Changing Length Of A Shadow Based On The Motion Of The Sun

1 Which star type has a surface temperature of4000 K and a luminosity 1000 times greater than the Sun?

(1) dwarf (3) giant

(2) main sequence (4) supergiant

2 How many days during one year is the Sun directly overhead at noon in New York City?

(1) one (3) three

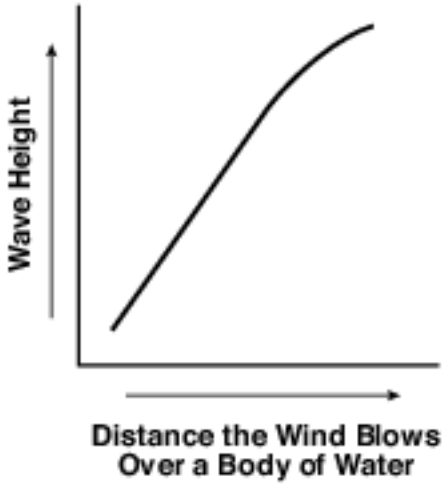
(2) two (4) zero

3 Which atmospheric conditions occur when the dry-bulb temperature is 30°C and the difference between the dry-bulb temperature and wet-bulb temperature is 1°C?

(1) warm and humid (3) cool and humid

(2) warm and dry (4) cool and dry

4 The graph below shows the relationship between the distance that wind blows over a body of water and the height of the waves that are generated.



A west wind blowing with the same velocity would generate the highest waves along the shoreline at

(1) Jamestown (3) Plattsburgh

(2) Oswego (4) Riverhead

5 Which surface ocean current cools the climate of the western coastline of South America?

(1) Brazil Current (3) Falkland Current

(2) Peru Current (4) California Current

6 When equal masses of ice and liquid water receive the same amount of energy, without a change in state, the ice changes temperature faster than the liquid water does because the

(1) specific heat of ice is less than the specific heat of liquid water

(2) specific heat of ice is greater than the specific heat of liquid water

(3) density of ice is less than the density of liquid water

(4) density of ice is greater than the density of liquid water

7 Which conclusion can be drawn from the pattern of fossils found in Earth's rock record?

(1) Humans have existed for a longer period of time than dinosaurs.

(2) Complex land organisms have been replaced by simpler marine forms.

(3) Many species have existed in the past, and most have become extinct.

(4) Few life forms existed before the late Cretaceous period.

8 Approximately how many million years ago (mya) was the amount of Earth's total landmass located south of the equator the greatest?

(1) 119 mya (3) 359 mya

(2) 232 mya (4) 458 mya

9 Which layer of Earth's interior is inferred to be composed of solid iron and nickel?

(1) asthenosphere (3) outer core

(2) stiffer mantle (4) inner core

10 The first S-wave reaches a seismic station22 minutes after an earthquake occurred. How

long did it take the first P-wave to reach the same seismic station?
(1) 8 minutes 50 seconds
(2) 10 minutes 00 seconds
(3) 12 minutes 00 seconds
(4) 12 minutes 50 seconds

Base your answers to questions 11 on the passage below and on your knowledge of Earth science.

Waimea Canyon

Waimea Canyon is located on the west side of the island of Kauai, Hawaii. Waimea Canyon has been referred to as the “Grand Canyon of the Pacific.” But unlike the Grand Canyon, which was carved through horizontal layers of sedimentary rocks, Waimea Canyon was cut through basalt. The formation of this igneous rock began about 4 million years ago. Numerous lava flows followed as magma rose from deep within Earth. The canyon then was formed over time by erosional agents, causing deep, V-shaped valleys that exposed the basalt layers along the canyon walls.

Over time, the composition of the basalt, where it was exposed at the surface, was changed due to oxidation (rusting) of iron-bearing minerals, such as pyroxene and olivine. The result is a canyon with red rocks and soils.

11 Identify the epoch during which the first basalt lava flows occurred on Kauai. [1]
Epoch

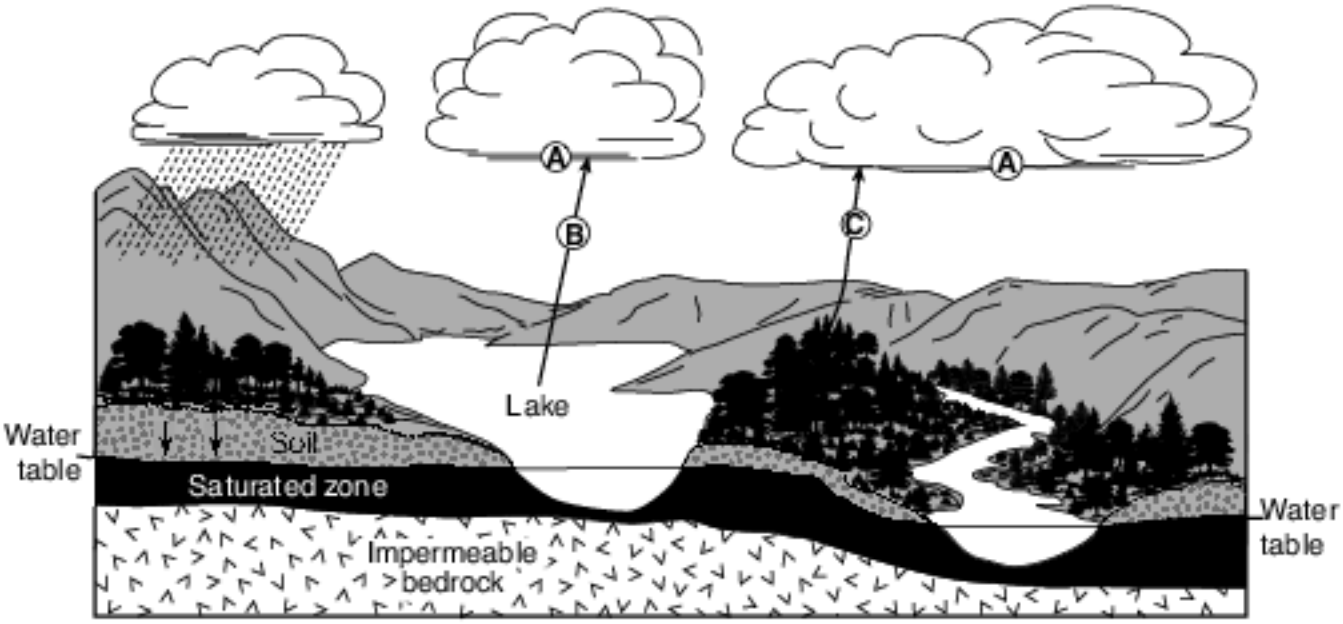
Base your answers to questions 12 on the map in image provided, on the table below, and on your knowledge of Earth science. The map shows a portion of the Nazca Plate under the southeastern Pacific Ocean. Plate A represents another tectonic plate. The table shows some data for islands and seamounts (undersea volcanoes that do not rise above the ocean surface) that originally formed at the Easter Island Hot Spot.

Islands and Seamounts Formed By the Easter Island Hot Spot

Name	Island or Seamount	Latitude (° S)	Longitude (° W)	Distance from East Pacific Ridge (km)	Age of Oceanic Bedrock (million years)
Easter Island	island	27	109	360	0.3
Sala y Gomez	island	26	105	750	1.7
GS57202-70	seamount	25	98	1500	7.9
18DS	seamount	26	93	2000	11.5
17DS	seamount	25	88	2500	14.9
12DS	seamount	23	83	3100	22.0

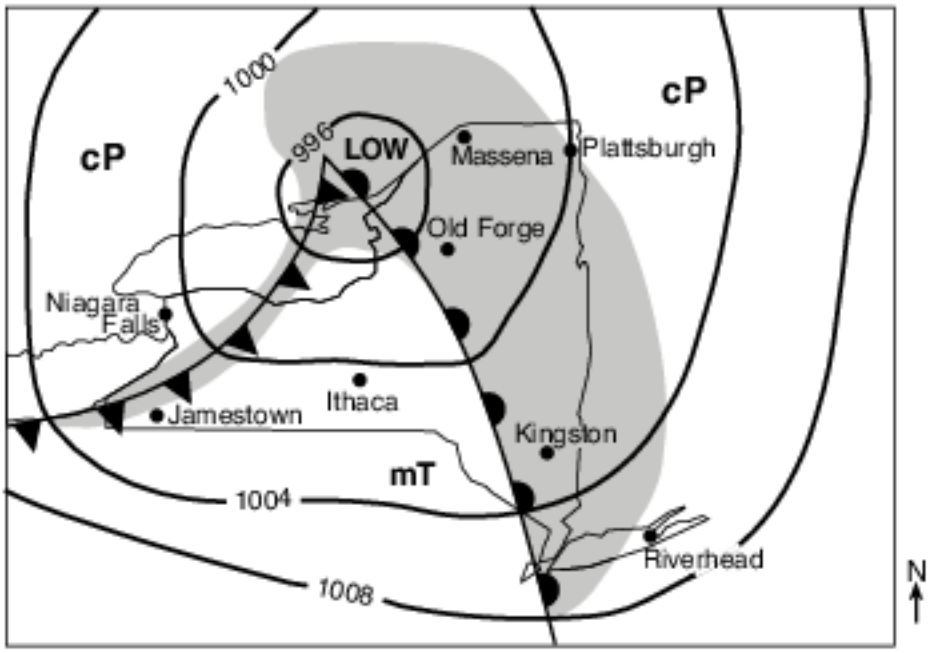
12 Identify the name of tectonic plate A. [1]
Plate

Base your answers to questions 13 on the diagram below and on your knowledge of Earth science. The diagram represents the water cycle. Letters A through C identify water cycle processes. Arrows represent movement of water or water vapor. The level of the water table is indicated.



13 Water vapor forms a cloud of liquid droplets at location A. State the number of joules per gram of heat energy that is released into the atmosphere during this process. [1]
J/g

Base your answers to questions 14 on the weather map below and on your knowledge of Earth science. The map shows the location of a low-pressure system over New York State during late summer. Isobar values are recorded in millibars. Shading indicates regions receiving precipitation. The air masses are labeled. Eight locations in New York State are indicated.



14 Convert the air pressure at Plattsburgh, New York, from millibars to inches of mercury. [1]
in of Hg

Base your answers to questions 15 on the topographic map in image provided and on your knowledge of Earth science. Partially drawn contour lines are shown on the southern portion of the map. Points of elevation are recorded in meters. Points A, B, C, and D represent locations on Earth's surface. Line AB and dashed line CD are reference lines.

15 Calculate the gradient, in meters per kilometer, from point C to point D. [1]
m/km

Answer Keys

1 3

2 4

3 1

4 2

5 2

6 1

7 3

8 4

9 4

10 3

11 Allow 1 credit for Pliocene Epoch.

12 Allow 1 credit for Pacific Plate.

13 Allow 1 credit for 2260 J/g.

14 Allow 1 credit for any value from 29.52 to 29.53 in of Hg.

15 Allow 1 credit for any value from 18.8 to 21.2 m/km.