

# NATIONAL SCIENCE LEAGUE – 2015

## EARTH SCIENCE CONTEST

- ANSWER KEY -

1. \_\_\_ D \_\_\_

2. \_\_\_ C \_\_\_

3. \_\_\_ D \_\_\_

4. \_\_\_ A \_\_\_

5. \_\_\_ B \_\_\_

6. \_\_\_ C \_\_\_

7. \_\_\_ A \_\_\_

8. \_\_\_ B \_\_\_

9. \_\_\_ C \_\_\_

10. \_\_\_ B \_\_\_

11. \_\_\_ D \_\_\_

12. \_\_\_ C \_\_\_

13. \_\_\_ A \_\_\_

14. \_\_\_ B \_\_\_

15. \_\_\_ C \_\_\_

16. \_\_\_ B \_\_\_

17. \_\_\_ D \_\_\_

18. \_\_\_ A \_\_\_

19. \_\_\_ D \_\_\_

20. \_\_\_ C \_\_\_

21. \_\_\_ A \_\_\_

22. \_\_\_ A \_\_\_

23. \_\_\_ C \_\_\_

24. \_\_\_ B \_\_\_

25. \_\_\_ B \_\_\_

26. \_\_\_ D \_\_\_

27. \_\_\_ A \_\_\_

28. \_\_\_ B \_\_\_

29. \_\_\_ D \_\_\_

30. \_\_\_ C \_\_\_

31. \_\_\_ A \_\_\_

32. \_\_\_ B \_\_\_

33. \_\_\_ A \_\_\_

34. \_\_\_ D \_\_\_

35. \_\_\_ C \_\_\_

36. \_\_\_ D \_\_\_

37. \_\_\_ A \_\_\_

38. \_\_\_ D \_\_\_

39. \_\_\_ A \_\_\_

40. \_\_\_ B \_\_\_

**National Science**  
**Earth Science**

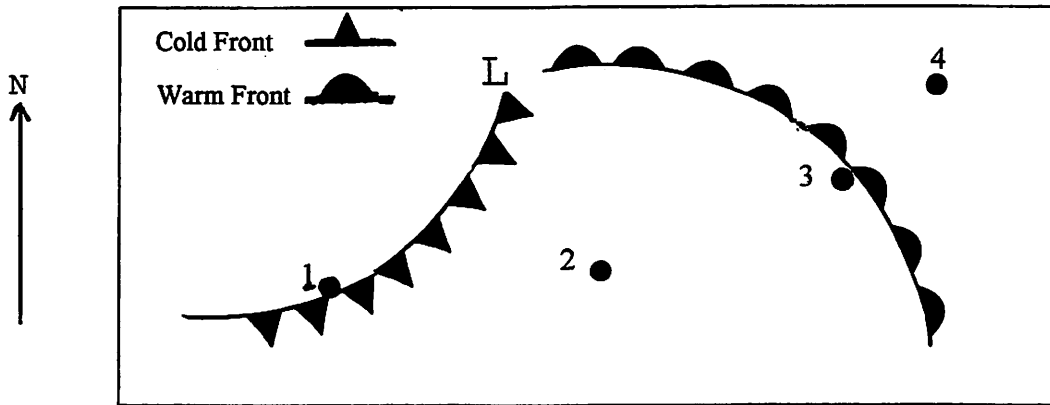
DIRECTIONS: On the answer sheet, write the letter of the choice that best answers the question or completes the statement.

1. The difference in arrival time between P and S waves at a single seismic station can be used to determine the  
A. strength of an earthquake.  
B. latitude and longitude of an earthquake.  
C. depth below the surface of an earthquake.  
D. distance to an earthquake.
2. An anemometer is used to measure  
A. temperature. C. wind speed.  
B. air pressure. D. relative humidity.
3. Of these four, the most abundant element by weight in the earth's crust is  
A. gold. C. iron.  
B. aluminum. D. silicon.
4. Most of the water vapor entering the atmosphere comes from  
A. the oceans. C. rivers and lakes.  
B. glaciers and ice sheets. D. the land masses.
5. A piece of granite rock was found to contain very large mineral crystals. These large crystals are the result of the  
A. compression and cementing of sediments.  
B. solidification of molten material deep under ground.  
C. recrystallization of rock subjected to pressure and heat.  
D. melting of rock by a lava flow.
6. Which organisms lived on the earth before the dinosaurs?  
A. flowering plants C. brachiopods  
B. mammals D. birds
7. On a day when it is not raining, the relative humidity is usually highest around  
A. 6:00 A.M. C. 12:00 noon.  
B. 12:00 midnight. D. 6:00 P.M.
8. Which is a true statement about soil?  
A. An impermeable soil makes the best aquifer.  
B. A soil can be very porous but have low permeability.  
C. The lower the porosity the greater the infiltration rate is.  
D. A soil that has very low porosity must also be impermeable.
9. Very old rivers and streams tend to have  
A. steep gradients.  
B. straight stream channels.  
C. a large amount of silt and mud in them.  
D. a fast rate of water flow.

10. What is the name for the area on the earth's surface where the air is rising straight upwards?
- A. a planetary wind belt
  - B. a convergence zone
  - C. a convection cell
  - D. a divergence zone
11. Which is a true statement about our sun?
- A. It is one of the smallest stars known.
  - B. It is about 50 million kilometers from the earth.
  - C. It emits only visible light.
  - D. It is made mostly of helium and hydrogen.
12. An example of chemical weathering is
- A. wind blowing sand over a large pumice rock.
  - B. rapid heating and cooling causing a rock to crumble.
  - C. a cave being formed from a limestone rock formation.
  - D. water freezing in a crack in a rock.
13. Fossils of marine organisms found near the top of a 1 km tall mountain are evidence for
- A. crustal uplifting.
  - B. continental drift.
  - C. erosion.
  - D. glaciation.
14. Which of the following is a result of the earth's rotation?
- A. the daily tides in the oceans
  - B. the winds appearing to curve to the left in the Southern Hemisphere
  - C. the four seasons of the year
  - D. some constellations, such as Orion, being visible only for a few months out of the year
15. Red giants and white dwarfs are different types of
- A. black holes.
  - B. galaxies.
  - C. stars.
  - D. nebulae.
16. Which gas in the atmosphere is believed to be part of the cause of global warming?
- A. oxygen
  - B. carbon dioxide
  - C. nitrogen
  - D. hydrogen
17. Which of the following is NOT part of the plate tectonic theory?
- A. deep ocean trenches
  - B. mid-ocean ridges
  - C. rift valleys
  - D. orographic effect
18. The three laws of planetary motion were derived by
- A. Kepler.
  - B. Copernicus.
  - C. Ptolemy.
  - D. Brahe.
19. Observations made of the star Polaris can be used to determine your
- A. latitude in the Southern Hemisphere.
  - B. longitude in the Northern Hemisphere.
  - C. longitude in the Southern Hemisphere.
  - D. latitude in the Northern Hemisphere.

USE THE FOLLOWING INFORMATION AND YOUR KNOWLEDGE OF EARTH SCIENCE TO ANSWER QUESTIONS 20 THROUGH 23:

The diagram below represents a weather system moving across the United States from California. It is presently located over Indiana. The numbers indicate the locations of four weather stations.



20. In which direction is this system most likely to move within the next day?
 

A. North	C. East
B. South	D. West
  
21. Which of the four weather stations is presently experiencing a drop in temperature?
 

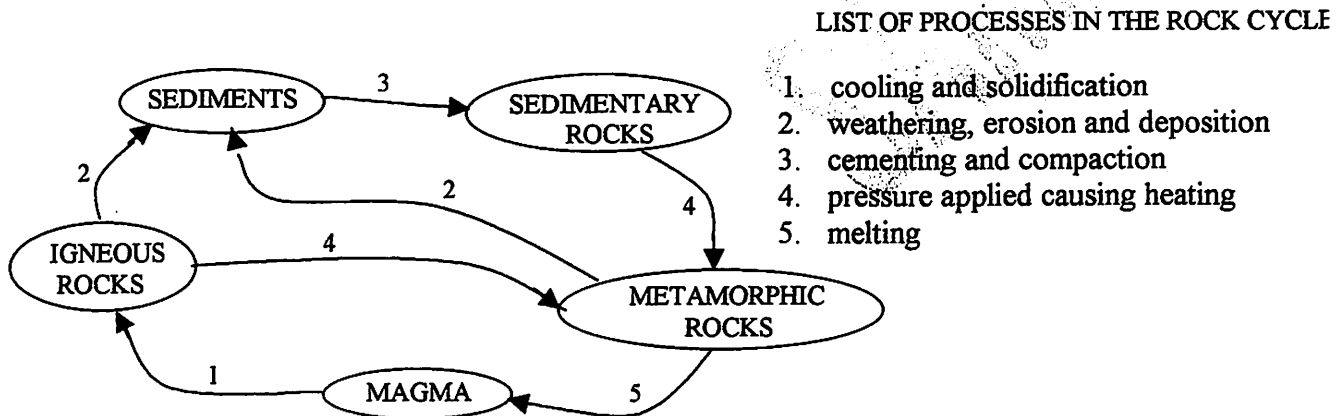
A. 1	C. 3
B. 2	D. 4
  
22. Which of the four weather stations has winds coming from the northwest?
 

A. 1	C. 3
B. 2	D. 4
  
23. The barometric pressure MOST recently fell at station
 

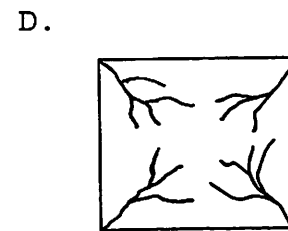
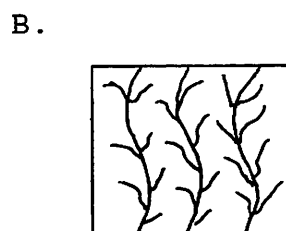
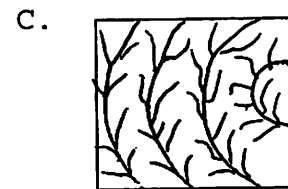
A. 1.	C. 3.
B. 2.	D. 4.
  
24. Which is true about the majority of the places where the plates that make up the earth's crust meet?
  - A. subsidence is occurring there
  - B. the largest earthquakes and volcanoes occur there
  - C. deep ocean trenches are being formed there
  - D. volcanic island arcs are being formed there
  
25. Everyone living on the 30° West longitude line
  - A. is the same distance from the Equator.
  - B. has the same solar noon.
  - C. sees the same stars in the sky each night.
  - D. has the winter season from December 21 to March 21.

USE THE FOLLOWING INFORMATION AND YOUR KNOWLEDGE OF EARTH SCIENCE TO ANSWER QUESTIONS 26 AND 27:

Below is a simplified diagram of the rock cycle.

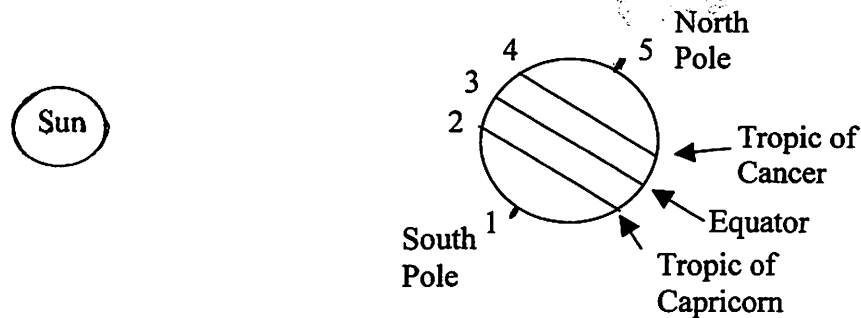


26. According to the diagram above, which of the following must occur in order to change igneous rocks or sedimentary rocks to metamorphic rocks?
- A. They must be completely melted and allowed to cool.
  - B. They must be changed chemically.
  - C. They must be weathered to very small pieces and cemented together.
  - D. They must be subjected to pressure and heat.
27. According to the diagram above, which of the following statements is true?
- A. Magma is the source of new minerals for the rock cycle.
  - B. Only metamorphic rocks can be made into sedimentary rocks.
  - C. Weathering, erosion, and deposition are responsible for changing igneous rocks to metamorphic rocks.
  - D. Sedimentary rocks can be changed directly into igneous rocks.
28. Which of the diagrams below represents the drainage pattern of a series of parallel hills and valleys?



USE THE FOLLOWING INFORMATION AND YOUR KNOWLEDGE OF EARTH SCIENCE TO ANSWER QUESTIONS 29 TO 32:

The diagram below shows the earth at one point in its orbit around the sun. Note that the five numbers represent locations on the surface of the earth. The diagram is not drawn to scale.



29. At which location would a person see the stars 24 hours a day?
 

A. 2	C. 4
B. 3	D. 5
  
30. At which location would there be 12 hours of daylight and 12 hours of darkness?
 

A. 1	C. 3
B. 2	D. 4
  
31. Which season is it in the Southern Hemisphere?
 

A. summer	C. winter
B. autumn	D. spring
  
32. At which location is the sun directly overhead at noon?
 

A. 1	C. 3
B. 2	D. 4
  
33. In which direction do people living in Australia look to see the sun at noon time?
 

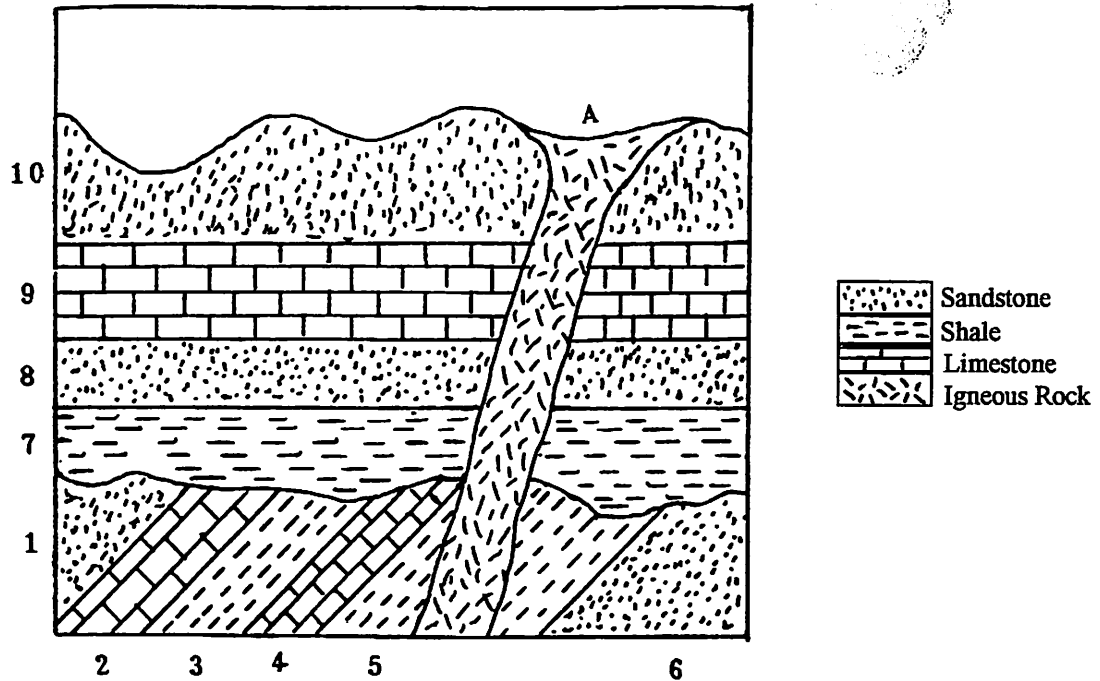
A. north	C. east
B. south	D. west
  
34. What is the name for the location on the surface of the earth directly above the place where an earthquake occurs?
 

A. the focus	C. the geosyncline
B. the lithosphere	D. the epicenter
  
35. As a planet travels around a star in an elliptical orbit,
 

A. the planet goes slowest when it is closest to the star.
B. its speed of rotation increases as it gets closer to the star.
C. the gravitational attraction between them is least when the planet is furthest away.
D. the apparent diameter of the star is greatest when the planet is furthest away.

USE THE FOLLOWING INFORMATION AND YOUR KNOWLEDGE OF EARTH SCIENCE TO ANSWER QUESTIONS 36 AND 37:

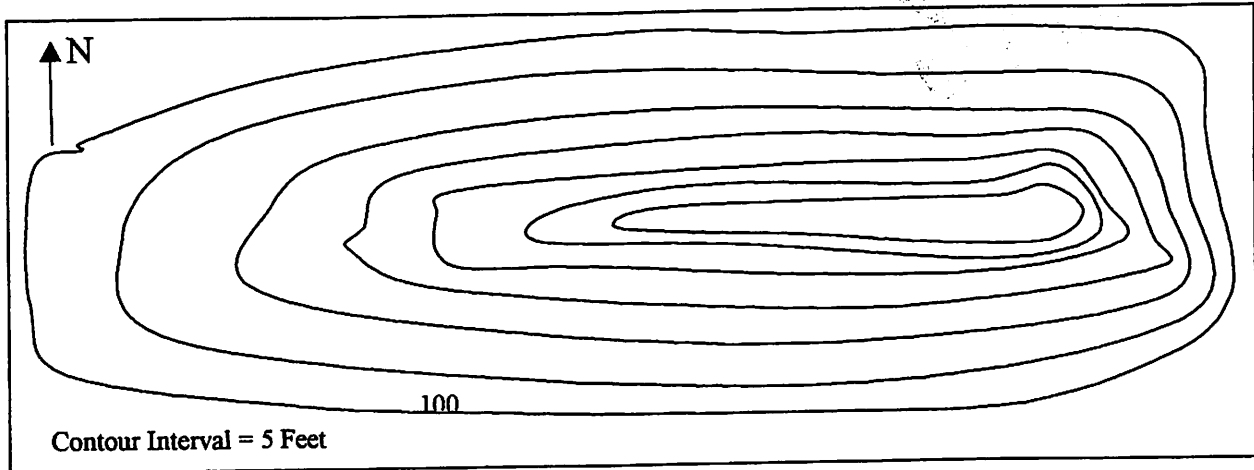
The diagram below is a cross section of the earth showing the rock found there. Assume that no overturning has occurred.



36. The best evidence of crustal movement is the
- present surface topography.
  - igneous intrusion.
  - deposition of sandstone, layer 10.
  - current positions of rock layers 1 to 6.
37. Which of the following occurred last?
- the erosion of the present surface to what it looks like now
  - the movement of layers 1 to 6 from their original position
  - the erosion of the surface between layers 1 to 6 and layer 7
  - the igneous intrusion

USE THE FOLLOWING TOPOGRAPHIC MAP AND YOUR KNOWLEDGE OF EARTH SCIENCE TO ANSWER QUESTIONS 38 TO 40:

This is a topographic map of a hill located in upstate New York.



38. The highest elevation on the hill is  
 A. 135 feet.  
 B. greater than 135 feet and less than 139 feet.  
 C. 130 feet.  
 D. greater than 130 feet but less than 134 feet.
39. This hill consists of an unsorted mixture of well-rounded particles from pebbles to boulders mixed in with a large amount of sand. It was formed  
 A. by a glacier moving through the area and stopping.  
 B. at the place where a river entered a large lake.  
 C. at the bottom of a large, shallow lake.  
 D. by the wind blowing across the surface of a desert.
40. Which profile best represents the shape of the hill in an east-west direction?

