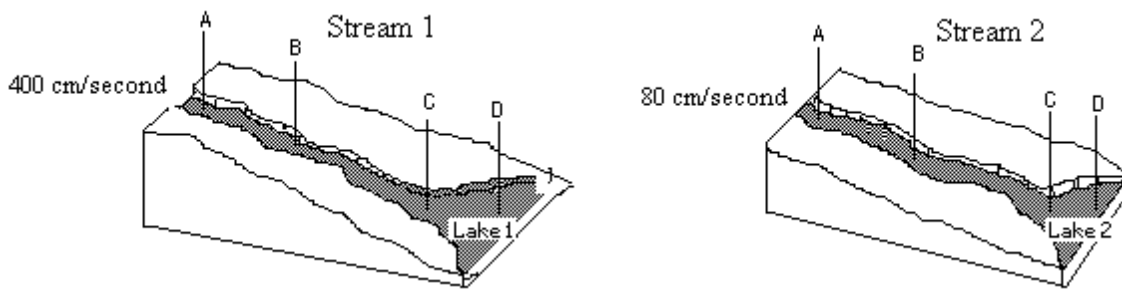
35. The river which separates New Jersey from Pennsylvania is the
A) Hudson River B) Mullica River C) Raritan River D) Delaware River

36. In the picture below are two lakes. These lake form when a river cuts through a neck of its meander. These lakes are called

A) a tarn
B) an oxbow
C) a cirque
D) a loop



Glacial sediments, containing clay, silt, sand, and pebbles, slide into each of the streams at points A. Notice that the water velocity is higher in Stream 1 than in Stream 2. Four different locations A, B, C, and D are marked on each stream. Use the diagrams below with questions 37 and 38.



37. What will most likely occur when the transported sediment in stream 2 reaches Lake 2?

- A) Clay particles will settle first.
- B) The largest particles will be carried farthest into the lake.
- C) The sediment will become more angular due to abrasion.
- D) The particles will be deposited in sorted layers.

38. In Lake 1, as the stream water moves from point C to point D, its velocity

- A) decreases
- B) increases
- C) remains the same

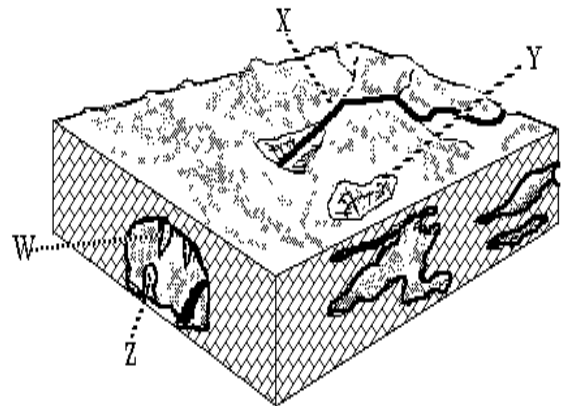
39. The surface level of a natural lake during periods of normal rainfall is usually

- A) below the water table
- B) above the water table
- C) at the water table
- D) unrelated to the water table

The diagram below shows caverns, surface depressions, and a river. Use the diagram with questions 40 and 41.

40. The depression in the ground above a limestone formation, shown by letter Y, is most likely a

- A) kettle
- B) pothole
- C) cirque
- D) sink



41. The stream, indicated by letter X above, is known as

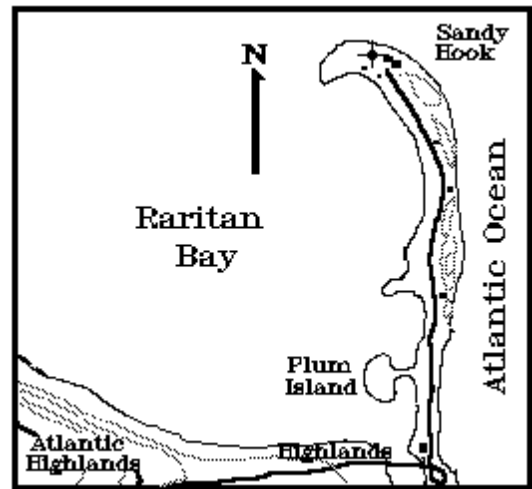
- A) an intermittent stream
- B) a disappearing stream
- C) a Karst stream
- D) a youthful stream

42. The narrow, sandy, barrier islands in the ocean along the coast of New Jersey were deposited over time by
 A) wind B) streams C) glacial ice D) wave action

43. When sand transported along a coast line encounters a shallow bay, it usually forms a
 A) beach B) barrier island C) tombolo D) bar

44. Sandy Hook derives its shape primarily from

- A) northeasterly winds washing sand around the end of a spit
- B) waves from southeasterly winds refracting waves around the end of a spit
- C) migration of dunes due to southeasterly winds
- D) convergence of waves from northeasterly and southeasterly winds



45. In which kind of climate does chemical weathering usually occur most rapidly?
 A) hot and dry B) hot and wet C) cold and dry D) cold and wet

46. Considering the rock cycle, which kind(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.

47. Which sediment is most easily picked up by the wind and transported by the wind?

- A) cobbles B) pebbles C) sand D) silt

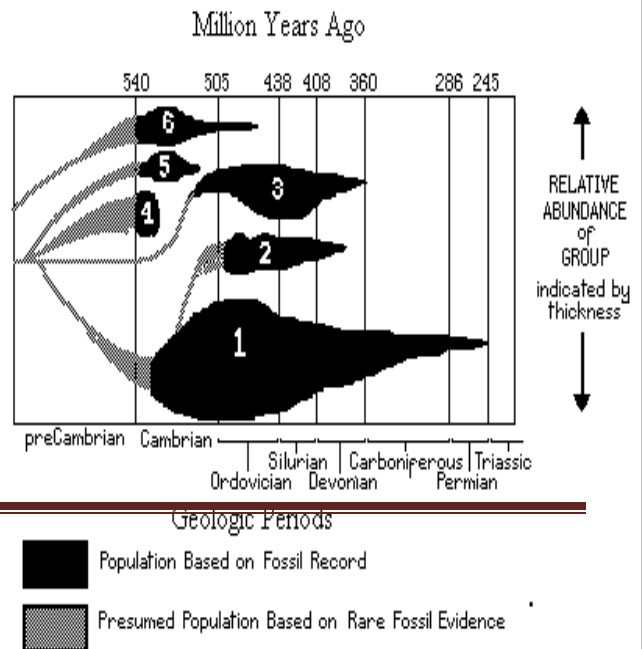
The graph below shows the growth in population and extinction of the six major groups of trilobites, labeled 1 through 6. Use it with questions 48, 49, 50, and 51.

48. The group of trilobites that became the most abundant was

- A) group 1 C) group 4
- B) group 3 D) group 6

49. Which fossil group would be the best index fossil for the entire Paleozoic Era?

- A) group 1 C) group 4
- B) group 2 D) group 6



56. What day will the sun set due west?

- A) Sept 22
- B) Dec 22
- C) June 21
- D) none of these

57. In which general direction did the observer look to see the sunset each day?

- A) North
- B) South
- C) East
- D) West

58. The large craters, such as Copernicus, on the moon were produced by

- A) impact of meteors
- B) volcanic eruptions
- C) collapse of calderas
- D) collapse of sinks

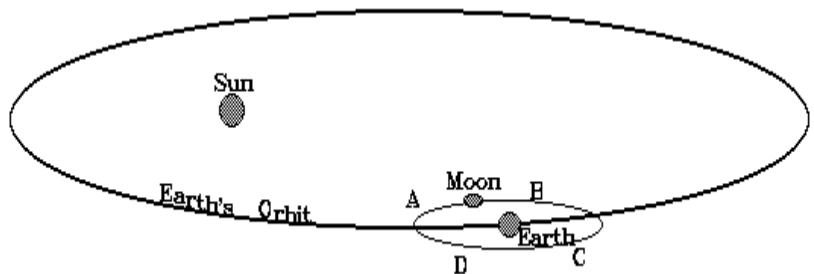
59. The length of one complete lunar cycle (new moon to new moon) is closest to

- A) 8 days
- B) 17days
- C) 27 days
- D) 29 days

60. The usual number of low tides which occur each day at any given place at the ocean shore is

- A) one
- B) two
- C) three
- D) four

61. The highest tides will occur when the moon is at either of which two positions as shown by the diagram below?



- A) A and C
- B) B and D
- C) C and D
- D) B and C

62. We have summer in New Jersey when the

- A) earth is closest to the sun
- B) south pole is tilted toward the sun
- C) north pole is tilted toward the sun
- D) sun is hottest

63. Spectral lines from star light often can tell us the star's

- A) composition , only
- B) composition and size
- C) composition and velocity
- D) velocity and size

64. Stable stars, like our sun, maintain a balance between

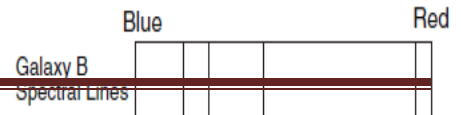
- A) mass and energy
- B) shrinking due to gravity and enlargement from collecting more gases
- C) shrinking due to gravity and shrinking due to cooling
- D) expansion due to thermal energy and shrinking due to gravity

65. The spectra of three galaxies were collected and compared to a laboratory sample of the hydrogen gas.

What conclusion can be drawn about the movement of galaxies A, B, and C?

A) galaxies A and B are moving away from the Earth, but C is moving toward the Earth

B) Only galaxy C is moving away from the Earth



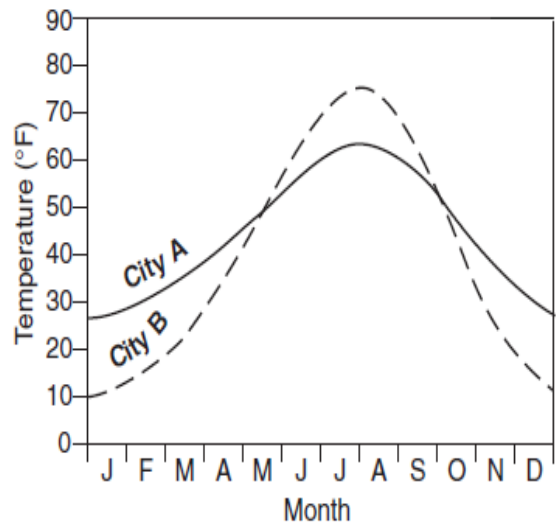
- C) all three galaxies are moving toward the Earth
- D) all three galaxies are moving away from the Earth

66. Our Sun's position in space is best described as the approximate center of
 A) a constellation B) the Milky Way galaxy C) the universe D) our solar system

67. Recently a star was found to have 7 planets all about in the same orbit. It was thought that these planets could have life on them because they are very similar to Earth. This star is about 40 light years away from Earth. Most likely this star is in which galaxy below?
 A) Andromeda galaxy B) Milky Way Galaxy C) Bodes Galaxy D) Black Eye Galaxy

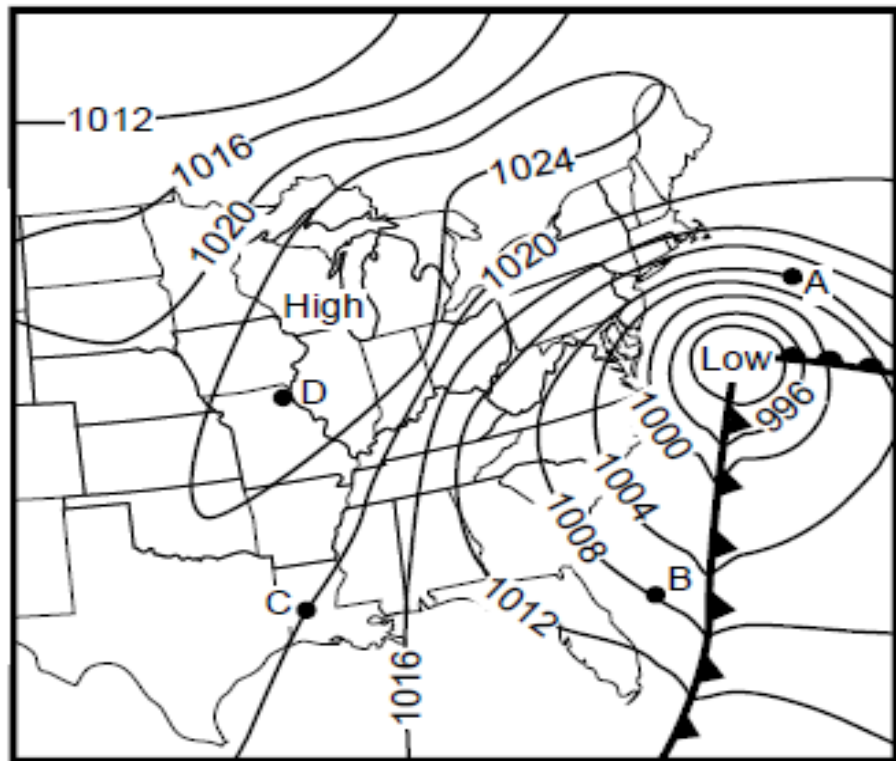
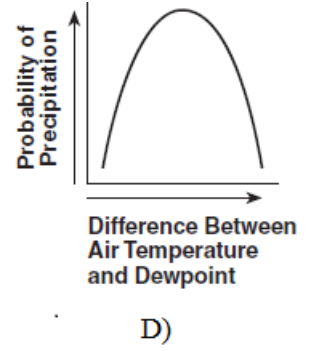
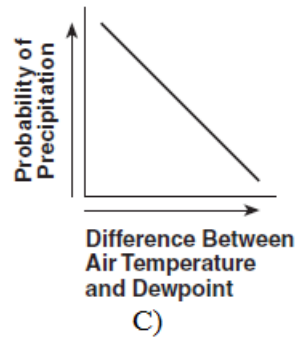
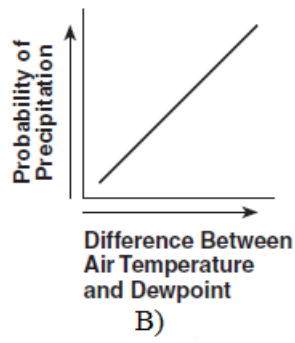
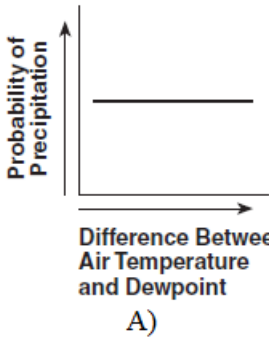
68. The graph below shows the average temperatures for cities A and B for one year. Where are these two cities most likely located?

- A) Both cities are in the Northern Hemisphere with city A inland and B on the coast
- B) Both are in the Southern Hemisphere with city A inland and B on the coast.
- C) Both are in the Northern Hemisphere with city A on the coast and B inland
- D) Both are in the Southern Hemisphere with city A on the coast and B inland.



69. Which of the following Earth surfaces usually reflects the most incoming solar radiation?
 A) snow cover B) dark soil C) green grass D) lake water

70. Which graph best represents the probability of precipitation and the difference between air temperature and dew point?



71. What do the isolines on this weather map represent?

- A) density
- B) humidity
- C) pressure
- D) temperature

72. Of the lettered locations on the map where are the strongest winds?

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

NEW JERSEY SCIENCE LEAGUE **Corrections**
 EARTH SCIENCE EXAM ANSWER KEY **TAN TEST**

DATE: March 9, 2017

1	A	19	C	37	D	55	D
2	A	20	B	38	A	56	A
3	A	21	A	39	C	57	D
4	C	22	C	40	D	58	A
5	B	23	C	41	B	59	D
6	D	24	C	42	D	60	B
7	D	25	D (all full credit)	43	D	61	A
8	D	26	B	44	B	62	C
9	C	27	B	45	B	63	C
10	A	28	C	46	D	64	D
11	A	29	B	47	D	65	D
12	D	30	D	48	A	66	D
13	B	31	A	49	A	67	B
14	A	32	D	50	B	68	C
15	C	33	C	51	B	69	A
16	C	34	D	52	C	70	C
17	B	35	D	53	A	71	C
18	A	36	B	54	B	72	A

Test Specifications

Since some earth science courses in New Jersey start with geology, others with astronomy, and still others with meteorology, each of the four tests will include the following topics. Over time, this provides an equal opportunity to everyone. The number in parentheses indicates the number of questions for that topic. The number per topic occasionally varies by one or two, but usually does not.

Minerals (4)	Sun (2)
Rocks (2)	Moon (2)
Earth Structure (3)	Sun-Moon-Earth System (3)
Plate Tectonics (4)	Solar System (2)
Faults/Folds/Seismology (4)	Stars (2)
Vulcanism (2)	Galactic Systems (1)
Glaciation/Deserts (2)	Cosmology (1)
Rivers: Erosion & Deposition (4)	
Ground Water/Caves (3)	Insolation/Temperature/Air Masses (3)
Ocean Shore Line/Currents/Salinity(3)	Atmospheric Pressure/Highs/Lows (3)
Weathering/Mass Wasting (3)	Moisture in the Atmosphere (2)
Historical Geology (4)	Frontal Systems (3)
Map Reading: Road/Topo/Geologic (4)	Interpreting Weather Maps (3)
Geodesics/Time/Map Projections (3)	

Dates for 2017 Season

Thursday March 9, 2017 Thursday April 13, 2017

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Earth Science April Exam 2017 **TAN EXAM Corrections**

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Choose the answer that best completes the statements or questions below and fill in the appropriate response on the scantron. If you change an answer, be sure to completely erase your first choice.

1. Weighing a lump of yellow metallic mineral gives a mass of 24.5 grams. Placing the mineral in a graduated cylinder, you find its volume to be about 4 cm³. Using the table below determine the identity of the mineral. **All full credit. Wrong chart.**

- A) gold
- B) chalcopryite
- C) pyrite
- D) arsenopyrite

Density of Minerals	
Mineral	Density
Chalcocite	5.5 - 5.8
Galena	7.58
Quartz	2.65
Pyrite	5.01

2. The general name for a mineral or group of minerals mined for their economic value is

- A) gangue B) burden C) wad D) ore

3. The most abundant element found in rocks and minerals on the earth's surface is

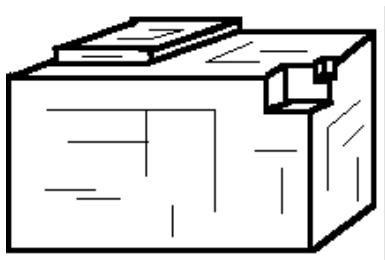
- A) silicon B) iron C) magnesium D) oxygen

4. The mica minerals are silicates that cleave in thin layers and show a single direction of cleavage. The silicate groups in the crystal structure are linked together to form

- A) rings B) chains C) two dimensional sheets D) three dimensional frameworks

5. The block of galena, shown below, displays how many directions of cleavage?

- A) 3 B) 6 C) 9 D) 12



6. Which home-building material is made mostly from the mineral gypsum?

- A) plastic pipes B) window glass C) iron nails D) drywall panels

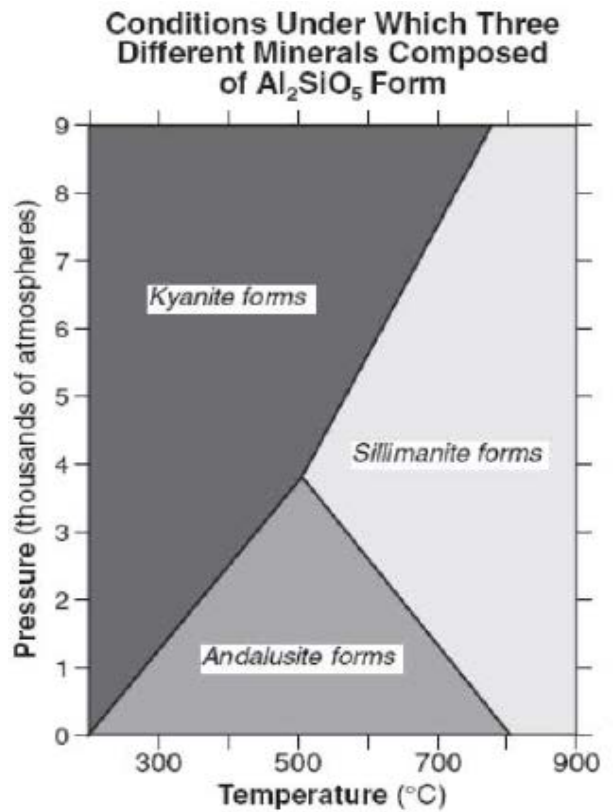
The diagram below shows the crustal temperature and pressure conditions under which three different minerals with the same chemical composition (Al_2SiO_5) crystallize. Use the diagram with questions # 7 and 8.

7. Under which crustal temperature and pressure conditions will andalusite form?

- A) 300°C and 6000 atmospheres
- B) 500°C and 2000 atmospheres
- C) 600°C and 4000 atmospheres
- D) 700°C and 8000 atmospheres

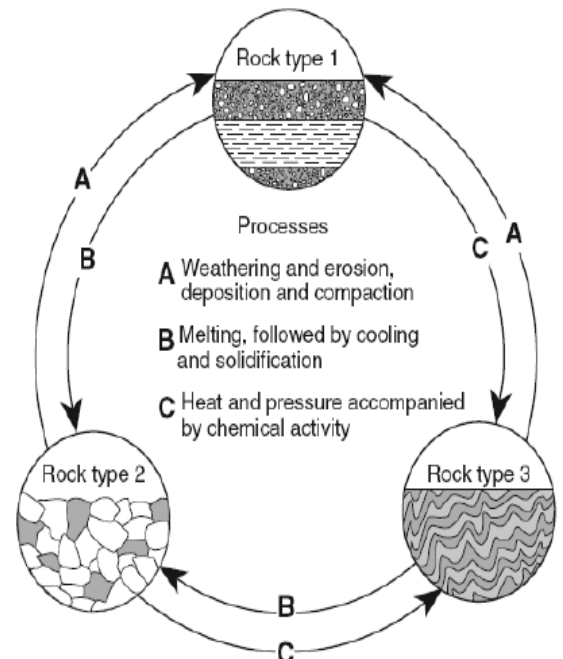
8. It is found that bedrock at a collisional plate boundary contained andalusite crystals. These crystals will change into sillimanite crystals as the pressure and temperature continues to increase. This change of andalusite into sillimanite is called _____?

- A) weathering
- B) solidification
- C) cementation
- D) metamorphism



9. The diagram below represents geological processes that act continuously on Earth to form different rock types. Which choice correctly classifies each rock type which are listed as 1, 2, 3?

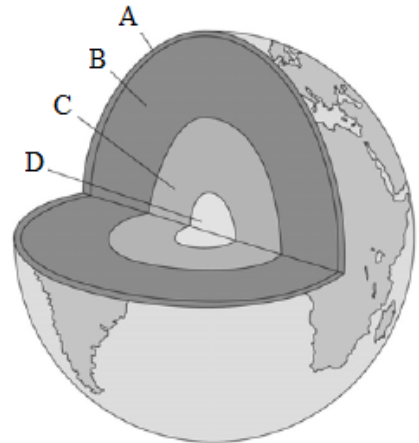
	1.	2.	3.
A)	sedimentary	metamorphic	igneous
B)	metamorphic	sedimentary	igneous
C)	igneous	metamorphic	sedimentary
D)	sedimentary	igneous	metamorphic



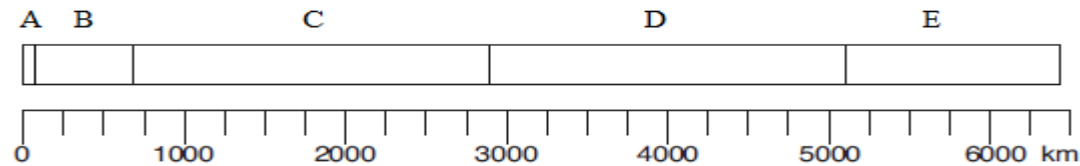
10. Intrusive rocks usually cool slowly, thus their crystals are
 A) small B) large C) perfectly formed D) euhedral
11. The material from which all rock originally formed is
 A) magma B) lava C) sediment D) crystals
12. Most rock forming minerals are silicates which are made up of a repeating units of oxygen and silicon in the geometric form of a
 A) hexoctahedron B) octahedron C) dodecahedron D) tetrahedron
13. Glass is chemically related to which mineral below?
 A) quartz B) pyrite C) halite D) Fluorite
14. What is the origin and rate of formation of the igneous rock below?
 A) plutonic with slow cooling
 B) plutonic with rapid cooling
 C) volcanic with slow cooling
 D) volcanic wit rapid cooling



15. The portion of the Earth labeled B in the diagram below is the
 A) crust
 B) mantle
 C) core
 D) lithosphere



The diagram below represents zones of the Earth's interior, identified by letters A through E. The depth is measured in kilometers.



16. Approximately what % of the distance to the center of the Earth does the mantle represent?
 A) 56% B) 35% C) 8% D) 1%
17. Based on the diagram in #16 what is the approximate thickness of the crust?
 A) 70 km B) 125 km C) 250 km D) 300 km

18. Crustal plates separate and new crust is produced at

- A) continental mountain ranges
- B) oceanic trenches
- C) mid-oceanic ridges
- D) island arcs

19. The supercontinent which existed when all the present continents were last joined is known as

- A) Gondwanaland
- B) Eurasia
- C) Laurasia
- D) Pangaea

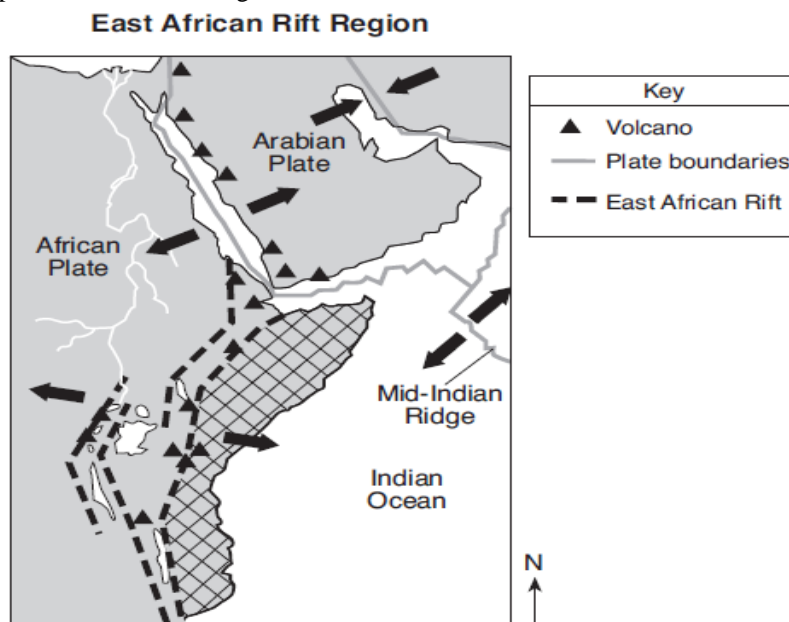
20. Magma from the mantle wells up to create new edges on crustal plates in

- A) subduction zones
- B) rift valleys
- C) island arcs
- D) hot spots

21. Iceland is a portion of the Mid-Atlantic Ridge which extends above the surface of the ocean. Volcanoes on Iceland result from a

- A) rift zone
- B) hot spot
- C) subduction zone
- D) laccolith

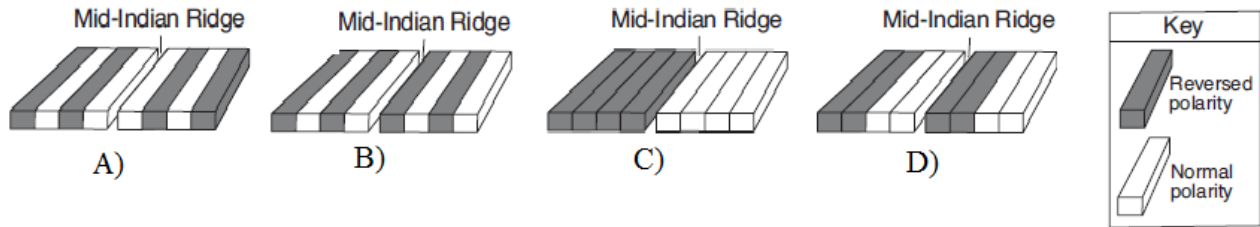
The map below shows the tectonic plate boundaries near the East African Rift. The arrows show the relative tectonic plate movement. A region of Africa is crosshatched.



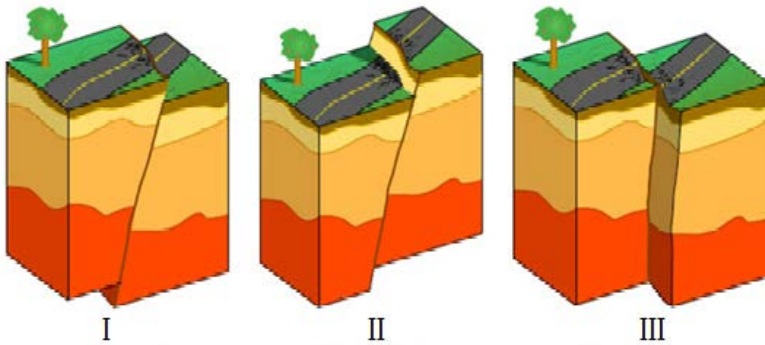
22. What appears to be happening to the crosshatched region of eastern Africa?

- A) The region is moving northward relative to the rest of Africa.
- B) The region is moving eastward relative to the rest of Africa
- C) Several volcanic mountains are forming as the rest of Africa subducts under this region.
- D) A folded mountain range is forming as this region collides with the rest of Africa.

23. Which diagram best represents the polarity of the magnetic field preserved in the ocean-floor bedrock found on both sides of the Mid-Indian Ridge?



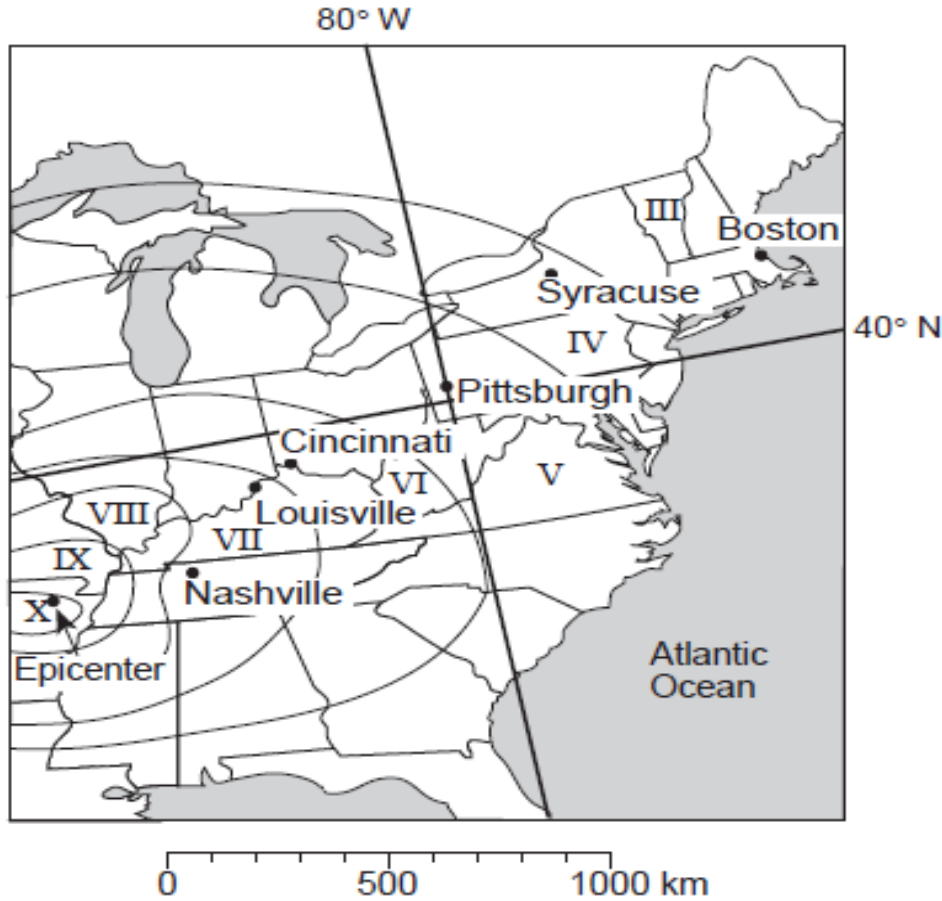
24. In the diagram below are three types of faults with numerals I, II, and III. What are the names of these faults according to the order in the diagram?



	I	II	III
A)	Normal	Reverse	Strike-slip
B)	Strike-Slip	Normal	Reverse
C)	Reverse	Strike-slip	Normal
D)	Reverse	Normal	Strike-slip

25. Earthquakes occur in California because
- A) earthquakes always accompany volcanoes
 - B) California is sinking into the Pacific Ocean
 - C) giant underground explosions occur every few years
 - D) two blocks of the earth's crust are grinding past each other

The map shows an earthquake that occurred slightly southwest of New Madrid, Missouri on December 16, 1811. The Roman Numerals on the map were determined from the Modified Mercalli Scale, which is based on the observed effects of the earthquake.



26. The distance from New York City to the epicenter is 1666 km. Approximately, **how much longer** did it take for the S-wave to arrive at New York City than the P-wave? P waves travel at 8 Km/sec, while S waves travel at 60% of the speed of P waves.

- A) 3 minutes 28 sec B) 2 minutes and 19 seconds C) 5 minutes and 47 seconds D) 7 minutes and 47 seconds

27. What is the approximate location of the earthquake's epicenter?

- A) 36°N, 90°W B) 90°N, 36°W C) 36°N, 90°E D) 90°N, 36°E

28. The actual point along a fault where slippage occurs and causes an earthquake is called

- A) orthocenter B) epicenter C) circum center D) focus

29. For which city was the difference in arrival times between the P-waves and S-waves the smallest?

- A) Nashville B) Pittsburgh C) Syracuse D) Boston

30. Shield volcanoes such as those in the Hawaiian Islands usually produce lava which is mostly

- A) ash B) ash and basalt C) basalt D) diabase

31. Volcanic ash layers can be used as time markers because they

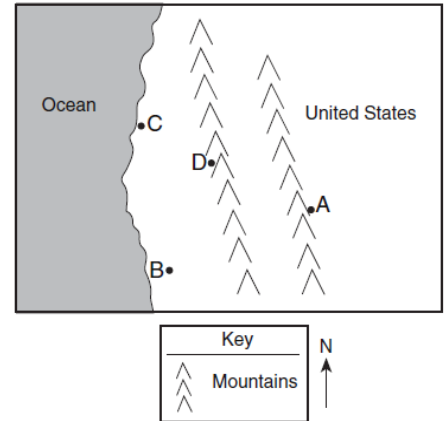
- A) are deposited rapidly over large areas
 B) have characteristic color and texture
 C) are deposited only on land
 D) contain fossil diatoms

32. Volcanic eruptions can affect climate because:
- A) they heat the atmosphere
 - B) Volcanic dust and gas in the upper atmosphere reflects solar radiation
 - C) emit a large amount of water vapor that increases global sea levels
 - D) emit large amounts of carbon dioxide gas.

33. The asthenosphere is
- A) the source of most magmas
 - B) completely molten
 - C) heated by the presence of magma
 - D) two of these choices are correct.

The map below shows the location of four cities, A, B, C, and D in the western United States. The prevailing winds are from the southwest.

34. Which one of the four cities receives the least amount of yearly rainfall?
- A) A
 - B) B
 - C) C
 - D) D



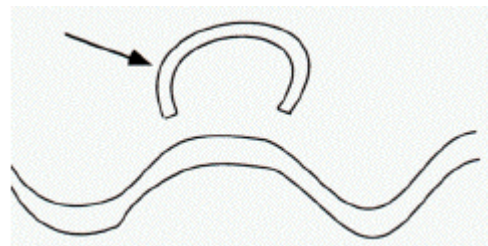
35. The desert conditions of the American Southwest are caused mostly by
- A) the circulation of ocean currents
 - B) the surrounding mountains
 - C) the subpolar jet stream
 - D) the usual high temperatures

36. As a river overflows its banks during a flood, it drops much of its coarser-grained load immediately, forming landforms called _____
- A) deltas
 - B) alluvial fans
 - C) natural levees
 - D) point bars

37. Which one of the following generally decreases downstream along the length of the stream?
- A) channel width
 - B) channel depth
 - C) gradient
 - D) velocity

38. Running water erodes solid rock by
- A) abrasion
 - B) chemical and physical weathering
 - C) undercutting action of currents
 - D) all of these

39. The arrow in the adjacent picture is pointing to a
- A) meander
 - B) point bar
 - C) natural levee
 - D) oxbow lake

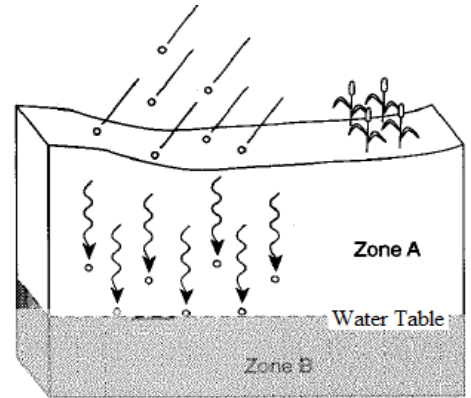


40. Measurements of a stream taken over 5 years indicate that its velocity has decreased. The stream's decreased velocity was most likely caused by
- A) an increase in atmospheric transparency
 - B) an increase in atmospheric surface winds
 - C) a decrease in gradient
 - D) a decrease in transpiration

41. Which characteristics of a particle would usually result in the longest settling time for the particle in calm water?
 A) low density and round shape C) high density and round shape
 B) low density and flat shape D) high density and flat shape.

42. About what % of the water on Earth is fresh liquid water?
 A) 1% B) 2% C) 3% D) 97%

43. The diagram is a cross-sectional view of rain falling on a farm field then moving into the water table. Which word best describes the movement of the rainwater through zone A?

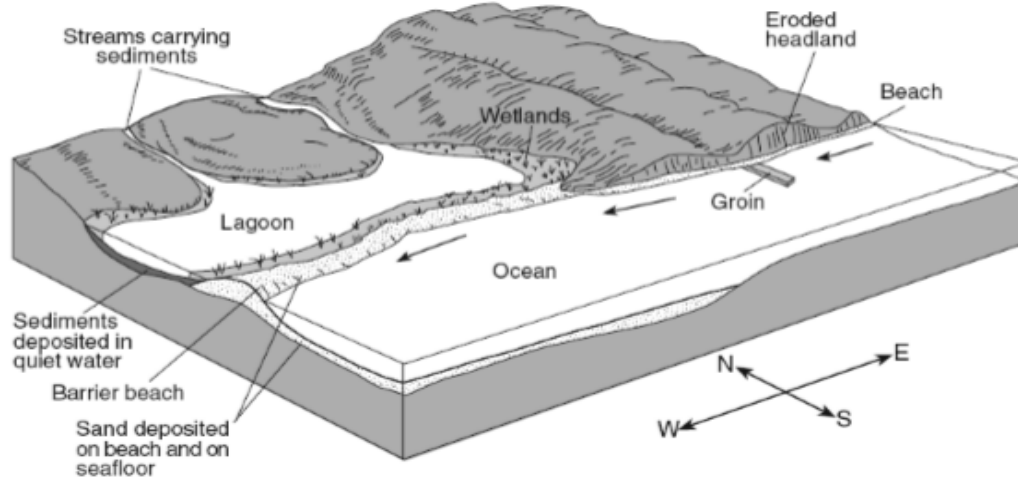


- A) runoff
- B) saturation
- C) infiltration
- D) precipitation

44. Oceans cover approximately what % of the surface of the Earth?
 A) 30% B) 50% C) 70% D) 90%

45. The height of an ocean wave increases as: _____
 A) the wind's speed increases
 B) the wind blows for longer periods of time
 C) the distance over which the wind blows over the water increases
 D) all of these choices.

The arrows show the direction in which sediment is being transported along the shoreline. A barrier beach has formed, creating a lagoon. The eroded headlands are composed of diorite bedrock. A groin has recently been constructed. A groin is a wall-like structure built into the water perpendicular to the shore line. The groin is built to trap beach sand.



46. The sediment deposited by the streams flowing into the lagoon are most likely
 A) sorted and layered B) sorted and not layered C) unsorted and layered D) unsorted and not layered

47. A small stream runs into the lagoon which is protected by the barrier island. Which event will most like occur during a heavy rainfall?
 A) Less sediment will be carried by the streams.
 B) An increase in sea level will cause more sediment to be deposited along the shore.
 C) The shoreline will experience a greater range in tides
 D) The discharge from the streams into the lagoon will increase.

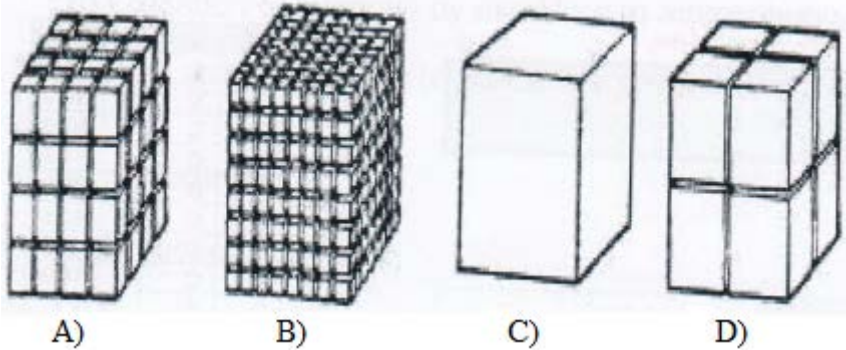
48. The soil layer which contains animal and plant matter is called

- A) silt B) subsoil C) humus D) talus

49. As a particle of sediment in a stream breaks into several smaller pieces, the rate of weathering of the sediment will

- A) decrease due to a decrease in surface area
B) decrease due to an increase in surface area
C) increase due to a decrease in surface area
D) increase due to an increase in surface area

50. The diagrams below represent blocks of limestone. Each breaks into the segments indicated in each drawing. Which choice will then weather at the fastest rate?



51. The eruption of the volcano that made Crater Lake in Oregon killed a lot of trees. The wood from many of the trees was preserved by burial. The wood has been analyzed for radioactive carbon-14. Carbon-14 has a half-life of about 5,730 years and decays to nitrogen-14. About 55% of the carbon-14 has decayed in those trees. Which of the following is the best estimate of the number of years ago that the Crater Lake volcano erupted?

- A) 400 B) 4,500 C) 5,000 D) 6,500

52. Layers of clay, called varves, show seasonal deposition in the bottoms of some deep lakes. They may be used to determine the age in a manner similar to

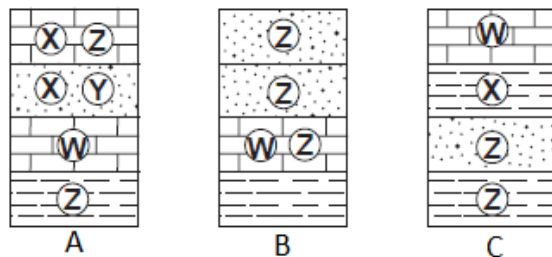
- A) uranium-lead age dating B) potassium-argon age dating C) tree ring age dating D) radio carbon age dating

53. Fossils are usually found in which type of rock?

- A) sedimentary B) igneous C) metamorphic D) all of these

54. The cross sections below represent three widely separated bedrock outcrops which are labeled A, B, and C. The letters W, X, Y, and Z represent fossils found in the rock layers. Which fossil would be the best index fossil?

- A) W
B) X
C) Y
D) Z



55. Approximately what percentage of Earth's history represents human existence?

- A) less than 1% B) 1.8 % C) 23.5 % D) more than 50%

The map below represents Mt. Hekla volcano in Iceland. The isolines represent the thickness of the ash in centimeters that settled on the area after the volcanic eruption. The eruption took place March 29, 1947. Point x is a location on the surface of the ash.

56. At the time of the eruption what direction was the wind primarily blowing from?

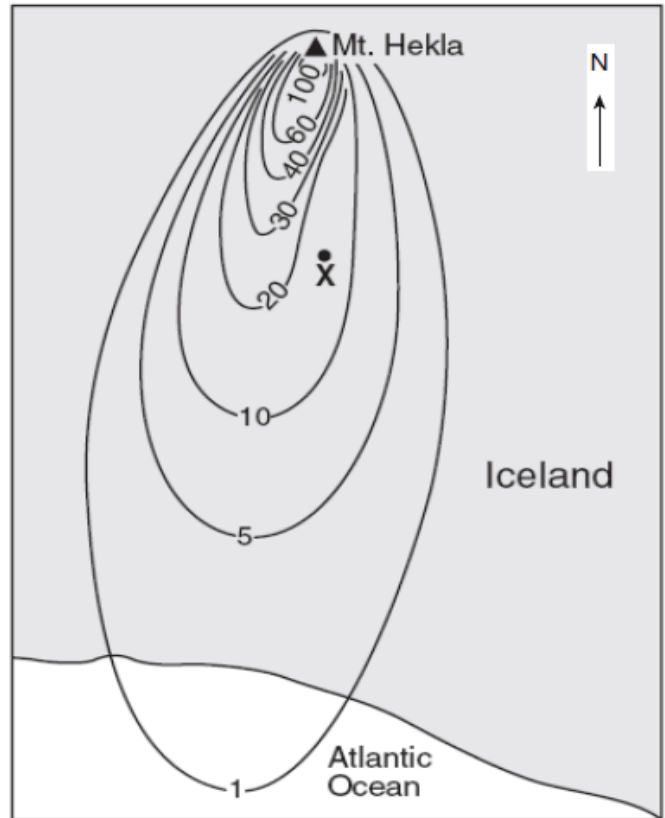
- A) North
- B) South
- C) East
- D) West

57. How many centimeters thick was the ash at point x?

- A) 5 cm
- B) 10 cm
- C) 15 cm
- D) 20 cm

58. In addition to the ash, solid rock formed on Mt Hekla from the lava extruded from the eruption. This rock is most likely

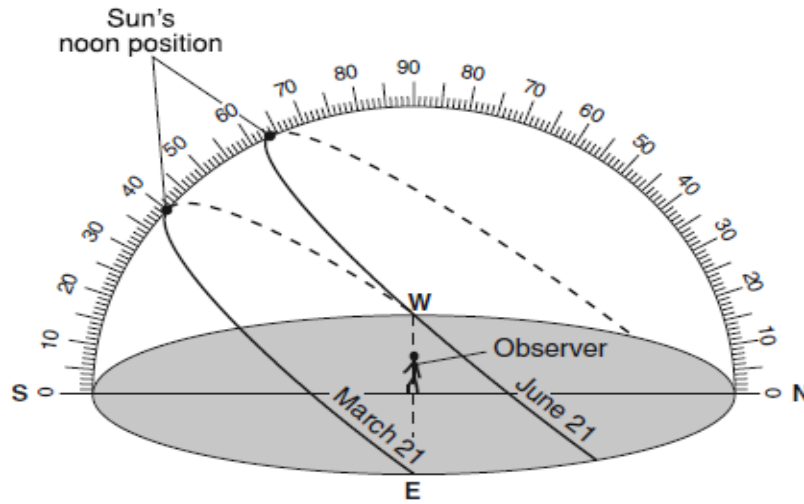
- A) light-colored metamorphic
- B) dark-colored metamorphic
- C) fine-grained igneous
- D) coarse-grained igneous



59. The longitude of Trenton, NJ is about 75° W. The longitude of Honolulu, HI is about 160° W. The Standard Time difference between the two cities should be about

- A) 85 minutes
- B) 6 hours
- C) 9 hours 40 minutes
- D) 11 hours

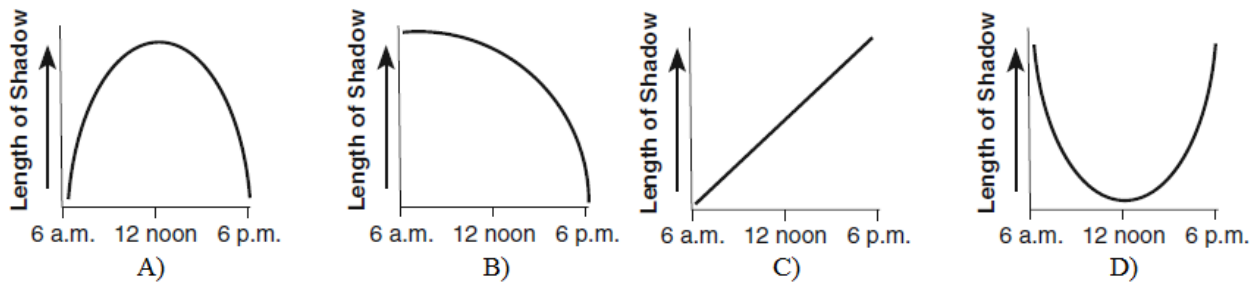
The diagram below shows the apparent path of the sun as viewed by an observer at 50° N latitude on June 21 and March 21. The data in the table records the Sun's maximum altitude on the same two days. The blank in the table is to be filled in for question # NYR June 15, 2012 # 38, 39, 40, 41.



Data Table

Date	Sun's Maximum Altitude
June 21	63.5°
March 21	40°
December 21	

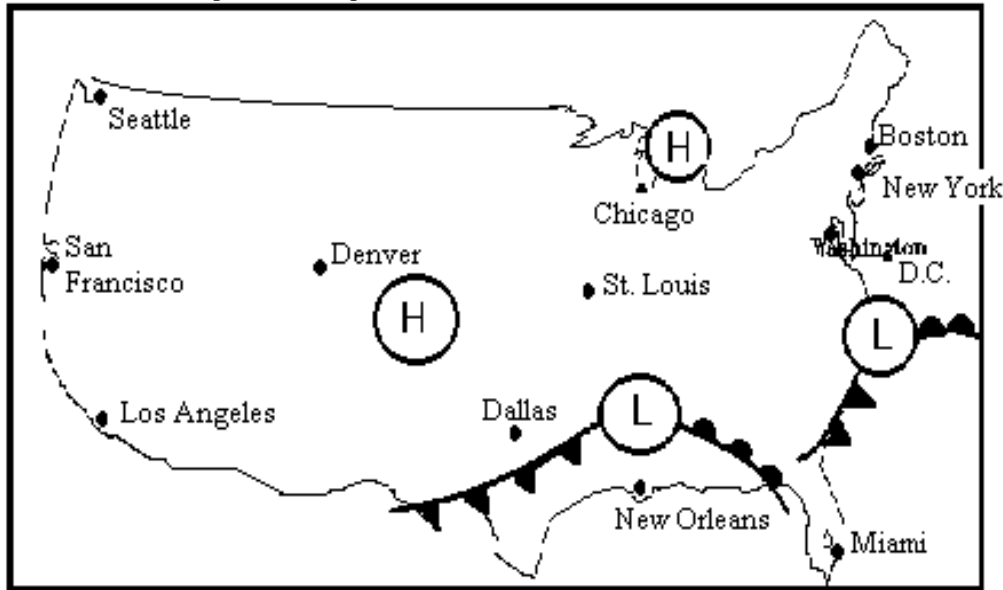
60. Which value should be placed in the data table for the Sun's maximum altitude on December 21?
 A) 16.5° B) 23.5° C) 40° D) 90°
61. Which statement best compares the intensity and angle of insolation at noon on March 21 and June 21?
 A) The intensity and angle of insolation are greatest on March 21.
 B) The intensity and angle of insolation are greatest on June 21.
 C) The intensity of insolation is greatest on June 21 and the angle of insolation is greatest on March 21.
 D) The intensity of insolation is greatest on March 21 and the angle of insolation is greatest on June 21.
62. Which graph best represents the relationship between the time of day and the length of a shadow cast by the observer on March 21?



63. The large craters, such as Copernicus, on the moon were produced by
 A) impact of meteors B) volcanic eruptions C) collapse of calderas D) collapse of sinks
64. Weathering of rock on the surface of the moon is caused by
 A) frost action during the lunar night
 B) bombardment with micrometeorites
 C) sandblasting from the solar wind
 D) water running into the lunar seas
65. Summer in the northern hemisphere is hotter than winter because
 A) light from the sun travels a straighter line in summer
 B) the earth is closer to the sun in summer
 C) the earth is tilted on its axis
 D) the moon reflects more sunlight in summer

66. Kepler's first law states that planets follow orbits that are
 A) circular B) elliptical C) parabolic D) hyperbolic
67. When a star is moving toward us the spectral lines from its light will be
 A) shifted toward the red B) shifted toward the blue C) fuzzier D) narrower
68. In space, the point directly above your head is called your
 A) nadir B) meridian C) ecliptic D) zenith
69. The ratio of the amount of water in the air to the amount which it can hold at a given temperature is
 A) the dew point B) the relative humidity C) the absolute humidity D) the vapor pressure

Use the weather map below for questions 70, 71, and 72.



70. The weather in Denver is probably
 A) clear
 B) raining or snowing
 C) cloudy
 D) unsettled
71. The low pressure center north of New Orleans will probably move toward the
 A) east
 B) southeast
 C) north
 D) northeast
72. What type of weather front is located southeast of Dallas?
 A) cold front
 B) warm front
 C) occluded front
 D) stationary front

NEW JERSEY SCIENCE LEAGUE **Corrections**
 EARTH SCIENCE EXAM ANSWER KEY **TAN TEST**

DATE: April 13, 2017

1	D(all full credit)	19	D	37	C	55	A
2	D	20	B	38	D	56	A
3	D	21	A	39	D	57	C
4	C	22	B	40	C	58	C
5	A	23	A	41	B	59	B
6	D	24	D	42	A	60	A
7	B	25	D	43	C	61	B
8	D	26	B	44	C	62	D
9	D	27	A	45	D	63	A
10	B	28	D	46	A	64	B
11	A	29	A	47	D	65	C
12	D	30	C	48	C	66	B
13	A	31	A	49	D	67	B
14	D	32	B	50	B	68	D
15	B	33	A	51	D	69	B
16	B	34	A	52	C	70	A
17	A	35	B	53	A	71	D
18	C	36	C	54	A	72	A

Test Specifications

Since some earth science courses in New Jersey start with geology, others with astronomy, and still others with meteorology, each of the four tests will include the following topics. Over time, this provides an equal opportunity to everyone. The number in parentheses indicates the number of questions for that topic. The number per topic occasionally varies by one or two, but usually does not.

- | | |
|---------------------------------------|---------------------------------------|
| Minerals (4) | Sun (2) |
| Rocks (2) | Moon (2) |
| Earth Structure (3) | Sun-Moon-Earth System (3) |
| Plate Tectonics (4) | Solar System (2) |
| Faults/Folds/Seismology (4) | Stars (2) |
| Vulcanism (2) | Galactic Systems (1) |
| Glaciation/Deserts (2) | Cosmology (1) |
| Rivers: Erosion & Deposition (4) | |
| Ground Water/Caves (3) | Insolation/Temperature/Air Masses (3) |
| Ocean Shore Line/Currents/Salinity(3) | Atmospheric Pressure/Highs/Lows (3) |
| Weathering/Mass Wasting (3) | Moisture in the Atmosphere (2) |
| Historical Geology (4) | Frontal Systems (3) |
| Map Reading: Road/Topo/Geologic (4) | Interpreting Weather Maps (3) |
| Geodesics/Time/Map Projections (3) | |

Dates for 2017 Season

Thursday January 12, 2017 Thursday February 9, 2017

Thursday March 9, 2017 Thursday April 13, 2017

All schools must complete the April exam and mail in the results by April 28th, 2017

New Jersey Science League

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Web address: <http://entnet.com/~personal/njscil/html/>

What is to be mailed back to our office?

PLEASE RETURN THE AREA RECORD AND ALL TEAM MEMBER SCANTRONS (ALL STUDENTS PLACING 1ST, 2ND, 3RD, AND 4TH).

If you return scantrons of alternates, then label them as ALTERNATES.

Dates 2018 Season

Thursday January 11, 2018 Thursday February 8, 2018

Thursday March 8, 2018 Thursday April 12, 2018