$\qquad$

Base your answers to questions $\mathbf{1}$ through $\mathbf{4}$ on the topographic map below. Points $X, Y$, and $Z$ are locations on the map. Elevations are expressed in meters.


1. What is the elevation of point $Z$ ?
A) 190 m
B) 240 m
C) 220 m
D) 250 m
2. Mill River generally flows toward the
A) northeast
B) southeast
C) northwest
D) southwest
3. What is the elevation of point $Z$ ?
A) 250 m
B) 240 m
C) 190 m
D) 220 m
4. Which profile best represents the topography along the dashed line from point $X$ to point $Y$ ?
A)

B)

C)

D)

5. The altitude of the ozone layer near the South Pole is 20 kilometers above sea level. Which temperature zone of the atmosphere contains this ozone layer?
A) stratosphere
B) troposphere
C) mesosphere
D) thermosphere
6. The Earth's actual shape is most correctly described as
A) an oblate sphere
B) a circle
C) a perfect sphere
D) an eccentric ellipse
7. Base your answer to the following question on the topographic map below that represents a location in North America. A grid system of letters and numbers along the edges of the map is provided to assist in finding locations. Elevations are expressed in feet.


What is a possible elevation at point $X$ (grid location 3-D)?
A) 488 ft
B) 548 ft
C) 558 ft
D) 598 ft
8. The graph below shows temperature readings for a day in April.


The average rate of temperature change, in Fahrenheit degrees per hour, between 6 a.m. and noon was
A) $6 \% \mathrm{hr}$
B) $8 \% \mathrm{hr}$
C) $3 \% \mathrm{hr}$
D) $18 \% \mathrm{hr}$
9. An empty 250 -milliliter beaker has a mass of 60 grams. When 100 milliliters of oil is added to the beaker, the total mass is 140 grams. The density of the oil is approximately
A) $1.4 \mathrm{~g} / \mathrm{ml}$
B) $1.7 \mathrm{~g} / \mathrm{ml}$
C) $0.6 \mathrm{~g} / \mathrm{ml}$
D) $0.8 \mathrm{~g} / \mathrm{ml}$
10. The graph below shows the changes in height of ocean water over the course of 2 days at one Earth location.


Which statement concerning these changes is best supported by the graph?
A) The changes are cyclic and occur at predictable time intervals.
B) The changes are cyclic and occur at the same time every day.
C) The changes are noncyclic and may occur at any time.
D) The changes are noncyclic and occur at sunrise and sunset.
11. At which location will the highest altitude of the star Polaris be observed?
A) Arctic Circle
B) Tropic of Cancer
C) central New York State
D) Equator

Base your answers to questions $\mathbf{1 2}$ hhrough $\mathbf{1 5}$ on the topographic map below. Elevations are in feet. Point A and B are locations on the map.

8. Which graph best represents the profile along line $A B$ ?
A)

C)

B)

D)

13.Toward which direction does the Green River flow?
A) southwest
B) northeast
C) southeast
D) northwest
14. What is the gradient along the straight line between points A and B ?
A) $20 \mathrm{ft} / \mathrm{mi}$
B) $25 \mathrm{ft} / \mathrm{mi}$
C) $35 \mathrm{ft} / \mathrm{mi}$
D) $10 \mathrm{ft} / \mathrm{mi}$
15. What evidence can be used to determine that the land surface in the northeast corner of the map is relatively flat?
A) the dark contour line labeled 300
B) a rapidly flowing river
C) the absence of many contour lines
D) a large region covered by water
16. A 25-gram sample of halite was placed in a jar with five other mineral samples and water. The jar was shaken vigorously for 5 minutes. The halite sample was then found to have a mass of 15 grams. What was the rate of weathering of the halite sample?
A) $0.50 \mathrm{~g} / \mathrm{min}$
B) $2.0 \mathrm{~g} / \mathrm{min}$
C) $3.0 \mathrm{~g} / \mathrm{min}$
D) $10 . \mathrm{g} / \mathrm{min}$
17. As the altitude increases within Earth's stratosphere, air temperature generally
A) decreases, only
B) increases, only
C) decreases, then increases
D) increases, then decreases
18. Which diagram most accurately shows the cross-sectional shape of the Earth?
A)

C)

B)

D)


Base your answers to questions $\mathbf{1 9}$ through $\mathbf{2 4}$ on the topographic map below. Points $A$ through $I$ are locations on the map. Elevations are shown in meters.



| Key |
| :--- |
| Contour interval $=10$ meters |

19. In which section of the map is the highest elevation located?
A) northwest
B) southeast
C) northeast
D) southwest
20. The contour lines crossing Deer River show that the river flows
A) northward into Wolf Pond
B) northward out of Wolf Pond
C) southward into Wolf Pond
D) southward out of Wolf Pond
21. Which locations have the same elevation?
A) $F$ and $G$
B) $C$ and $I$
C) $A$ and $C$
D) $B$ and $E$
22. What is the elevation of Point E?
A) 50 m
B) 20 m
C) 40 m
D) 30 m
23. The profile represents a cross section of the landscape between points
A) $B$ and $C$
B) $I$ and $H$
C) $C$ and $A$
D) $A$ and $D$
24. What is the approximate gradient along line $B D$ ?
A) $150 \mathrm{~m} / \mathrm{km}$
B) $25 \mathrm{~m} / \mathrm{km}$
C) $100 \mathrm{~m} / \mathrm{km}$
D) $50 \mathrm{~m} / \mathrm{km}$
25. The North Star (Polaris) can be used for navigation in Earth's Northern Hemisphere because
A) the position of Polaris changes with the seasons
B) Polaris is located directly over the Tropic of Cancer
C) Polaris is the brightest and most easily located star
D) the altitude of Polaris is equal to the observer's latitude
26. The topographic map below shows a hill. Points $X$ and $Y$ represent locations on the hill's surface. Elevations are shown in meters.


What is the gradient between points $X$ and $Y$ ?
A) $120 \mathrm{~m} / \mathrm{km}$
B) $100 \mathrm{~m} / \mathrm{km}$
C) $40 \mathrm{~m} / \mathrm{km}$
D) $80 \mathrm{~m} / \mathrm{km}$

Base your answers to questions 27 through 31 on the contour map below. Points $A$ through $F$ represent locations on the map.

27. Which location has the same elevation as location $D$ ?
A) $A$
B) $E$
C) $C$
D) $F$
28. What is the most likely elevation of the surface of Sunfish Lake?
A) 55 m
B) 151 m
C) 140 m
D) 28 m
29. Which diagram best represents the topographic profile from location $A$ to location $F$ ?
A)
B)
C)
D)
30. Which statement about hill $C$ is best supported by the map?
A) Hill $C$ is located approximately 2 km west of Cedar River.
B) Hill $C$ has been shaped by glaciers.
C) The highest possible elevation of hill $C$ is 179 m .
D) The steepest slope of hill $C$ is on the western side.
31. If no elevation values were given, which general rule could be used to establish that Cedar River flows into Sunfish Lake?
A) Contour lines bend upstream when crossing a river.
B) A large body of water is generally the source of water for a river.
C) Rivers always flow toward large bodies of water.
D) Rivers shown on maps generally flow southward.
32. An observer recorded the times of three successive high tides at one Earth location as:

- 7:12 a.m.
- 7:38 p.m.
- 8:04 a.m.

What was the time of the next high tide?
A) 9:04 p.m.
B) $8: 12 \mathrm{p} . \mathrm{m}$.
C) $8: 38$ p.m.
D) $8: 30 \mathrm{p} . \mathrm{m}$.
33. In which two temperature zones of the atmosphere does the temperature increase with increasing altitude?
A) troposphere and mesosphere
B) stratosphere and thermosphere
C) troposphere and stratosphere
D) mesosphere and thermosphere
34. What is the approximate altitude of Polaris at Syracuse, New York?
A) $43^{\circ}$
B) $47^{\circ}$
C) $76^{\circ}$
D) $90^{\circ}$
35. The maps below show the odor fields from a neighborhood hamburger barbecue. An $X$ marks the exact location of the barbecue grill. The wind was blowing from the northeast when map $A$ was drawn. Map $B$ represents the same area drawn 1 hour after map $A$ was drawn.

Map A Odor Field


Map B
Odor Field, 1 Hour Later


| Key |  |
| :--- | :--- |
| 1 Just noticeable | 3 Moderate |
| 2 Weak | 4 Strong |

Which conclusion about what happened during the hour is best supported by comparing these two maps?
A) The wind direction remained constant.
B) The odor became stronger in the western section of the map area.
C) The size of the field grew.
D) The field values changed at many places.
36.


If each side of the cube shown above has the same length as the measured side, what is the approximate volume of the cube?
A) $4.84 \mathrm{~cm}^{3}$
B) $10.65 \mathrm{~cm}^{3}$
C) $6.60 \mathrm{~cm}^{3}$
D) $2.20 \mathrm{~cm}^{3}$
37. What is the approximate location of the Canary Islands hot spot?
A) $32^{\circ} \mathrm{N} 18^{\circ} \mathrm{W}$
B) $32^{\circ} \mathrm{N} 18^{\circ} \mathrm{E}$
C) $32^{\circ} \mathrm{S} 18^{\circ} \mathrm{E}$
D) $32^{\circ} \mathrm{S} 18^{\circ} \mathrm{W}$
38. The graph below shows the relationship between mass and volume for three samples, $A, B$, and $C$, of a given material.


What is the density of this material?
A) $1.0 \mathrm{~g} / \mathrm{cm}^{3}$
B) $5.0 \mathrm{~g} / \mathrm{cm}^{3}$
C) $10.0 \mathrm{~g} / \mathrm{cm}^{3}$
D) $20.0 \mathrm{~g} / \mathrm{cm}^{3}$
39. Which term is best defined as a measure of the amount of space a substance occupies?
A) density
B) volume
C) weight
D) mass

Base your answers to questions 40 through $\mathbf{4 3}$ on the diagrams below, and your knowledge of Earth science. The diagrams represent five substances, $A$ through $E$, at the same temperature. Some mass, volume, and density values are indicated for each substance. Substance $C$ is a liquid in a graduated cylinder. [Note that 1 cubic centimeter $=1$ milliliter. Objects are not drawn to scale.]

40. Which two substances could be made of the same material?
A) $A$ and $B$
B) $B$ and $E$
C) $C$ and $D$
D) $A$ and $E$
41. Water $(W)$ was added to the graduated cylinder containing liquid $C$. Objects $A$ and $D$ were then dropped into the cylinder. Which diagram most accurately shows the resulting arrangement of these substances?
A)

B)

C)

D)

42. What is the volume of liquid $C$ ?
A) 25.0 mL
B) 125.0 mL
C) 50.0 mL
D) 75.0 mL
43. What is the volume of object $D$ ?
A) $1.0 \mathrm{~cm}^{3}$
B) $2.0 \mathrm{~cm}^{3}$
C) $7.0 \mathrm{~cm}^{3}$
D) $16.0 \mathrm{~cm}^{3}$
44. The contour map below shows elevations recorded in meters. Line $A B$ is a reference line on the map.


Which graph best represents the profile from point $A$ to point $B$ ?
A)

B)

C)

D)

45. A classification system is based on the use of
A) the human senses to observe properties of objects
B) instruments to observe properties of objects
C) inferences to make observations
D) observed properties to group objects with similar characteristics
46. The use of a triple-beam balance to determine the mass of a rock is an example of measuring by using
A) inferences and interpretations
B) all of the five senses
C) a combination of dimensional quantities
D) a direct comparison with a standard
47. Which graph best represents the relationship between the density of a substance and its state of matter (phase) for most earth materials, excluding water?
[Key: $S=$ solid, $L=$ liquid, $G=$ gas]
A)

B)

C)

D)

48. A student collected and recorded measurements of the amount of carbon monoxide in the air at the same location each day for one week. The data are shown below.

| Day | Time | Carbon Monoxide <br> (parts per million) |
| :---: | :---: | :---: |
| 1 | $9: 10$ a.m. | 0.20 |
| 2 | $3: 10$ p.m. | 0.38 |
| 3 | $10: 45$ a.m. | 0.40 |
| 4 | $7: 20$ a.m. | 1.15 |
| 5 | $6: 00$ a.m. | 0.95 |
| 6 | $6: 00$ p.m. | 0.65 |
| 7 | $7: 15$ p.m. | 0.14 |

The student concluded that the amount of carbon monoxide in the air increased and then decreased during the week. A source of error in the student's investigation is that the student failed to
A) state the method of measurement
B) identify the days of the week
C) identify the month
D) collect data at the same time each day
49. A group of students observed and measured various characteristics of a stream for one day. Which statement about the stream is most likely an inference?
A) The water level of the stream will rise after the next rainfall.
B) The stream water is dark brown.
C) The velocity of the stream is greatest near the outside of a meander.
D) The stream's depth is different at various distances from the streambank.
50. A $1,000.0$-gram sample of dry rock fragments was placed in a container of water, shaken for 3 minutes, and strained through a wire screen. The mass of the sample after shaking was $1,002.1$ grams. Which statement best explains this result?
A) Some of the original rock fragments were lost when the sample was strained.
B) The rock fragments became wet when they were shaken.
C) The rock fragments formed new minerals that were more dense.
D) The rock fragments were broken into smaller pieces, resulting in additional mass.
51. Which graph best represents the relationship between mass and volume of a material that has a density of 5 grams per cubic centimeter?
A)

B)

C)

D)

52. A gravity meter is used to measure the amount of gravitational pull at the Earth's North Pole and at the Earth's Equator. How would these readings of gravitational pull compare? [Assume both readings are taken at sea level.]
A) The reading would be lower at the North Pole than at the Equator.
B) The reading would be higher at the North Pole than at the Equator.
C) The readings would be the same at the North Pole and at the Equator.
53. As air on the surface of Earth warms, the density of the air
A) decreases
B) increases
C) remains the same
54. Base your answer to the following question on the topographic map below. Points $A, B, C, D$ and $X$ represent locations on the map. Elevations are measured in feet.


Which cross section best represents the profile along straight line $A B$ ?
A)


C)

D)

55. What time is it in Greenwich, England (at $0^{\circ}$ longitude), when it is noon in Massena, New York?
A) noon
B) $7 \mathrm{a} . \mathrm{m}$.
C) $10 \mathrm{p} . \mathrm{m}$.
D) $5 \mathrm{p} . \mathrm{m}$.
56. Which event is most predictable?
A) A meteorite falls to Earth.
B) Coral fossils are found on mountaintops.
C) An earthquake occurs.
D) The Sun rises.
57. Oxygen is the most abundant element by volume in Earth's
A) crust
B) troposphere
C) hydrosphere
D) inner core
58. During a laboratory activity, four students each determined the density of the same piece of granite. The results are shown in the table below.

| Student | Density Determined |
| :---: | :---: |
| 1 | $2.69 \mathrm{~g} / \mathrm{cm}^{3}$ |
| 2 | $2.71 \mathrm{~g} / \mathrm{cm}^{3}$ |
| 3 | $2.72 \mathrm{~g} / \mathrm{cm}^{3}$ |
| 4 | $2.69 \mathrm{~g} / \mathrm{cm}^{3}$ |

The accepted value for the density of granite is 2.70 grams per cubic centimeter. Therefore, the results of this activity indicate that
A) the balance used by student 3 was broken
B) the accepted density of granite is incorrect
C) each student determined the exact accepted value for the density of granite
D) the density determined by each student contains a small error

Base your answers to questions $\mathbf{5 9}$ and $\mathbf{6 0}$ on the diagrams below, which represent two different solid, uniform materials cut into cubes $A$ and $B$.

$\begin{aligned} \text { Mass of } A=320 \mathrm{~g} & \text { Density of } B=3 \mathrm{~g} / \mathrm{cm}^{3} \\ \text { Volume of } A=64 \mathrm{~cm}^{3} & \text { Volume of } B=27 \mathrm{~cm}^{3}\end{aligned}$
(Not drawn to scale)
59. What is the density of cube $A$ ?
A) $5.0 \mathrm{~g} / \mathrm{cm}^{3}$
B) $12.8 \mathrm{~g} / \mathrm{cm}^{3}$
C) $0.2 \mathrm{~g} / \mathrm{cm}^{3}$
D) $64.0 \mathrm{~g} / \mathrm{cm}^{3}$

60 . What is the mass of cube $B$ ?
A) 9 g
B) 27 g
C) 3 g
D) 81 g
61. The graph below shows world population beginning in the year 1800 and projected to the year 2000.


The graph shows the greatest increase in population between
A) 1975 and 2000
B) 1875 and 1900
C) 1925 and 1950
D) 1825 and 1850
62. The graph below represents percentage of elements by volume.


This graph best represents the elements of the Earth's
A) lithosphere
B) troposphere
C) hydrosphere
D) stratosphere
63. At an altitude of 95 miles above Earth's surface, nearly $100 \%$ of the incoming energy from the Sun can be detected. At 55 miles above Earth's surface, most incoming x-ray radiation and some incoming ultraviolet radiation can no longer be detected. This missing radiation was most likely
A) reflected by the troposphere
B) absorbed in the thermosphere
C) reflected by the stratosphere
D) absorbed in the mesosphere

Base your answers to questions $\mathbf{6 4}$ and $\mathbf{6 5}$ on the topographic map below. Points A and B represent locations on the map. Elevations are shown in meters.

64. What could be the highest elevation on Little Deer Island?
A) 5 m
B) 34 m
C) 39 m
D) 25 m
65. Which map would best represent this area if sea level were to rise 10 meters?
A)

B)

C)

D)

66. An observer recorded the barometric pressure while traveling up the west side of a mountain and down the other side. Which graph best represents the probable air pressure changes that were observed?
A)

B)

C)

D)

67. A quantity of water is frozen solid and then heated from $0^{\circ} \mathrm{C}$ to $10^{\circ} \mathrm{C}$. Which statement best describes the properties of the water during this time?
A) Mass and volume change.
B) Volume and density change.
C) Mass changes but volume remains constant.
D) Volume changes but density remains constant.
68. The topographic map below shows a stream crossing several contour lines and passing through points $X$ and $Y$. Elevations are measured in feet.


What is the approximate gradient between point $X$ and point $Y$ ?
A) $10 \mathrm{ft} / \mathrm{mi}$
B) $20 \mathrm{ft} / \mathrm{mi}$
C) $40 \mathrm{ft} / \mathrm{mi}$
D) $80 \mathrm{ft} / \mathrm{mi}$
69. Base your answer to the following question on the world map below. Letters $A$ through $D$ represent locations on Earth's surface.


At which location could an observer not see Polaris in the night sky at any time during the year?
A) A
B) B
C) C
D) D
70. Base your answer to the following question on the contour map below, which shows a hill formed by glacial deposition near Rochester, New York. Letters $A$ through $E$ are reference points. Elevations are in feet.

## Contour Map



Which description best compares the gradients of this hill?
A) $C E$ and $A E$ have the same gradient.
B) $A E$ and $E B$ have the same gradient.
C) $C E$ has a steeper gradient than $E D$.
D) $A E$ has a steeper gradient than $E B$.
71. Base your answer to the following question on the latitude and longitude system shown below. The map represents a part of the Earth's surface and its latitude-longitude coordinates. Points $A$ through $F$ represent locations in this area.


How are latitude and longitude lines drawn on a globe of the Earth?
A) Longitude lines are parallel and latitude lines meet at the Equator.
B) Latitude lines are parallel and longitude lines meet at the poles.
C) Latitude lines are parallel and longitude lines meet at the Equator.
D) Longitude lines are parallel and latitude lines meet at the poles.
72. In the diagrams below, the dark zone at the surface of each wedge-shaped segment of the Earth represents average ocean depth. Which segment is drawn most nearly to scale?
A)

B)

C)

D)

73. A black hole is a celestial feature believed to have a mass millions of times the mass of our Sun and a diameter less than the diameter of Earth. An object of such high mass and small volume would have
A) an elliptical orbit with Earth at one focal point
B) a very low density
C) an elliptical orbit with the Sun at one focal point
D) a very high density
74. If an observer on Earth views Polaris on the horizon, the observer is located at the
A) Tropic of Cancer $\left(23.5^{\circ} \mathrm{N}\right)$
B) equator $\left(0^{\circ}\right)$
C) Tropic of Capricorn $\left(23.5^{\circ} \mathrm{S}\right)$
D) North Pole $\left(90^{\circ} \mathrm{N}\right)$
75. The diagram below shows latitude measurements every 10 degrees and longitude measurements every 15 degrees.


What is the latitude and longitude of point $X$ ?
A) $75^{\circ} \mathrm{N} 30^{\circ} \mathrm{E}$
B) $50^{\circ} \mathrm{N} 45^{\circ} \mathrm{W}$
C) $60^{\circ} \mathrm{S} 30^{\circ} \mathrm{W}$
D) $40^{\circ} \mathrm{S} 45^{\circ} \mathrm{E}$
76. As altitude increases from the tropopause to the mesopause, the atmospheric temperature will
A) decrease, only
B) increase, only
C) decrease, then increase
D) increase, then decrease

Base your answers to questions 77 through 79 on the maps below. Points $A, B, C, X$, and $Y$ are locations on the topographic map. The small map identifies the New York State region shown in the topographic map.

77. What is the elevation of point $A$ on the topographic map?
A) $1,650 \mathrm{ft}$
B) $1,600 \mathrm{ft}$
C) $1,550 \mathrm{ft}$
D) $1,700 \mathrm{ft}$
78. Which graph best represents the profile from point $B$ to point $C$ ?
A)

B)

C)

D)

79. What is the approximate gradient between point $X$ and point $Y$ ?
A) $1,000 \mathrm{ft} / \mathrm{mi}$
B) $500 \mathrm{ft} / \mathrm{mi}$
C) $250 \mathrm{ft} / \mathrm{mi}$
D) $100 \mathrm{ft} / \mathrm{mi}$
80. The solid rock material that directly underlies the sediments on the ocean floor is part of the Earth's
A) outer core
B) troposphere
C) lithosphere
D) hydrosphere

Base your answers to questions $\mathbf{8 1}$ and $\mathbf{8 2}$ on the diagram below, which represents a solid material of uniform composition.

81. The mass of this piece of material is approximately
A) 4.4 g
B) 0.23 g
C) 32 g
D) 9.3 g
82. If this material is heated and expands, the density of the material will
A) decrease
B) increase
C) remain the same
83. The diagrams below represent two solid objects $A$ and $B$. with different densities.

(Density $=0.8 \mathrm{~g} / \mathrm{cm}^{3}$ )

(Density $=1.2 \mathrm{~g} / \mathrm{cm}^{3}$ )

What will happen when the objects are placed in a container of water (water temperature $=4^{\circ} \mathrm{C}$ )?
A) Both objects will float.
B) Object $A$ will float and object $B$ will sink.
C) Object $B$ will float and object $A$ will sink.
D) Both objects will sink.
84. Compared to the weight of a person at the North Pole, the weight of the same person at the Equator would be
A) slightly more, because the person is closer to the center of Earth
B) slightly less, because the person is farther from the center of Earth
C) slightly more, because the person is farther from the center of Earth
D) slightly less, because the person is closer to the center of Earth
85. The Earth is slightly flattened from a perfect spherical shape because of
A) the pull of the sun and moon
B) its molten core
C) storms on the sun's surface
D) its rotation
86. The data table below shows the mass and volume of three samples of the same mineral. [The density column is provided for student use.]

Data Table

| Sample | Mass $(\mathrm{g})$ | Volume $\left(\mathrm{cm}^{3}\right)$ | Density $\left(\mathrm{g} / \mathrm{cm}^{3}\right)$ |
| :---: | :---: | :---: | :---: |
| A | 50 | 25 |  |
| B | 100 | 50 |  |
| C | 150 | 75 |  |

Which graph best represents the relationship between the density and the volume of these mineral samples?
A)

B)

C)

D)


Base your answers to questions $\mathbf{8 7}$ and $\mathbf{8 8}$ on the contour map below. Points $A, B, C, D, X$, and $Y$ are locations on the map. Elevations are expressed in feet. The maximum elevation of Basket Dome is indicated at point $X$.

87. In which general direction does Tenaya Stream flow?
A) southeast to northwest
B) southwest to norheast
C) northwest to southeast
D) northeast to southwest
88. The highest elevation of Basket Dome 40 years ago was measured at 7,600 feet. What is the rate of change in elevation for this area?
A) $40 \mathrm{in} / \mathrm{yr}$
B) $1.7 \mathrm{in} / \mathrm{yr}$
C) $24 \mathrm{in} / \mathrm{yr}$
D) $0.6 \mathrm{in} / \mathrm{yr}$
89. The polar circumference of the Earth is 40,008 kilometers. What is the equatorial circumference?
A) $12,740 \mathrm{~km}$
B) $25,000 \mathrm{~km}$
C) $40,008 \mathrm{~km}$
D) $40,076 \mathrm{~km}$
90. A contour map is shown below. Elevations are shown in feet.


What is the contour interval of this map?
A) 25 ft
B) 15 ft
C) 10 ft
D) 20 ft
91. Which graph shows the most probable effect of environmental pollution on the chances of human survival?
A)

B)

C)

D)

92. In the classroom during a visual inspection of a rock, a student recorded four statements about the rock. Which statement about the rock is an observation?
A) The rock dates from the Precambrian Era.
B) The rock cooled very rapidly.
C) The rock formed deep in the Earth's interior.
D) The rock is black and shiny.
93. Base your answer to the following question on the map below, which shows the latitude and longitude of five observers, $A, B, C, D$, and $E$, on Earth.


Which two observers would be experiencing the same apparent solar time?
A) $B$ and $C$
B) $A$ and $C$
C) $D$ and $E$
D) $B$ and $E$
94. As shown below, an empty 1,000.-milliliter container has a mass of 250.0 grams. When filled with a liquid, the container and the liquid have a combined mass of 1,300. grams.


What is the density of the liquid?
A) $1.00 \mathrm{~g} / \mathrm{mL}$
B) $1.05 \mathrm{~g} / \mathrm{mL}$
C) $1.30 \mathrm{~g} / \mathrm{mL}$
D) $0.95 \mathrm{~g} / \mathrm{mL}$
95. Base your answer to the following question on the two tables below and on your knowledge of Earth science. Table 1 shows the composition, hardness, and average density of four minerals often used as gemstones. Table 2 lists the minerals in Moh's Scale of Hardness from 1 (softest) to 10 (hardest).

Table 1

| Gemstone Mineral | Composition | Hardness | Average Density <br> $\left(\mathrm{g} / \mathrm{cm}^{3}\right)$ |
| :--- | :--- | :---: | :---: |
| emerald | $\mathrm{Be}_{3} \mathrm{Al}_{2}\left(\mathrm{Si}_{6} \mathrm{O}_{18}\right)$ | $7.5-8$ | 2.7 |
| sapphire | $\mathrm{Al}_{2} \mathrm{O}_{3}$ | 9 | 4.0 |
| spinel | $\mathrm{MgAl}_{2} \mathrm{O}_{4}$ | 8 | 3.8 |
| zircon | $\mathrm{ZrSiO}_{4}$ | 7.5 | 4.7 |


| KEY |  |
| :--- | :--- |
| $\mathrm{Al}=$ aluminum | $\mathrm{O}=$ oxygen |
| $\mathrm{Be}=$ beryllium | $\mathrm{Si}=$ silicon |
| $\mathrm{Mg}=$ magnesium | $\mathrm{Zr}=$ zirconium |

If the mass of a spinel crystal is 9.5 grams, what is the volume of this spinel crystal?
A) $36.1 \mathrm{~cm}^{3}$
B) $2.5 \mathrm{~cm}^{3}$
C) $5.7 \mathrm{~cm}^{3}$
D) $0.4 \mathrm{~cm}^{3}$
96. Base your answer to the following question on the diagram below, which represents latitude and longitude lines on Earth. Points $A$ through $E$ represent locations on Earth. Arrows represent direction of rotation.


What is the approximate latitude and longitude of location $A$ ?
A) $160^{\circ} \mathrm{N}, 15^{\circ} \mathrm{E}$
B) $15^{\circ} \mathrm{N}, 160^{\circ} \mathrm{W}$
C) $160^{\circ} \mathrm{S}, 15^{\circ} \mathrm{W}$
D) $15^{\circ} \mathrm{N}, 160^{\circ} \mathrm{E}$
97. The lines on which set of views best represent Earth's latitude system?
A)

B)

C)

D)

98. The diagram below is a cross section of an ice-covered lake in New York State during the month of January. Points $A, B, C$, and $D$ are locations at various levels in the lake. The temperature of the water at location $D$ is $4^{\circ} \mathrm{C}$.


Which graph best represents the relationship between location and density of the ice or water?
A)

B)

C)

D)

99. The topographic map below shows a lake and two rivers.


In which direction does each of the rivers flow?
A) The Sapphire River and the Garnet River both flow west.
B) The Sapphire River flows east and the Garnet River flows west.
C) The Sapphire River and the Garnet River both flow east.
D) The Sapphire River flows west and the Garnet River flows east.
100. A contour map is shown below. Elevations are shown in feet.


Which side of Amethyst Hill has the steepest slope?
A) west
B) north
C) east
D) south

