FULL-LENGTH PRACTICE TESTS 14

English Test

35 Minutes — 50 Questions

Directions: Each passage has certain words and phrases that are underlined and numbered. The questions in the right column will provide alternatives for the underlined segments. Most questions require you to choose the answer that makes the sentence grammatically correct, concise, and relevant. If the word or phrase in the passage is already the correct, concise, and relevant choice, select Choice A, NO CHANGE. Some questions will ask a question about the underlined segment. When a question is presented, choose the best answer.

Some questions will ask about part or all of the passage. These questions do not refer to a specific underlined segment. Instead, these questions will accompany a number in a box.

For each question, choose your answer and fill in the corresponding bubble on your answer sheet. Read the passage once before you answer the questions. You will o en need to read several sentences beyond the underlined portion to be able to choose the correct answer. Be sure to read enough to answer each question.

Passage I

Duke Ellington, a Jazz Great

[1]

By the time Duke Ellington published his autobiography, *Music Is My Mistress,* in 1973 he had[1] traveled to dozens of countries and every continent. "I pay rent in New York City," he answered when asked of his residence. [A]

[2]

In the 1920s, though, Ellington pays[2] more than rent in New York; he paid his dues on the bandstand. Having moved to Harlem from Washington, D.C., in 1923, Ellington established: his own[3] band and achieved critical recognition with a polished sound and appearance. As Ellington made a name for himself as a leader arranger and pianist[4], his Harlem Renaissance compositions and recordings highlighted two enduring characteristics of the man. First, Ellington lived for jazz. Second, Harlem sustained it[5], physically and spiritually.

[3]

[B] Ellington himself admitted he was not a very good pianist. As a teenager[6] in Washington. He missed more piano lessons then he took[7] with his teacher, Mrs. Clinkscales, and spent more time

going to dances than practicing the piano.

Mrs. Clinkscales was really the name of his piano teacher! In the clubs, [8] therefore, Ellington and his friends eventually caught word of New York and [9] the opportunities that awaited and were there for young musicians. Ellington [10] wrote, "Harlem, to our minds, did indeed have the world's most glamorous atmosphere. We had to go there." He promptly left Washington with drummer Sonny Greer, [11] before they could even unpack in Harlem, they found themselves penniless. Not until Ellington was lucky enough to find fifteen dollars on the street could he return to Washington and re-collect himself.

[4]

Ellington eventually did return to Harlem, and he achieved great success as the bandleader at the Cotton Club from 1927 to 1932. [C] Located in the heart of Harlem at 142nd Street and Lenox Avenue,

he played at the Cotton Club, [12] which was frequented by top entertainers and rich patrons. Harlem's nightlife, "cut out of a very luxurious, royal-blue bolt of velvet," was an inspirational backdrop, and Ellington composed, arranged, and recorded prolifically to excited critical acclaim. "Black and Tan Fantasy," "Hot and Bothered," and "Rockin' in Rhythm" were Ellington's early hits during this period. [13] They exhibited his unique ability to compose music that animated both dancers in search of a good time and improvising musicians in search of good music. [D] Before long, the once fumbling pianist from

Washington, D.C., became the undisputed leader of hot jazz in decadent Harlem. [14]

1. A. NO CHANGE
   B. 1973. He had
   C. 1973, it had
   D. 1973, he had

2. F. NO CHANGE
   G. paid
   H. has to pay
   J. pay

3. A. NO CHANGE
   B. established the following: his own
   C. established his own
   D. took the time and effort to establish his own

4. F. NO CHANGE
   G. leader arranger, and pianist,
   H. leader, arranger, and pianist
   J. leader, arranger, and pianist,

5. A. NO CHANGE
   B. him,
   C. them,
   D. itself,

6. F. NO CHANGE
   G. good pianist as a teenager
   H. good pianist, a teenager
   J. good pianist, as a teenager

7. A. NO CHANGE
   B. lessons then he had taken
   C. lessons; he took
   D. lessons than he took

8. F. NO CHANGE
   G. That was really the name of his piano teacher: Mrs. Clinkscales!
   H. Mrs. Clinkscales was really the name of his piano teacher.
   J. DELETE the underlined portion.

9. A. NO CHANGE
   B. however,
   C. despite,
   D. then,

10. F. NO CHANGE
    G. awaiting and being there for
    H. that awaited
    J. that were there for

11. A. NO CHANGE
    B. Sonny Greer but before they
    C. Sonny Greer, but before they
    D. Sonny Greer, they

12. F. NO CHANGE
    G. he played at the Cotton Club, a club that was frequented
    H. the Cotton Club, which was frequented
    J. the Cotton Club was frequented

13. The purpose of including the names of Ellington's songs is to:

    A. provide some details about Ellington's early music.
    B. contradict an earlier point that Ellington did not create his own music.
    C. illustrate the complexity of Ellington's music.
    D. discuss the atmosphere at the Cotton Club.

14. The purpose of Paragraph 4, as it relates to the previous paragraphs, is primarily to:

F. demonstrate how accomplished Ellington had become.
G. suggest that Ellington did not like living in New York.
H. remind us how difficult it is to be a musician.
J. make us skeptical of Ellington's abilities.

Question 15 asks about the preceding passage as a whole.

15. The writer is considering adding the following sentence to the essay:

> The combination of fun and seriousness in his music led to critical acclaim and mass appeal.

If the writer were to add this sentence, it would most logically be placed at Point:

A. A in Paragraph 1.
B. B in Paragraph 3.
C. C in Paragraph 4.
D. D in Paragraph 4.

Passage II

The following paragraphs may or may not be in the most logical order. Each paragraph is numbered in brackets, and question 29 will ask you to choose the appropriate order.

Coloring as Self-Defense in Animals

[1]

Some animals change its[16] coloring with the seasons. The ptarmigan sheds its brown plumage in winter,[17] replacing it with white feathers. The stoat, a member of the weasel family is known[18] as the *ermine* in winter because its brown fur changes to white. The chameleon is perhaps the most versatile of all animals having[19] changed their protective coloration. The chameleon changes its color in just a few minutes to that of whatever surface it happens to be sitting on.

[2]

While animals like the chameleon use their coloring[20] as a way of hiding from predators, the skunk uses its distinctive white stripe as a way of standing out from its surroundings. Far from placing it in danger, the skunk's visibilities[21] actually protects it. By distinguishing itself from other animals. The[22] skunk warns its predators to avoid its infamous stink. Think about it:

the question is would your appetite be whetted by the skunk's odor?[23]

[3]

Researchers have been investigating[24] how animal species have come to use coloring as a means of protecting themselves. One study has shown that certain animals have glands that release special hormones, resulting in the

change of skin or fur color. Therefore[25], not all the animals that camouflage themselves have these glands. The topic remains and endures as[26] one of the many mysteries of the natural world.

[4]

Animals have a variety of ways of protecting themselves from enemies. Some animals adapt in shape and color to their environment. The tree frog, for example, blends perfectly into its surroundings. When it sits motionless, a background of leaves completely hides the tree frog.[27] This camouflage enables the tree frog to hide from other animals that would be[28] interested in eating the tree frog.

16. F. NO CHANGE
    G. their
    H. it's
    J. there

17. A. NO CHANGE
    B. in winter and replacing
    C. in winter: replacing
    D. in winter replacing

18. F. NO CHANGE
    G. weasel family known
    H. weasel family, which is known
    J. weasel family, is known

19. A. NO CHANGE
    B. who changes
    C. that change
    D. that changed

20. F. NO CHANGE
    G. their use coloring
    H. use coloring their
    J. coloring their use

21. A. NO CHANGE
    B. the skunk’s visibility
    C. the skunks’ visibility
    D. it is the skunk’s visibilities

22. F. NO CHANGE
    G. animals, therefore, the
    H. animals because
    J. animals, the

23. A. NO CHANGE
    B. would your appetite be whetted by the skunk's odor?
    C. the question is as follows, would your appetite be whetted by the skunk's odor?
    D. the question is would your appetite be whetted by the odor of the skunk?

24. F. NO CHANGE
    G. investigated
    H. were investigating
    J. investigate

25. A. NO CHANGE
    B. Nevertheless,
    C. However,
    D. Finally,

26. F. NO CHANGE
    G. remaining and enduring as
    H. remains and endures
    J. remains

27. A. NO CHANGE
    B. the tree frog is completely hidden in a background of leaves.
    C. completely hidden is the tree frog in a background of leaves.
    D. a background of leaves and the tree frog are completely hidden.

28. F. NO CHANGE
    G. This camouflage enables the tree frog to hide from predators.
    H. This camouflage enables the tree frog to hide from other animals interested in eating the tree frog.
    J. DELETE the underlined portion.

Questions 29–30 ask about the preceding passage as a whole.

29. What would be the most logical order of paragraphs for this essay?

    A. 3, 1, 4, 2
    B. 1, 2, 4, 3
    C. 4, 1, 2, 3
    D. 2, 1, 3, 4

30. Suppose the writer's primary purpose had been to write an essay on how animals use their coloring to protect themselves in the wild. Would this essay accomplish that purpose?

F. Yes, because the author covers several aspects of how animals use their coloring to protect themselves.
G. Yes, because the author thoroughly investigates how one animal protects itself with its coloring.
H. No, because the author does not consider animals that exist in the wild.
J. No, because the author does not include information from research studies.

Passage III

The History of Chocolate

The word *chocolate* is used to describe a variety of foods and made [31] from the beans of the cacao tree. The first people known to have made chocolate were the Aztecs, who used cacao seeds to make a bitter but tasty drink. Therefore [32], it was not until Hernan Cortez's exploration of Mexico in 1519. That [33] Europeans first learned of chocolate.

[34] When Cortez returned to Spain, his ship's cargo included three chests of cacao beans. It was from these beans that Europe experienced its first taste of what seemed to be a very unusual but desirable beverage. Even so [35], the drink soon became popular among those people wealthy enough to afford it.

Over the next century cafes specializing [36] in chocolate drinks began to appear throughout Europe. [37]

Of course, chocolate is very popular today. People all over the world enjoy chocolate bars chocolate sprinkles and even chocolate soda. [38] In fact, [39] Asia has cultivated the delicacy of chocolate-covered ants! People enjoy this food as a snack at the movies or sporting events. The chocolate ant phenomenon has yet to take over America, but enjoy their chocolate Americans do [40] nonetheless.

Many chocolate lovers around the world were ecstatic to hear that chocolate may actually be good for you. Researchers say: chocolate contains [41] a chemical that could prevent cancer and heart disease. New research measures the amount of catechins, the chemical thought to be behind the benefits, in different types of chocolate.The substance is also found in tea. [42] They show [43] that chocolate is very high in catechins. The research has yet to be officially verified by the Food and Drug Administration, though, [44] so an appropriate level of caution is warranted.

31. A. NO CHANGE
    B. foods, which are cultivated and made
    C. foods, which made
    D. foods made

32. F. NO CHANGE
    G. Additionally,
    H. As a result,
    J. However,

33. A. NO CHANGE
    B. 1519 that
    C. 1519, that
    D. 1519:

34. Which of the following true statements would provide the best transition from the preceding paragraph to this paragraph?

F. The Aztecs successfully drove the Spanish from Tenochtitlan at first, but Cortez returned to defeat them and take hold of the city in 1521.
G. Just four years after Cortez set off to explore Mexico, King Charles I appointed him governor of New Spain.
H. Cortez came to the New World in search of gold, but his interest was also fired by the Aztecs' strange drink.
J. Cortez befriended some of the people he met, but mostly he used deadly force in his quest to conquer Mexico.

35. A. NO CHANGE
B. Soon,
C. Nonetheless,
D. Not surprisingly,

36. F. NO CHANGE
G. Over the next century cafes specialize
H. Over the next century, cafes specializing
J. Over the next century, there were cafes specializing

37. The author is considering the addition of another sentence here that briefly describes one of the first European cafes to serve a chocolate drink. This addition would:

A. weaken the author's argument.
B. provide an interesting detail that is relevant to the essay.
C. contradict the topic of the paragraph and the essay as a whole.
D. highlight the author's opinion of chocolate.

38. F. NO CHANGE
G. chocolate, bars, chocolate, sprinkles, and even chocolate soda.
H. chocolate bars chocolate sprinkles—even chocolate soda.
J. chocolate bars, chocolate sprinkles, and even chocolate soda.

39. A. NO CHANGE
B. Unfortunately,
C. In spite of this,
D. The truth is,

40. F. NO CHANGE
G. but Americans enjoy their chocolate
H. but enjoy their chocolate is what Americans do
J. but Americans do enjoy their chocolate

41. A. NO CHANGE
B. have said the following: chocolate contains
C. say that chocolate contains
D. say: chocolate contained

42. F. NO CHANGE
    G. Another place where the substance is found is tea.
    H. Also, tea contains the substance.
    J. DELETE the underlined portion.

43. A. NO CHANGE
    B. It shows
    C. The studies show
    D. The scientist shows

44. Which choice most effectively concludes the sentence and the essay?

    F. NO CHANGE
    G. may prove to be less than helpful to people with multiple risk factors for cancer and heart disease; they should ask their doctors for additional prevention information.
    H. should be used to design similar experiments to test the efficacy of consuming other types of catechin-rich sustenance as a means of prevention.
    J. is likely to be welcomed by chocolate lovers everywhere, although dentists may be less pleased.

Question 45 asks about the preceding passage as a whole.

45. Suppose the writer's primary purpose had been to write about culinary trends in history. Would this essay accomplish that goal?

A. Yes, because the essay discusses many culinary trends in history.
B. Yes, because the essay shows how chocolate has been used over time.
C. No, because the essay focuses too much on chocolate in present times.
D. No, because the essay only covers chocolate.

Passage IV

The Military Uniform of the Future

[1]

Scientists, in programs administers by[46] the United States Army, are experimenting to develop the military uniform of the future. As imagined, it would be light as silk, bulletproof, and able to[47] rapidly change at the molecular level to adapt to biological or chemical threats. In response to a detected anthrax threat, for example, it would become an impermeable shield. The pant leg of a soldier who's[48] leg had been broken would have been[49] able to morph into a splint or even form an artificial muscle. [50]

[2]

[A] The especially promising Invisible Soldier program aims to make the long-held dream of human invisibility a reality by using technology. To create[51] a covering capable of confounding[52] a soldier from most wavelengths of visible light. [53] [54]

[3]

A solution proposed in the early stages of the Invisible Soldier program's development was to construct something that would sense the environment around the soldier.[55] The sensors would then send varying intensities of electrical current to the appropriate areas of the fabric, they[56] would be infused with chemicals sensitive to electricity. The coveralls would change colors continually as the soldier moved. [B]

[4]

[C] The problem with this solution from a military standpoint, you know,[57] is power: the fact that the suit[58] would require a continuous flow of electricity means that a soldier would have to carry a large number of batteries, which would hardly contribute to ease of movement and camouflage. [D]

[5]

[1] To address this problem, Army researchers have developed a new kind of color-changing pixel, known as the intererometric modulator or i-mod. [2] The researchers hope that a flexible suit made of i-mod pixels could completely blend into any background. [3] In addition to matching a background, the pixels could also be set to show other colors, for example, a camouflage mode that would render a soldier effectively invisible in the forest and a flash mode that would enhance a soldier's visibility in a rescue situation. [4] Changing the distance between the mirrors changes the color of the light that they reflect. [5] Each i-mod pixel is made up of a pair of tiny mirrors. 59

46. F. NO CHANGE
    G. administering by
    H. administered by
    J. administers with

47. A. NO CHANGE
    B. would: be light as silk, bulletproof, and able to
    C. would be light as silk bulletproof and able to
    D. light as silk, bulletproof, and was able to

48. F. NO CHANGE
    G. soldier whose
    H. soldier, who's
    J. soldier that's

49. A. NO CHANGE
    B. would be
    C. will have been
    D. is

50. The writer wants to add a sentence that describes an additional feature that the uniform of the future would include. Given that all of the following statements are true, which one, if added here, would most clearly and effectively accomplish the writer's goal?

    F. If a broken leg is not attended to properly, a soldier could suffer from bone deformity, nerve damage, and muscle atrophy.
    G. Nanosensors would transmit vital signs back to a medical team or monitor breathing for increased nitric oxide, a sign of stress.
    H. One issue the military uniform of the future would not address is the need for fresh water and ample supplies in even the most remote locations.
    J. Deep pockets would provide room for soldiers to store a myriad of important supplies such as ammunition, first aid kits, and batteries.

Mathematics Test

50 Minutes — 45 Questions

Directions: Choose the correct solution to each question and fill in the corresponding bubble on your answer sheet.

Do not continue to spend time on questions if you get stuck. Solve as many questions as you can before returning to any if time permits.

You may use a calculator on this test for any question you choose. However, some questions may be better solved without a calculator.

Note: Unless otherwise stated, you can assume:

1. Figures are NOT necessarily drawn to scale.
2. Geometric figures are two dimensional.
3. The term *line* indicates a straight line.
4. The term *average* indicates arithmetic mean.

1. What is the value of $5x + 12$ when $x = 8$?

A. 40
B. 48
C. 52
D. 60

2. If $7y - 9 = 33$, then $y = ?$

F. 5
G. 6
H. 7
J. 8

3. What is 18% of 350?

A. 63
B. 70
C. 56
D. 77

4. Which of the following is equivalent to $9(2x - 5)$?

F. $18x - 5$
G. $2x - 45$
H. $18x - 45$
J. $11x - 14$

5. A shirt costs $45 after a 25% discount. What was the original price?

A. $56.25
B. $50
C. $67.50
D. $60

6. What is the slope of a line passing through points (3, 8) and (9, 26)?

F. 3
G. 2
H. 4
J. 6

7. If $h(x) = x^2 + 4x - 7$, what is $h(5)$?

A. 32
B. 38
C. 42
D. 48

8. What is the value of $|-18 + 7|$?

F. -25
G. -11
H. 25
J. 11

9. A rectangle has a length of 22 inches and a width of 13 inches. What is its area?

A. 70 in^2
B. 143 in^2
C. 286 in^2
D. 572 in^2

10. If $6x + 11 = 2x + 35$, then $x = ?$

F. 5
G. 6
H. 7
J. 8

11. What is the circumference of a circle with diameter 20 cm? (Use $\pi \approx 3.14$)

A. 62.8 cm
B. 125.6 cm
C. 314 cm
D. 40 cm

12. Which of the following is a solution to $x^2 - 7x + 12 = 0$?

F. 2
G. 6
H. 3
J. 5

13. In a group of 150 people, 60 speak Spanish. What percent speak Spanish?

A. 30%
B. 35%

C. 38%
D. 40%

14. What is the distance between points (4, 11) and (4, -3) in the coordinate plane?

F. 14
G. 8
H. 7
J. 11

15. If 7/9 of a number is 63, what is the number?

A. 49
B. 81
C. 72
D. 54

16. What is the value of 2^7?

F. 14
G. 64
H. 49
J. 128

17. If the sum of four consecutive odd integers is 104, what is the smallest of these integers?

A. 23
B. 21
C. 23
D. 25

18. Which of the following is equivalent to $(x + 11)(x - 7)$?

F. $x^2 + 4x + 77$
G. $x^2 + 4x - 77$
H. $x^2 - 4x - 77$
J. $x^2 + 18x - 77$

19. What is the perimeter of a square with side length 16.5 cm?

A. 66 cm
B. 33 cm
C. 272.25 cm
D. 82.5 cm

20. If y varies inversely with x, and y = 6 when x = 8, what is y when x = 12?

F. 9
G. 16
H. 4
J. 2

21. What is the value of √169 + √121?

A. 24
B. √290
C. 18
D. 24

22. A box contains 12 red balls, 8 blue balls, and 10 green balls. What is the probability of randomly selecting a blue ball?

F. 4/15
G. 2/5
H. 8/30
J. 1/3

23. If $\sin(\theta) = 0.6$ and $\cos(\theta) = 0.8$, what is $\tan(\theta)$?

A. 0.48
B. 0.75
C. 1.33
D. 1.4

24. What is the solution set for the inequality $4x - 7 > 21$?

F. $x > 28$
G. $x < 7$
H. $x > 14$
J. $x > 7$

25. A cylinder has a radius of 6 inches and a height of 9 inches. What is its volume? (Use $\pi \approx 3.14$)

A. 169.56 in^3
B. 678.24 in^3
C. 1017.36 in^3
D. 339.12 in^3

26. A right triangle has legs of length 20 and 21. What is the length of the hypotenuse?

F. 28
G. 29
H. 30
J. 31

27. What is the value of $(5x - 3)^2$ when $x = 4$?

A. 289
B. 361
C. 256
D. 324

28. The sum of the interior angles of a decagon (10-sided polygon) is:

F. 1260°
G. 1080°
H. 1440°
J. 1620°

29. If 3^(2x) = 81, what is the value of x?

A. 4
B. 3
C. 27
D. 2

30. Which of the following is equivalent to √200?

F. 10√2
G. 20√5
H. 5√8
J. 100√2

31. In an arithmetic sequence, the first term is 12 and the common difference is 7. What is the 15th term?

A. 103
B. 110
C. 117
D. 98

32. If matrix P = [8 5; 3 7] and matrix Q = [3 2; 4 1], what is P - Q?

F. [11 7; 7 8]

G. [5 7; -1 6]
H. [5 3; 1 6]
J. [5 3; -1 6]

33. A sphere has a radius of 9 cm. What is its volume? (Use $\pi \approx 3.14$ and $V = (4/3)\pi r^3$)

A. 1017.36 cm^3
B. 2712.96 cm^3
C. 3052.08 cm^3
D. 904.32 cm^3

34. What is the value of 8! (8 factorial)?

F. 5040
G. 40,320
H. 720
J. 64

35. For which value of x is the expression $(x + 7)/(x^2 - 49)$ undefined?

A. $x = 7$ or $x = -7$
B. $x = 0$
C. $x = 49$
D. $x = -49$

36. If the angles of a quadrilateral are in the ratio 2:3:4:6, what is the measure of the largest angle?

F. 72°
G. 96°
H. 144°
J. 120°

37. What is the range of the function $f(x) = -x^2 + 8$ for all real numbers x?

A. All real numbers
B. $y \geq 8$
C. $y > 8$
D. $y \leq 8$

38. If $\log_4(x) = 5$, then x = ?

F. 1024
G. 20
H. 625

J. 256

39. A rectangular prism has dimensions 7 cm × 9 cm × 12 cm. What is its volume?

A. 28 cm^3
B. 756 cm^3
C. 378 cm^3
D. 1512 cm^3

40. What is the least common multiple (LCM) of 15 and 25?

F. 5
G. 125
H. 50
J. 75

41. If $f(x) = 4x - 9$ and $g(x) = x^2 + 3$, what is $f(g(4))$?

A. 67
B. 55
C. 67
D. 76

42. The arithmetic mean of eight numbers is 27. If seven of the numbers are 24, 26, 30, 28, 25, 29, and 31, what is the eighth number?

F. 27
G. 23
H. 25
J. 29

43. In an isosceles right triangle, each of the two equal angles measures:

A. 45°
B. 60°
C. 30°
D. 50°

44. If x varies directly with y^3, and $x = 54$ when $y = 3$, what is x when $y = 4$?

F. 72
G. 96
H. 128
J. 108

45. What is the greatest common factor (GCF) of 96 and 144?

A. 24
B. 32
C. 36
D. 48

Reading Test

36 Minutes — 40 Questions

Directions: The Reading Test includes multiple passages. Each passage includes multiple questions. A er reading each passage, choose the best answer and fill in the corresponding bubble on your answer sheet. You may review the passages as o en as necessary.

Passage I

PROSE FICTION: This passage is adapted from *Bleak House* by Charles Dickens, which was first published in 1853. In this excerpt, Esther recounts some of her childhood experiences.

I can remember, when I was a very little girl indeed, I used to say to my doll when we were alone together, "Now, Dolly, I am not clever, you know very well, and you must be
(5) patient with me, like a dear!"

My dear old doll! I was such a shy little thing that I seldom dared to open my lips, and never dared to open my heart,

to anybody else. It almost makes me cry to think what a relief it used to be to me when I came home from school of a day to run upstairs to my room and say, “Oh, you dear faithful Dolly, I knew you would be expecting me!” and then to sit down on the floor, leaning on the elbow of her great chair, and tell her all I had noticed since we parted.

I was brought up, from my earliest remembrance—like some of the princesses in the fairy stories, only I was not charming—by my godmother. At least, I only knew her as such. She was a good, good woman! She went to church three times every Sunday, and to morning prayers on Wednesdays and Fridays, and to lectures whenever there were lectures, and never missed. She was handsome; and if she had ever smiled, would have been (I used to think) like an angel—but she never smiled. She was always grave and strict. She was so very good herself, I thought, that the badness of other people made her frown all her life. It made me very sorry to consider how good she was and how unworthy of her I was, and I used ardently to hope that I might have a better heart; and I talked it over very often with the dear old doll, but I never loved my godmother as I ought

to have loved her and as I felt I must have loved her if I had been a better girl.

I had never heard my mama spoken of. I had never been shown my mama's grave. I had never been told where it was.

Although there were seven girls at the neighboring school where I was a day boarder, and although they called me little Esther Summerson, I knew none of them at home. All of them were older than I, to be sure (I was the youngest there by a good deal), but there seemed to be some other separation between us besides that, and besides their being far more clever than I was and knowing much more than I did. One of them in the first week of my going to the school (I remember it very well) invited me home to a little party, to my great joy. But my godmother wrote a stiff letter declining for me, and I never went. I never went out at all.

It was my birthday. There were holidays at school on other birthdays—none on mine. There were rejoicings at home on other birthdays, as I knew from what I heard the girls relate to one another—there were none on mine. My birthday was the most melancholy day at home in the whole year.

Dinner was over, and my godmother and I were sitting at the table before the

fire. The clock ticked, the fire clicked; not another sound had been heard in the room or in the house for I don't know how long. I happened to look timidly up from my stitching, across the table at my godmother, and I saw in her face, looking gloomily at me, "It would have been far better, little Esther, that you had had no birthday, that you had never been born!"

I broke out crying and sobbing, and I said, "Oh, dear godmother, tell me, pray do tell me, did Mama die on my birthday?"

"No," she returned. "Ask me no more, child!"

. . . I put up my trembling little hand to clasp hers or to beg her pardon with what earnestness I might, but withdrew it as she looked at me, and laid it on my fluttering heart. She said slowly in a cold, low voice—I see her knitted brow and pointed finger—"The time will come—and soon enough—when you will understand this better and will feel it too. I have forgiven her"—but her face did not relent—"the wrong she did to me, and I say no more of it, though it was greater than you will ever know. Forget your mother and leave all other people to forget her. Now, go!"

I went up to my room, and crept to bed, and laid my doll's cheek against mine

wet with tears, and holding that solitary friend upon my bosom, cried myself to sleep. Imperfect as my understanding of my sorrow was, I knew that I had brought no joy at any time to anybody's heart and that I was to no one upon earth what Dolly was to me.

Dear, dear, to think how much time we passed alone together afterwards, and how often I repeated to the doll the story of my birthday and confided to her that I would try as hard as ever I could to repair the fault I had been born with. I hope it is not self-indulgent to shed these tears as I think of it.

1. By writing "Dolly, I am not clever" (line 3), "how unworthy of her I was" (lines 30–31), and "I knew that I had brought no joy at any time to anybody's heart" (lines 88–89), the author intends to give the impression that the narrator:

   A. is an especially mean and unintelligent girl.
   B. has a low opinion herself because of her upbringing, not because of her character.
   C. resents and rejects her godmother's statement that she should never have been born.
   D. hates her godmother for not celebrating her (the narrator's) birthday.

2. The author refers to Esther's doll as a "solitary friend" (line 86) in order to emphasize that the doll is:

   F. only an amusing plaything.
   G. Esther's only kind companion and confidante.
   H. a princess in a fairy tale.
   J. a beautiful toy that was too fragile to touch.

3. As it is used in line 51, the word *stiff* most nearly means:

   A. difficult to bend.
   B. rigidly formal.
   C. unchanging.
   D. not moving easily or freely.

4. Which of the following most likely contributed to Esther's belief that she had been born with a fault (lines 94–95)?

   F. She is not very clever.
   G. Her birthday was never celebrated.
   H. She did not have any friends at school.
   J. Her mother died in childbirth.

5. Esther's godmother's words, actions, and facial expression as described in the tenth paragraph (lines 71–83) suggest that she:

A. had a change of heart about celebrating Esther's birthday.
B. did not know what had happened to Esther's mother.
C. continued to resent Esther's mother.
D. had truly forgiven Esther's mother.

6. According to the passage, Esther's childhood could be most accurately characterized as:

F. an adventure.
G. a time of loneliness and confusion.
H. a period of dedication to education and self-improvement.
J. a period of attempting to become more like her godmother.

7. From Esther's statement, "I was to no one upon earth what Dolly was to me" (lines 89–90), it is reasonable to infer that Esther:

A. believed that her godmother loved her.
B. believed that she would be able to become friends with the girls at school.
C. believed that no one loved her.
D. believed that her mother was alive.

8. In the passage, it is implied that all of the following contributed to separating Esther from the other girls at her school EXCEPT:

F. the other girls were older than Esther.
G. Esther's godmother did not allow Esther to socialize with the other girls outside of school.
H. Esther believed that the other girls were much smarter.
J. Esther was self-indulgent.

9. According to the passage, one reason that Esther thinks of her godmother as a "good, good woman" (line 20) is that:

A. when she smiles, she looks like an angel.
B. she forgave Esther's mother.
C. she frequently attends church services.
D. she gave Esther a doll.

10. In the passage, Esther describes herself as a child as:

F. self-indulgent and not very clever.
G. shy and not very clever.
H. shy and faithful.
J. self-indulgent and faithful.

Passage II

SOCIAL SCIENCE: This passage is excerpted from "The Return of the Big Cats" by Mac Margolis, *Newsweek*, December 11, 2000,

Marcos Nunes is not likely to forget his first holiday in Brazil's Pantanal wilderness. One afternoon last October, he was coaxing his horse through a lonely tuft of woods when
(5) he suddenly found himself staring down a fully grown spotted jaguar. He held his breath while the painted cat and her cub paraded silkily through the grove, not 10 meters away. "Thank you," he wrote later
(10) in a hotel visitor's log, "for the wonderful fright!"

As Nunes and other ecotourists are discovering, these big, beautiful animals, once at the brink of extinction, are now
(15) staging a comeback. Exactly how dramatic a comeback is difficult to say because jaguars—*Panthera onca*, the largest feline in the New World—are solitary, secretive, nocturnal predators. Each cat needs to
(20) prowl at least 35 square kilometers by itself. Brazil's Pantanal, vast wetlands that spill over a 140,000-square-kilometer swath of South America the size of Germany, gives them plenty of room to roam. Nevertheless,
(25) scientists who have been tagging jaguars with radio transmitters for two decades have in recent years been reporting a big increase in sightings. Hotels, campgrounds, and bed-and-breakfasts have sprung up to
(30) accommodate the half-million tourists a year

(twice the number of five years ago) bent on sampling the Pantanal's wildlife, of which the great cats must be the most magnificent example.

(35) Most sightings come from local cattle herders—but their jaguar stories have a very different ring. One day last September, ranch hand Abel Monteiro was tending cattle near the Rio Vermelho, in the southern Pantanal,

(40) when, he says, a snarling jaguar leaped from the scrub and killed his two bloodhounds. Monteiro barely had time to grab his .38 revolver and kill the angry cat. Leonelson Ramos da Silva says last May he and a group

(45) of field hands had to throw flaming sticks all night to keep a prowling jaguar from invading their forest camp. The Brazilian interior, famous for its generous spirit and cowboy *bonhomie*, is now the scene of a

(50) political catfight between the scientists, environmentalists, and ecotourists who want to protect the jaguars and the embattled ranchers who want to protect themselves and their livelihood.

(55) The ranchers, to be sure, have enough headaches coping with the harsh, sodden landscape without jaguars attacking their herds and threatening their livelihoods. Hard data on cattle losses due to jaguars in

(60) the Pantanal are nonexistent, but there are

stories. In 1995, Joo Julio Dittmar bought a 6,200-hectare strip of ideal breeding ground, only to lose 152 of his 600 calves to jaguars, he claims. Ranchers chafe at laws that forbid
(65) them to kill the jaguars. “This is a question of democracy,” says Dittmar. “We ranchers ought to be allowed to control our own environment.”

Man and jaguar have been sparring for
(70) territory ever since 18th-century settlers, traders, and herdsmen began to move into this sparsely populated *serto*, or back lands. By the 1960s, the Pantanal was a vast, soggy canvas, white with gleaming herds of Nelore
(75) cattle. Game hunters were bagging 15,000 jaguars a year in the nearby Amazon Basin (no figures exist on the Pantanal) as the worldwide trade in pelts reached $30 million a year. As the jaguars grew scarce, their
(80) chief food staple, the capybara—a meter-long rodent, the world’s largest—overran farmers’ fields and spread trichomoniasis, a livestock disease that renders cows sterile.

Then in 1967, Brazil outlawed jaguar
(85) hunting, and a world ban on selling pelts followed in 1973. Weather patterns also shifted radically—due most likely to global warming—and drove annual floods to near-biblical proportions. The waters are
(90) only now retreating from some inundated

pasturelands. As the Pantanal herds shrank from 6 million to about 3.5 million head, the jaguars advanced. Along the way they developed a taste for the bovine intruders.

(95) The ranchers' fear of the big cats is partly cultural. The ancient Inca and Maya believed that jaguars possessed supernatural powers. In Brazil, the most treacherous enemy is said to be *o amigo da onca*, a

(100) friend to the jaguar.

Some people believe there may be a way for ranchers and jaguars to coexist. Sports hunters on "green safaris" might shoot jaguars with immobilizing drugs, allowing

(105) scientists to fit the cats with radio collars. Fees would help sustain jaguar research and compensate ranchers for livestock losses. (Many environmentalists, though, fear fraudulent claims.) Scientists are setting up

(110) workshops to teach ranchers how to protect their herds with modern husbandry, pasture management, and such gadgets as blinking lights and electric fences.

Like many rural folk, however, the

(115) wetland ranchers tend to bristle at bureaucrats and foreigners telling them what to do. When the scholars go home and the greens log off, the *pantaneiros* will still be there—left on their own to deal with the jaguars as

(120) they see fit.

11. As it is used in line 62, the word *canvas* most nearly means:

A. a survey of public opinion.
B. a background.
C. a coarse cotton fabric.
D. a painting.

12. The author's purpose in retelling Nunes's experience is to:

F. describe the dangers of encountering wild animals.
G. suggest the excitement of unexpected jaguar sightings.
H. support the rancher's claim that jaguars threaten their herds.
J. argue that ecotourism is unsafe.

13. According to the passage, it is difficult to determine the extent of the jaguar's comeback because:

A. the area the jaguars inhabit is so large.
B. the stories that the local ranchers tell about jaguars contradict the conclusions reached by scientists.
C. jaguars are solitary, nocturnal animals that can have a territory of 35 square kilometers.
D. scientists have only used radio transmitters to track the movements of the jaguar population.

14. The information about ecotourism in the first and second paragraphs of the passage (lines 1–28) suggests that:

F. the jaguars are seen as a threat to the safety of tourists.
G. the jaguars are important to the success of Brazil's growing ecotourism industry.
H. the growth of the ecotourism industry is threatening the habitat of the jaguars.
J. it is common for ecotourists to spot one or more jaguars.

15. According to the passage, which of the following is NOT a method scientists are teaching ranchers in order to protect cattle herds?

A. "Green safaris"
B. Pasture management
C. The use of blinking lights and electric fences
D. Modern husbandry

16. The author of the passage most likely included the jaguar stories of three ranchers in order to:

F. express more sympathy toward the ranchers than toward the environmentalists and scientists.
G. illustrate the dangers and economic losses that the jaguars currently pose to ranchers.
H. show the violent nature of the ranchers.
J. provide a complete picture of the Pantanal landscape.

17. From information in the passage, it is most reasonable to infer that the cattle herds “shrank from 6 million to about 3.5 million head” (lines 78–79) because:

    A. the jaguars had killed so many cattle.
    B. environmentalists and scientists worked to convert pastureland into refuges for the jaguars.
    C. many cows had become sterile from trichomoniasis, and annual floods submerged much of the pastureland used by ranchers.
    D. the cattle could not tolerate the increase in the average temperature caused by global warming.

18. The main conclusion the passage reaches about the future of the relationship between the people and the jaguars in the Pantanal is that:

    F. the increase in ecotourism will ensure the continued growth of the jaguar population.
    G. the ranchers themselves will ultimately determine how they will cope with the jaguars.
    H. the jaguar population will continue to fluctuate with the number of tourists coming into the Pantanal.
    J. the scientists’ new ranching methods will make it easy for the ranchers and jaguars to coexist.

19. Given the adjectives the author uses to describe the jaguar, his attitude toward the animal is one of:

A. admiration.
B. fear.
C. revulsion.
D. concern.

20. Based on the passage, the author would most likely agree that:

F. ranchers have a stronger argument than do environmentalists.
G. jaguars are too shy to be seen by ecotourists.
H. the resurgence of jaguars can be a positive development.
J. The conflict between jaguars and ranchers is a recent problem.

Passage III

HUMANITIES: This passage is excerpted from *Music Through the Ages: Revised Edition*, © 1987 by Marion Bauer and Ethel R. Peyser, edited by Elizabeth E. Rogers, copyright © 1932 by Marion Bauer and Ethel R. Peyser, renewed copyright © 1960 by Ethel R. Peyser. Reprinted by permission of G. P. Putnam's Sons, a division of Penguin Group (USA), Inc.

Greek instruments can be classified into two general categories—string and pipe, or lyre and aulos. Our knowledge of them comes from representations on monuments, vases, (5) statues, and friezes and from the testimony of Greek authors. The lyre was the national instrument and included a wide variety of

types. In its most antique form, the chelys, it is traced back to the age of fable and allegedly owed its invention to Hermes. Easy to carry, this small lyre became the favorite instrument of the home, amateurs, and women, a popular accompaniment for drinking songs and love songs as well as more noble kinds of poetry. Professional Homeric singers used a kithara, a larger, more powerful instrument, which probably came from Egypt. The kithara had a flat wooden sound box and an upper horizontal bar supported by two curving arms. Within this frame were stretched strings of equal length, at first but three or four in number. Fastened to the performer by means of a sling, the kithara was played with both hands. We are not sure in just what manner the instrument was used to accompany the epics. It may have been employed for a pitch-fixing prelude and for interludes, or it may have paralleled or decorated the vocal melody in more or less free fashion.

Two types of tuning were used: the dynamic, or pitch method, naming the degrees "according to function," and the thetic, or tablature, naming them "according to position" on the instrument.

As early as the eighth century b.c.e., lyres of five strings appeared. Terpander

(fl. c. 675 b.c.e.), one of the first innovators, is said to have increased the number of strings to seven. He is also supposed to have completed the octave and created the Mixolydian scale. Aristoxenos claimed that the poetess Sappho, in the seventh century b.c.e., in addition to introducing a mode in which Dorian and Lydian characteristics were blended, initiated use of the plectrum or pick. At the time of Sophocles (495–406 b.c.e.), the lyre had eleven strings.

Another harplike instrument was the magadis, whose tone was described as trumpetlike. Of foreign importation, it had twenty strings, which, by means of frets, played octaves. As some of the strings were tuned in quarter tones, it was an instrument associated with the enharmonic mode. Smaller versions, the pectis and the barbitos, were also tuned in quarter tones. Greek men and boys had a style of singing in octaves that was called magadizing, after the octave-playing instruments.

The kithara was identified with Apollo and the Apollonian cult, representing the intellectual and idealistic side of Greek art. The aulos or reed pipe was the instrument of Dionysians, who represented the unbridled, sensual, and passionate aspect of Greek culture.

Although translated as “flute,” the aulos is more like our oboe. Usually found in double form, the pipes set at an angle, the aulos was imputed to have a far more exciting effect than that produced by the subdued lyre. About 600 b.c.e., the aulos was chosen as the official instrument of the Delphian and Pythian festivals. It was also used in performances of the Dionysian dithyramb as well as a supplement of the chorus in classic Greek tragedy and comedy.

There was a complete family of auloi covering the same range as human voices. One authority names three species of simple pipes and five varieties of double pipes. (The double pipe was the profes sional instrument.) An early specimen was supposed to have been tuned to the chromatic tetrachord D, C sharp, B flat, A—a fact that points to Oriental origin. Elegiac songs called aulodia were composed in this mode to be accompanied by an aulos. Although the first wooden pipes had only three or four finger holes, the number later increased so that the Dorian, Phrygian, and Lydian modes might be performed on a single pair. Pictures of auletes show them with a bandage or phorbeia over their faces; this might have been necessary to hold the two pipes in place, to modulate the tone or,

perhaps, to aid in storing air in the cheeks

for the purpose of sustained performance.

21. The passage suggests that the aulos was considered "the instrument of the Dionysians" (line 55) because:

    A. it expressed the excitement and passion of that aspect of Greek culture.
    B. it was chosen as the official instrument of the Delphian and Pythian festivals.
    C. it represented the intellectual and idealistic side of Greek art.
    D. it was invented around the time that the Dionysian cult originated.

22. The statement that the chelys can be "traced back to the age of fable" (line 8) implies that the chelys:

    F. was invented by storytellers.
    G. was used to accompany the epics.
    H. probably existed in legend only.
    J. was a particularly ancient instrument.

23. As it is used in line 25, the word *decorated* most nearly means:

A. adorned.
B. embellished.
C. increased.
D. made pretty.

24. According to the passage, the kithara was:

F. most likely of Greek origin.
G. played with one hand.
H. used by professional musicians.
J. less powerful than a chelys.

25. Which of the following is NOT cited as a change that occurred to the lyre between the eighth and fifth centuries b.c.e.?

A. Musicians began to use a plectrum.
B. Lyres featured increasing numbers of strings.
C. Musicians began to use different scales and modes.
D. Lyres were used to accompany dramatic productions.

26. The author most likely views ancient Greek instruments as:

F. interesting and integral to Greek culture.
G. too ancient to be relevant to today's instrumental music.
H. complicated in design and use.
J. primitive when compared to modern instruments.

27. The author's approach to Greek music and instruments is that of:

A. an historian.
B. a professional musician.
C. a music teacher.
D. a Greek scholar.

28. According to the passage, one of Sappho's contributions to ancient Greek music was that she:

F. completed the octave and created the Mixolydian scale.
G. introduced a mode blending Dorian and Lydian characteristics.
H. incorporated poetry into recitals of lyre music.
J. helped increase the number of strings on the lyre.

29. According to the passage, which of the following is/are characteristic(s) of the aulos?

I. It was used in performances of the Dionysian dithyramb.
II. It sounded more exciting than the lyre.
III. It resembled the modern-day flute more than it did the oboe.

A. I only
B. I and II only
C. II and III only
D. I, II, and III

30. Which of the following does the passage suggest is true about our knowledge of ancient Greek instruments?

F. Our knowledge is dependent on secondary sources.
G. Little is known about how instruments were tuned.
H. Very few pictures of ancient Greek instruments have survived.
J. More is known about stringed instruments than about pipe instruments.

Passage IV

NATURAL SCIENCE: The immune system can be divided into two major divisions: nonspecific and specific. The nonspecific immune system is composed of defenses that are used to fight off infection in general and are not targeted at specific pathogens. The specific immune system is able to attack very specific disease-causing organisms by means of protein-to-protein interaction and is responsible for our ability to become immune to future infections from pathogens we have fought off already.

Passage A

Nonspecific defenses serve as the first line of defense for the body to fight off infection. The skin and mucous membranes form one part of these nonspecific defenses, which our body uses against
(5) foreign cells or viruses. Intact skin cannot normally be penetrated by bacteria or viruses, and oil and sweat secretions give the skin a pH that ranges from 3 to 5, which is acidic enough to discourage

most microbes from growing there. In addition, saliva, tears, and mucous all contain the enzyme lysozyme, which can destroy bacterial cell walls (causing bacteria to rupture due to osmotic pressure) and some viral capsids. Mucous is able to trap foreign particles and microbes and transport them to the stomach through swallowing or to the outside during coughing or blowing the nose. Also, movement in the stomach due to peristalsis and in the airways due to cilia helps remove harmful agents.

Certain white blood cells are another part of the nonspecific defense systems. Macrophages are large white blood cells that circulate, looking for foreign material or cells to engulf, which they do through phagocytosis. Macrophages circulate through the blood and are able to transport themselves through capillary walls and into tissues that have been infected or wounded. Macrophages are called antigen-presenting cells (APCs) because of their ability to display on their own cell surface the proteins that were on the surface of the cell or viral particle they have just digested. That, in turn, often results in a more intensive immune response from other white blood cells, like B and T cells.

Neutrophils are white blood cells that are actively phagocytic like macrophages but are not APCs. Our bodies normally produce approximately 1 million neutrophils per second, and they can be found anywhere in the body. They usually destroy themselves as they fight off pathogens.

People who have decreased numbers of neutro-

phils circulating through their blood are extremely susceptible to bacterial and fungal infections. Other white blood cells that secrete toxic substances without fine-tuned specificity include the eosinophils, basophils, and mast cells.

Passage B

The major specific defense of the immune system includes specialized white blood cells known as lymphocytes, which come in two varieties: B cells and T cells. Both are produced by stem cells in the bone marrow, and although T cells mature in the thymus, B cells do not. The thymus is essential for "educating" T cells; those that recognize "self" antigens (proteins found on one's own cell surfaces) are killed off to prevent the body from attacking itself. This negative selection results in the development of T cell tolerance, a necessity of the specific immune system. Yet a positive selection process also exists whereby T cells that do not react to a specific set of glycoproteins, called MHC (major histocompatibility complex) proteins, are killed off because T cells need to be able to bond to both self-MHC and foreign antigens simultaneously.

There are three types of T cells: helper (TH), cytotoxic (TC), and suppressor (TS). While TH cells are mediators between macrophages and B cells, TC cells are essential in defending against viruses because they can kill virally infected cells directly. Since virally infected cells display some

viral proteins on their surfaces, TC cells can bind to those proteins and secrete enzymes that tear the cell membrane, thereby killing the cell. TS cells are involved in controlling the immune response so that it does not run amok; they do this by suppressing the production of antibodies by B cells.

T cells cannot detect free antigens; they can only respond to displayed antigens and MHC on the surfaces of cells. When they do recognize a displayed antigen, it is always in combination with a self-MHC protein displayed along with the antigen on the host cell surface.

Every B cell has surface receptors that can recognize a specific set of foreign antigens (proteins found on the surfaces of foreign cells and viruses). B cells can be "activated" in one of two ways: either they can come into contact with a foreign antigen that can bind to the B cell surface receptors, or they can engulf a pathogen, displaying its antigens on the B cell surface much as a macrophage would.

B and T cells each have unique cell receptors. That means that almost every one of the several billion B and T cells in the body is capable of responding to a slightly different foreign antigen. When a particular B or T cell gets activated, it begins to divide rapidly to produce identical clones.

In the case of B cells, these clones will all produce antibodies of the same structure, capable of responding to the same invading antigens. B cell clones are known as plasma B cells and can

produce thousands of antibody molecules per second as long as they live.

Questions 31–33 ask about Passage A.

31. In line 17, the author mentions peristalsis in order to:

A. describe the functioning of the stomach.
B. define cilia.
C. give an example of a defense against infection.
D. identify a specific pH range.

32. Which specific characteristic of macrophages often results in a more intensive immune response?

F. The specific immune system detects the pathogens that the macrophage is engulfing.
G. Macrophages are antigen-presenting cells.
H. Macrophages will pass “non-self” proteins to the specific immune system division.
J. Foreign particles are digested within macrophage lysosomes.

33. According to the passage, neutrophils:

A. may cause people to be more susceptible to disease.
B. are similar to macrophages because they engulf foreign material.
C. display non-self proteins on their cell walls as do macrophages.
D. will always destroy themselves in battling pathogens.

Questions 34–36 ask about Passage B.

34. As it is used in line 65, the word *mediators* most nearly means:

F. regulators.
G. peacemakers.
H. instigators.
J. intermediaries.

35. According to the passage, once a particular B cell gets activated, the cell:

A. divides quickly to create plasma B cells.
B. produces a foreign antigen.
C. uses pseudopodia to destroy foreign particles.
D. creates identical clones called neutrophils.

36. The passage describes a B cell as:

F. a type of macrophage that can display antigens on its surface.
G. using entirely different methods to capture foreign antigens than do macrophages.
H. maturing in the thymus, where those that recognize “self” antigens are killed off.
J. able to detect proteins found on the surfaces of foreign cells and viruses.

Questions 37–40 ask about both passages.

37. The specific immune system differs from the nonspecific immune system in that it:

A. is more complicated.
B. uses white blood cells.
C. is responsible for the body’s ability to become immune.
D. does not target specific pathogens.

38. Which of the following statements provides the most accurate comparison of the passages?

F. Passage A provides a generic overview, while Passage B provides specific details.
G. Passage A includes nonspecific information about a concept, while Passage B provides specific information.
H. Passage A provides information about one aspect of a system, while Passage B provides additional information about that system.
J. Passage A provides an explanation of a process, while Passage B provides a different explanation of that same process.

39. It can be most reasonably inferred from both passages that:

A. certain nonspecific defenses are required to occur before certain specific defenses can commence.
B. nonspecific and specific defenses of the immune system operate independently.
C. nonspecific defenses serve to communicate information to specific defenses.
D. specific defenses are more important than nonspecific passages.

40. It can reasonably be assumed that both authors are writing for an audience comprised primarily of:

F. physicians specializing in immunology.
G. nonprofessional but interested readers.
H. daily newspaper readers.
J. science teachers.

Science Test

40 Minutes — 40 Questions

Directions: The Science Test includes multiple passages. Each passage includes multiple questions. A er reading each passage, choose the best answer and fill in the corresponding bubble on your answer sheet. You may review the passages as o en as necessary.

You may NOT use a calculator on this test.

Passage I

Blood samples of equal volume were collected from five students on one day immediately after waking in the morning and one hour after a breakfast of pancakes and syrup with orange juice. The samples were then analyzed. Tables 1 and 2 show the color, mass, and sugar concentration of the blood samples taken before and after breakfast, respectively. *Sugar concentration* was calculated in milligrams per deciliter (mg/dL) as follows:

$$\text{sugar concentration } (\text{mg/dL}) = \frac{\text{mass of sugars (mg)}}{\text{volume of blood (dL)}}$$

The normal range for blood sugar concentration is 90 mg/dL–120 mg/dL.

Table 1			
Before-breakfast blood samples			
Student	Color	Mass(g)	Sugar concentration (mg/dL)
A	9	1.067	116
B	4	1.049	93
C	3	1.051	94
D	6	1.058	108
E	7	1.064	112
Note: Color values were assigned according to the following scale: 0 = pale red; 10 = dark red			

Table 2			
A er-breakfast blood samples			
Student	Color	Mass(g)	Sugar concentration (mg/dL)
A	8	1.069	119
B	5	1.051	96
C	4	1.055	102
D	6	1.060	110
E	7	1.066	115
Note: Color values were assigned according to the following scale: 0 = pale red; 10 = dark red			

1. Based on the information presented in the passage, which of the following blood samples most likely had the highest water content per milliliter?

   A. The before-breakfast blood sample from Student A
   B. The before-breakfast blood sample from Student B
   C. The after-breakfast blood sample from Student C
   D. The after-breakfast blood sample from Student D

2. Do the data in Tables 1 and 2 support the conclusion that as the mass of a given volume of blood decreases, blood color darkens?

   F. Yes, because blood samples with the lowest masses had lower color values.
   G. Yes, because blood samples with the lowest masses had higher color values.
   H. No, because blood samples with the lowest masses had lower color values.
   J. No, because blood samples with the lowest masses had higher color values.

3. Based on the results provided, as the sugar concentration of a given volume of blood increases, the mass of that volume of blood:

A. increases, then decreases.
B. decreases, then increases.
C. increases only.
D. decreases only.

4. One of the five students had a cold on the day the blood samples were collected. Given that the sugar concentration of blood tends to increase during periods of illness, the student with a cold was most likely:

F. Student A.
G. Student B.
H. Student C.
J. Student D.

5. A volume of 0.5 mL from which of the following blood samples would weigh the most?

A. The before-breakfast blood sample from Student B
B. The before-breakfast blood sample from Student D
C. The after-breakfast blood sample from Student C
D. The after-breakfast blood sample from Student E

6. What is the positive difference in mass, in milligrams, between the before and after samples from Student C ?

F. 0.000004
G. 0.004
H. 0.04
J. 4.0

Passage II

The following experiments were performed to study the effects of adding various amounts of a *solute* (a substance that is dissolved in a solution) on the boiling points and freezing points of two different *solvents* (substances that dissolve other substances). The two solvents, isopropyl alcohol (IPA) and acetone, boil at 108°C and 56°C, respectively, and freeze at –88°C and –95°C, respectively, at standard atmospheric pressure.

Experiment 1

A student dissolved 0.05 moles of potassium chloride (KCl) in 200 g of IPA. Each mole of KCl produces 2 moles of solute particles: 1 mole of potassium ions (K^+) and 1 mole of chloride ions (Cl^-) in solution. After the KCl dissolved, the boiling point of the solution was determined. This procedure was repeated dissolving different amounts of KCl in IPA and acetone (using 200 g of solvent for each solution). The results are shown in Table 1.

Table 1

Solution	Solvent	Amount of KCl added (moles)	Boiling point (°C)

Note: Boiling points were measured at standard atmospheric pressure.

Table 1			
Solution	Solvent	Amount of KCl added (moles)	Boiling point (°C)
1	IPA	0.05	109.5
2	IPA	0.1	111.2
3	IPA	0.2	114.4
4	IPA	0.4	119.7
5	acetone	0.05	56.4
6	acetone	0.1	56.8
7	acetone	0.2	57.9
8	acetone	0.4	59.2
Note: Boiling points were measured at standard atmospheric pressure.			

Experiment 2

A student dissolved 0.05 moles of KCl in 200 g of IPA. After the KCl dissolved, the freezing point of the solution was determined. The procedure was repeated using various amounts of KCl. The results are shown in Table 2.

Table 2		
Solution	Amount of KCl added (moles)	Freezing point (°C)
9	0.05	−88.5

Note: Freezing points were measured at standard atmospheric pressure.

Table 2		
Solution	Amount of KCl added (moles)	Freezing point (°C)
10	0.1	−89.0
11	0.2	−90.0
12	0.4	−92.0
Note: Freezing points were measured at standard atmospheric pressure.		

7. A solution containing 200 g of IPA and an unknown amount of KCl freezes at –93.0°C. Based on the results of Experiment 2, the number of moles of KCl dissolved in the solution is closest to:

   A. 0.4.
   B. 0.5.
   C. 0.6.
   D. 0.7.

8. Which of the following factors was NOT directly controlled by the student in Experiment 2 ?

   F. The substance added to the IPA
   G. The amount of IPA used
   H. The amount of solute added to the IPA
   J. The freezing points of the IPA solutions

9. From the results of Experiment 2, which of the following statements most accurately reflects the effect of the number of solute particles dissolved in IPA on the freezing point of a solution?

   A. The number of solute particles produced does not affect the freezing point.
   B. The more solute particles present, the higher the freezing point will be.
   C. The more solute particles present, the lower the freezing point will be.
   D. No hypothesis can be made because only one solute was tested.

10. According to the results of Experiments 1 and 2, which of the following conclusions can be made about the changes in the boiling point and freezing point of IPA solutions when 0.4 moles of KCl are added to 200 g of IPA? The boiling point is:

   F. raised more than the freezing point is lowered.
   G. raised less than the freezing point is raised.
   H. lowered more than the freezing point is lowered.
   J. lowered less than the freezing point is raised.

11. Based on the results of Experiment 1, as the number of potassium particles and chloride particles in 200 g of IPA increased, the boiling point of the solution:

A. increased only.
B. decreased only.
C. increased, then decreased.
D. remained the same.

12. $MgCl_2$ produces 3 moles of solute particles per mole when dissolved. Experiment 1 was repeated using a solution containing 200 g of IPA and 0.2 moles of $MgCl_2$. Assuming that $MgCl_2$ has the same effect on the boiling point of IPA as does KCl per particle produced when dissolved, the boiling point of the solution would most likely be:

F. between 109.5°C and 111.2°C.
G. between 111.2°C and 114.4°C.
H. between 114.4°C and 119.7°C.
J. above 119.7°C.

13. Based on the relationship between moles and boiling point in Table 1 and the trend with the freezing point of IPA in Table 2, which value is the best approximation of the freezing point, in °C, for acetone when 0.1 moles of KCl are added?

A. –88.5
B. –89.0
C. –95.0
D. –95.5

Passage III

The study of carbon isotopes present in an archaeological sample can allow researchers to approximate the age of the sample. To do this, the ratio of the isotopes ^{14}C and ^{12}C in a sample of formerly living tissue, such as skeletal remains, is compared to the $^{14}C/^{12}C$ ratio in a sample of air from Earth's *biosphere*. The biosphere is the layer of the atmosphere closest to Earth's surface, in which living organisms constantly exchange carbon isotopes with the environment. The comparison of a sample's ratio to that of the biosphere is called the *C-14 index* ($\delta^{14}C$). The $\delta^{14}C$ is calculated using the following formula:

$$\delta^{14}\mathrm{C} = \frac{\left(^{14}\mathrm{C}/^{12}\mathrm{C}\right)_{\text{biosphere}} - \left(^{14}\mathrm{C}/^{12}\mathrm{C}\right)_{\text{sample}}}{\left(^{14}\mathrm{C}/^{12}\mathrm{C}\right)_{\text{biosphere}}} \times 100$$

Scientists conducted 3 studies to examine the C-14 index of human remains excavated from sites in Mexico and Mali in order to learn more about the ancient civilizations that once existed in those locations.

Study 1

Human remains from 10 different tombs throughout Mexico were examined, and the average C-14 index was calculated for each tomb. Figure 1 shows a comparison between the calculated values of $\delta^{14}C$ and the ages of the remains as determined by other methods.

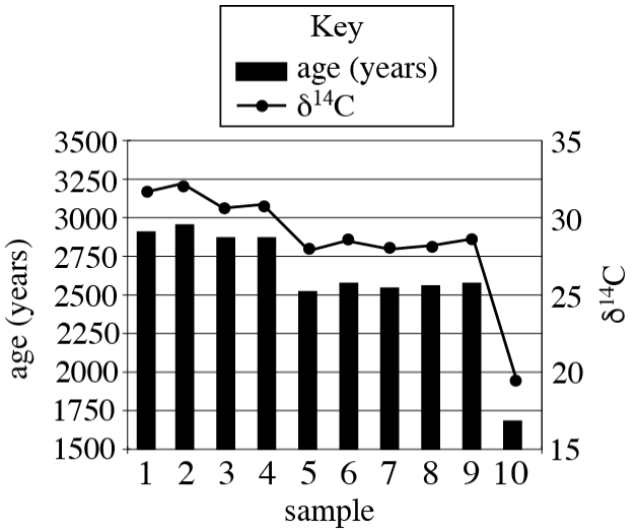

Figure 1

Study 2

The remains from a different archaeological site in Mexico were organized according to the depth beneath the surface from which they were excavated. Since layers of soil and rock were deposited at a known rate at this location, each depth corresponded to a different sample age. In total, 20 m of earth represented the last 11,000 years of soil and rock accumulation. The calculated values of $\delta^{14}C$ for samples taken from different depths are shown in Figure 2.

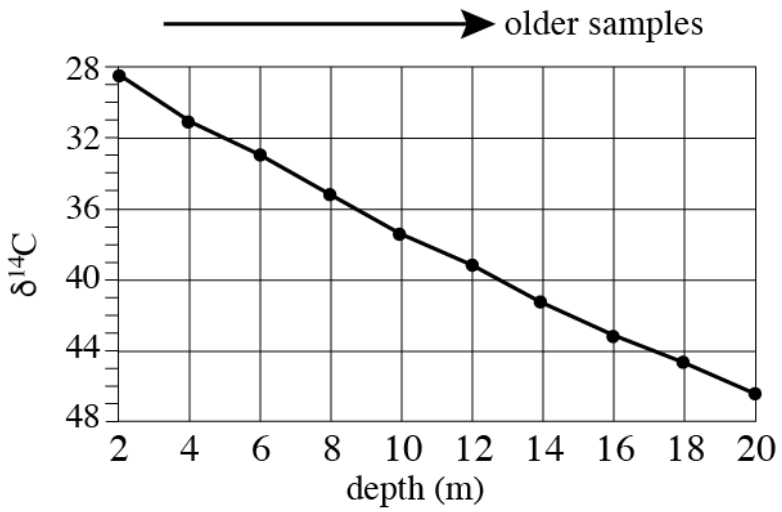

Figure 2

Study 3

The procedures of Study 2 were repeated for samples excavated from an archaeological site in Mali in western Africa. The past 11,000 years of soil and rock accumulation was represented by 40 m of depth. The calculated values of $\delta^{14}C$ for the samples are shown in Figure 3.

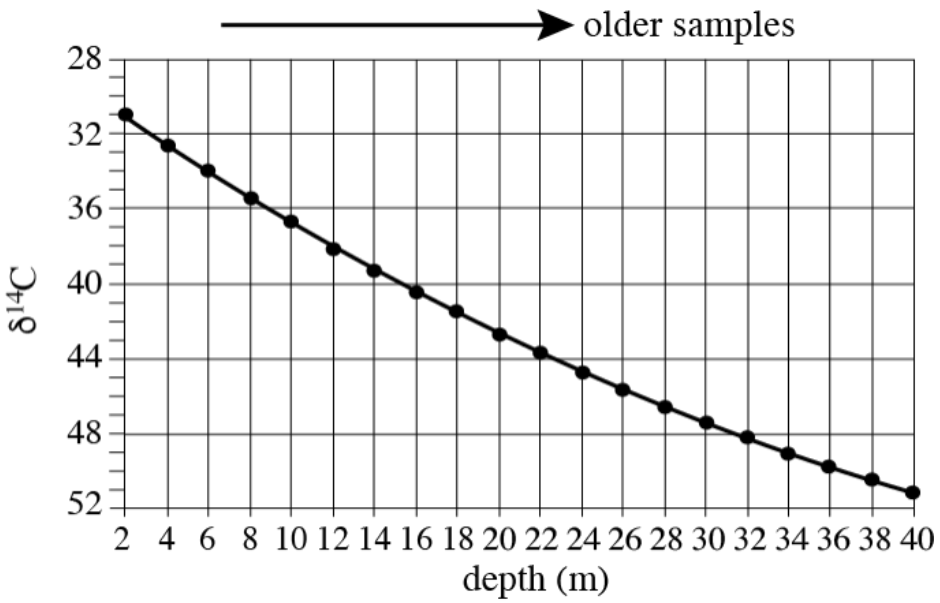

Figure 3

14. According to Study 1, average $\delta^{14}C$ values for the samples from Mexico were closest for which of the following pairs of tombs?

F. Tomb 2 and Tomb 3
G. Tomb 4 and Tomb 5
H. Tomb 5 and Tomb 10
J. Tomb 6 and Tomb 9

15. According to Study 1, which of the following best describes the relationship between the average C-14 index and the ages of the samples from Mexico? As the ages of the samples increased, the average $\delta^{14}C$ of the samples:

A. increased only.
B. decreased only.
C. increased, then decreased.
D. decreased, then increased.

16. Which of the following statements best describes why Mexico and Mali were chosen as locations for these studies? The locations had to have:

F. sample ages greater than 2,000 years for all tomb sites.
G. sites over which a significant amount of soil and rock was deposited over the last 11,000 years.
H. several sites at which little soil and rock was deposited over the last 11,000 years.
J. large areas of undeveloped land.

17. According to Study 2, a sample excavated from a depth of 25 m under the surface in Mexico most likely had a C-14 index that was:

A. less than 30.
B. between 30 and 40.
C. between 40 and 50.
D. greater than 50.

18. According to Studies 2 and 3, 11,000 years of soil and rock accumulation was represented by 20 m of earth in Mexico and 40 m

of earth in Mali. Which of the following statements best explains why the relationships between time and depth were different? The average rate of soil and rock accumulation over that time period in Mali:

F. was less than the rate in Mexico.
G. was the same as the rate in Mexico.
H. was greater than the rate in Mexico.
J. could not be determined in comparison with the rate in Mexico.

19. According to the information provided, a sample that has a calculated $\delta^{14}C$ of zero must have a $^{14}C/^{12}C$ ratio that compares in which of the following ways to the $^{14}C/^{12}C$ ratio of the biosphere? The sample's $^{14}C/^{12}C$ ratio is:

A. 1/4 of the $^{14}C/^{12}C$ ratio of the biosphere.
B. 1/2 of the $^{14}C/^{12}C$ ratio of the biosphere.
C. the same as the $^{14}C/^{12}C$ ratio of the biosphere.
D. twice as large as the $^{14}C/^{12}C$ ratio of the biosphere.

20. What is the approximate age, in years, of a sample from the Mexican tomb that was unearthed 5 meters beneath the surface?

F. 2,600
G. 2,900
H. 3,200
J. The age can not be determined due to the decomposition of the soil.

Passage IV

The last of the dinosaurs went extinct approximately 65 million years ago. Two scientists present their hypotheses about events that may have caused this extinction.

Scientist 1

The extinction of the dinosaurs was caused by a meteorite of about 10 km in diameter that struck Earth at a location along what is now the northwestern coast of the Yucatan Peninsula in Mexico. The initial impact incinerated everything on Earth's surface within a radius of approximately 500 km from the point of impact. The resulting shock wave set massive fires and generated tidal waves that caused destruction across much larger distances.

In addition, trillions of tons of debris were thrown into the air, blocking light from the sun and causing a significant decrease in global temperatures. The worldwide fires and the large amounts of CO_2 they released later resulted in an equally significant increase in temperatures and caused chemical reactions that led to downpours of acid rain.

Scientist 2

The extinction of the dinosaurs was caused by an extended period of widespread volcanic activity. Volcanic eruptions around the world introduced large amounts of soot into the atmosphere, causing dramatic climatic changes. Combined with the excess CO_2 released by fires ignited by lava flows, the soot in the atmosphere led to the production of acid rain. Before long, sources of food and water became too toxic for the dinosaurs.

The volcanoes also expelled huge amounts of sulfates (SO_4) into the atmosphere; the mixing of sulfates with water vapor caused more acid rain. Moreover, SO_4 in the atmosphere led to a breakdown of the ozone layer, allowing high levels of ultraviolet radiation to reach the surface.

21. Which of the following statements best explains why Scientist 1 mentions acid rain?

    A. Acid rain is beneficial to many living things.
    B. Acid rain is harmful to many living things.
    C. Acid rain helps create CO_2 in the atmosphere.
    D. Acid rain results in fires.

22. Suppose that sulfates in the atmosphere help to reflect solar radiation back into space, resulting in a reduction of Earth's surface temperature. Based on the passage, this new information would most likely weaken the viewpoint(s) of:

    F. Scientist 1.
    G. Scientist 2.
    H. both Scientist 1 and Scientist 2.
    J. neither Scientist 1 nor Scientist 2.

23. Scientist 2 would most likely agree that the ozone layer present in today's atmosphere is maintained, at least in part, by:

A. frequent meteor showers.
B. periodically active volcanoes.
C. the high level of CO_2 in the atmosphere.
D. the low level of SO_4 in the atmosphere.

24. Both scientists would most likely agree that worldwide climate changes occurred partially as a result of:

F. the impact of a meteorite.
G. tidal waves.
H. the presence of high levels of CO_2 in the atmosphere.
J. the presence of high levels of SO_4 in the atmosphere.

25. According to the information provided, radioactive dating of fragments of the meteorite described by Scientist 1 should show the fragments to be about how many million years old?

A. 2
B. 10
C. 50
D. 65

26. Sulfates are produced in large amounts by a variety of industrial processes. Scientist 2 would most likely predict that in an area of many sulfate-producing industries, if the industries were to alter their

processes so that sulfates were no longer produced, the climatic effect in that area would be an increase in the:

F. average pH of rainfall.
G. amount of rainfall.
H. acidity of rainfall.
J. amount of ultraviolet radiation reaching Earth's surface.

27. *Inorganic sulfates*, such as barium sulfate ($BaSO_4$), are substances that are formed when minerals combine with sulfates in a high-temperature environment. If scientists found that large amounts of inorganic sulfates had formed about 65 million years ago, this discovery would most likely support the viewpoint(s) of:

A. Scientist 1.
B. Scientist 2.
C. both Scientist 1 and Scientist 2.
D. neither Scientist 1 nor Scientist 2.

Passage V

Under certain conditions, mixtures of hydrogen and chlorine will form hydrochloric acid (HCl). In their chemistry class, students performed the following experiments to study how HCl forms.

Experiment 1

A clear, thick-walled gas syringe was filled with 20 mL of hydrogen gas (H_2) and 20 mL of chlorine gas (Cl_2), as shown in Diagram 1.

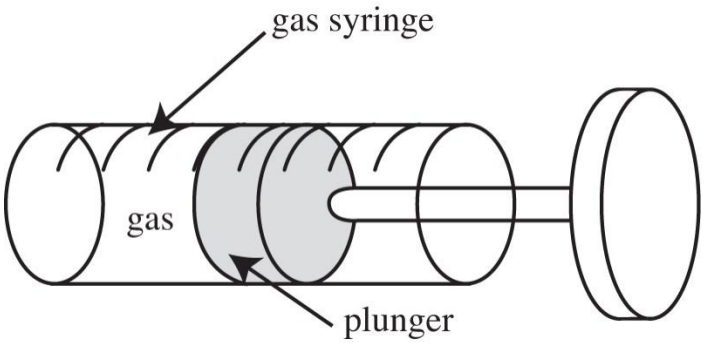

Diagram 1

The syringe's plunger was then locked into place, and the syringe was covered in a black cloth. After a few minutes, the cloth was removed and an ultraviolet lightbulb was flashed to illuminate the gas briefly from close range. A reaction occurred, forming droplets of HCl. The plunger was then released, and the final volume of gas was recorded after the system was allowed to adjust to room temperature. The composition of the remaining gas, if any, was analyzed. The procedure was repeated with different gas volumes, and the results were recorded in Table 1.

Table 1

Trial	Volume (mL)			
	Initial H_2	Initial Cl_2	Final H_2	Final Cl_2
1	20	20	0	0
2	20	30	0	10
3	20	40	0	20

Table 1				
Trial	Volume (mL)			
	Initial H_2	Initial Cl_2	Final H_2	Final Cl_2
4	10	40	0	30
5	40	40	0	0
6	30	20	10	0

Since equal numbers of different gas molecules are known to occupy equal volumes at the same pressure and temperature, the students proposed the following equation:

$$H_2 + Cl_2 \rightarrow 2\ HCl$$

Experiment 2

As shown in Diagram 2, streams of silicon tetrachloride ($SiCl_4$) and hydrogen (H_2) gases were allowed to mix in a high-temperature furnace, producing HCl vapor and solid Si. The vapor was released into a cooler chamber, where it condensed to form liquid HCl.

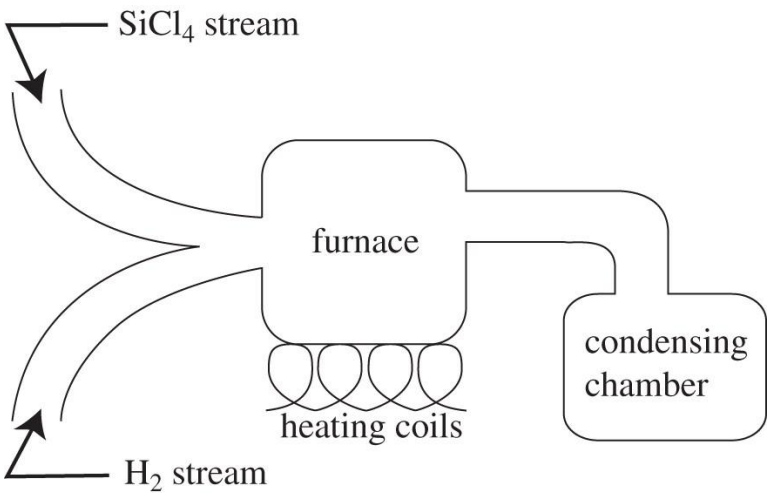

Diagram 2

The changes in mass of the contents of the furnace and condensing chamber were used to calculate the masses of $SiCl_4$ and H_2 reacted and the mass of HCl formed. It was determined that 4 molecules of HCl were produced for every 1 molecule of $SiCl_4$ and every 2 molecules of H_2 reacted:

$$SiCl_4 + 2\ H_2 \rightarrow Si + 4\ HCl$$

28. When sodium hydroxide (NaOH) and HCl are combined, both compounds decompose, and sodium chloride (NaCl) and H_2O are formed. Which of the following correctly represents this reaction?

F. $NaCl + H_2O \rightarrow NaOH + HCl$
G. $NaCl + 2\ H_2O \rightarrow NaOH + HCl$
H. $NaOH + HCl \rightarrow NaCl + H_2O$
J. $NaOH + HCl \rightarrow NaCl + 2\ H_2O$

29. In Trial 5 of Experiment 1, immediately after the reaction began but before the syringe plunger was released, one would predict that, compared to the pressure in the syringe before the flash, the pressure in the syringe after the flash would be:

A. lower, because the total amount of gas increased.
B. lower, because the total amount of gas decreased.
C. higher, because the total amount of gas increased.
D. higher, because the total amount of gas decreased.

30. If 10 mL of H_2 and 20 mL of Cl_2 were reacted using the procedure from Experiment 1, the final volume of Cl_2 would most likely be:

F. 0 mL.
G. 5 mL.
H. 10 mL.
J. 20 mL.

31. In Experiment 1, which of the following assumptions about the chemical reactions were made before the final measurements were taken?

A. Each reaction had run to completion.
B. Excess Cl_2 must be present for HCl to form.
C. HCl vapor is not absorbed by solid Si.
D. $SiCl_4$ and H_2 will only react when heated.

32. When oxygen gas (O_2) is reacted with H_2 under certain conditions, the following reaction occurs:

$$2\ H_2 + O_2 \rightarrow 2\ H_2O$$

Based on the results of Experiment 1, if 10 mL of O_2 were completely reacted with 25 mL of H_2 at the same pressure and temperature, what volume of H_2 would remain unreacted?

F. 0 mL
G. 5 mL
H. 10 mL
J. 15 mL

33. Which of the following events would NOT cause an error in interpreting the results of Experiment 2 ?

A. Other reactions occurring between $SiCl_4$ and H_2 that produced different products
B. HCl condensing before it reached the condensing chamber
C. Using $SiCl_4$ contaminated with nonreactive impurities
D. Using H_2 contaminated with reactive impurities

34. In which trial is Cl_2 a limiting reagent?

F. Trial 2
G. Trial 3
H. Trial 4
J. Trial 6

Passage VI

A wooden box was held in place on a plastic track a distance, d_0, from one end of the track, which was inclined at an angle, θ, above the floor, as shown in Diagram 1.

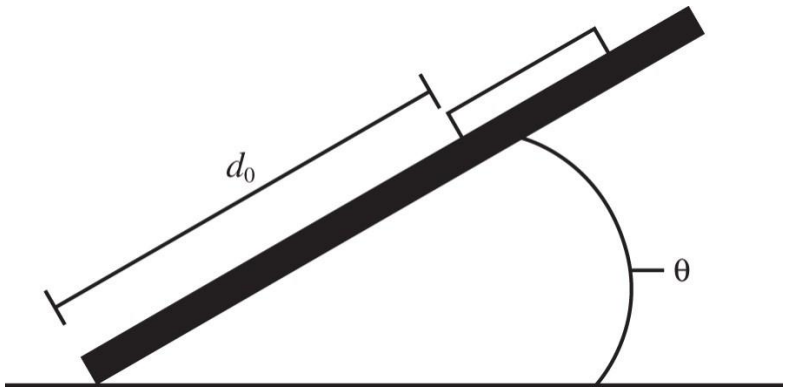

Diagram 1

When the box was released, it slid down the plane, as shown in Diagram 2.

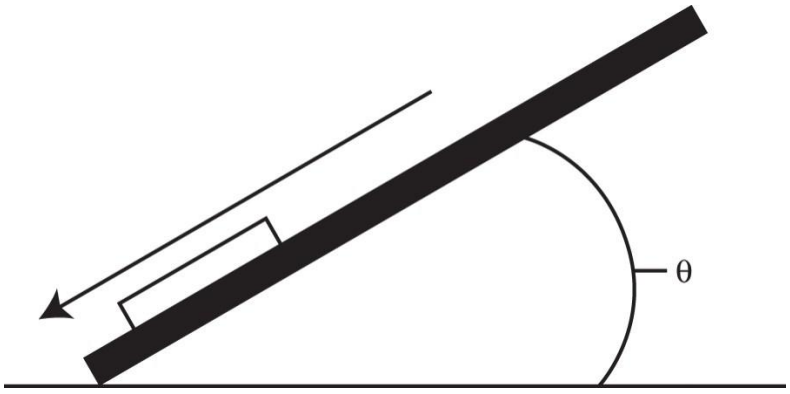

Diagram 2

The *slide time* was the time required for the leading face of the box to reach the end of the track. The slide time is graphed in Figure 1 for a fixed θ and various values of d_0 on the surfaces of Neptune, Earth, and Mercury. The slide time is graphed in Figure 2 for $d_0 = 60$ cm and various values of θ on the same three surfaces. The acceleration due to gravity on these planets' surfaces is shown in Table 1.

Table 1	
Planet	Acceleration due to gravity on surface of planet (m/sec^2)
Neptune	13.3
Earth	9.8
Mercury	3.6

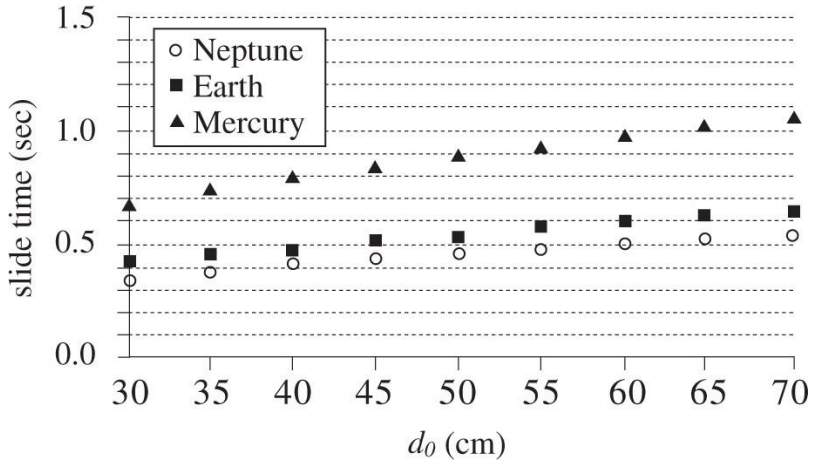

Figure 1

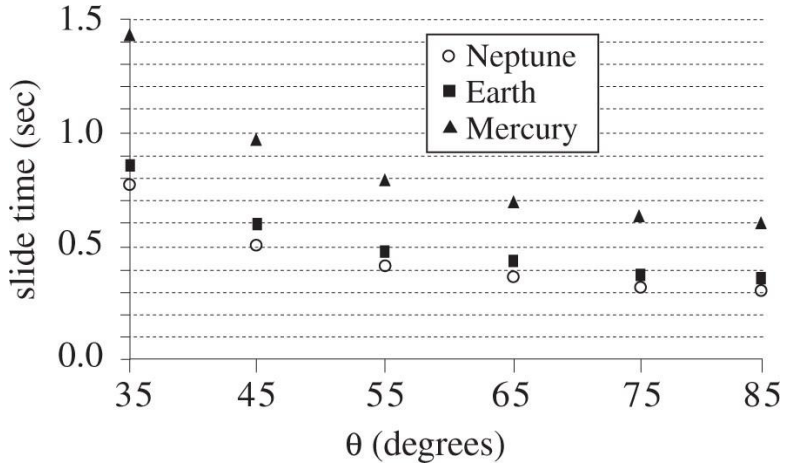

Figure 2

35. Which pair of values for θ produce slide times that are approximately equal for Earth and Mercury, respectively?

A. 45° and 85°
B. 35° and 65°
C. 45° and 55°
D. 35° and 55°

36. Based on Figure 1, if d_0 were 25 cm, the slide time on Mercury would be closest to:

F. 0.3 sec.
G. 0.4 sec.
H. 0.6 sec.
J. 1.1 sec.

37. According to Figure 2, the box with $d_0 = 60$ cm will have a slide time on Mercury of 1.2 sec if θ is approximately:

A. 27°.
B. 30°.
C. 38°.
D. 51°.

38. After the box traveled a distance x down the track, the distance from the leading face of the box to the end of the track would equal:

F. $d_0 - x$.
G. $d_0 + x$.
H. d_0.
J. x.

39. Suppose the box represented in Figure 2 has a 0.8 second slide time on Mercury's surface. For the same box released from the same d_0 to

have a 0.8 second slide time on Earth's surface, θ on Earth's surface would have to be approximately:

A. 23° greater than on Mercury's surface.
B. 23° less than on Mercury's surface.
C. 17° greater than on Mercury's surface.
D. 17° less than on Mercury's surface.

40. The acceleration due to gravity on the surface of the planet Jupiter is approximately 24.9 m/sec^2. Based on the information presented in the passage, a box's slide time on Jupiter's surface, for a given θ and a given d_0, would be:

F. less than its slide time on Neptune's surface.
G. greater than its slide time on Neptune's surface but less than its slide time on Earth's surface.
H. greater than its slide time on Earth's surface but less than its slide time on Mercury's surface.
J. greater than its slide time on Mercury's surface.

Writing Test

40 Minutes — 1 Question

Directions: The essay is used to evaluate your writing skills. You will have **40 minutes** to review the prompt and plan and write an essay in English. Before you begin, read everything in this test booklet carefully to make sure you understand the task.

Your essay will be judged based on the evidence it provides of your ability to do the following:

- Assert your own perspective on a complex issue and evaluate the relationship between your perspective and at least one other perspective
- Use reasoning and evidence to refine and justify your ideas
- Present your ideas in an organized way
- Convey your ideas effectively using standard written English

Write your essay on the lined essay pages in the answer booklet. All writing on those lined pages will be scored. Use the unlined pages in this test booklet to plan your essay. Your work on these unlined pages will not be scored.

Put your pencil down as soon as time is called.

Student Engagement

Studies show that students not only retain more information but also enjoy learning more when they actively participate in the classroom. Teachers therefore strive to optimize engagement to foster a positive, effective instructional environment. In an effort to increase student interaction in the high school classroom, some educators argue that curriculum should take into account the interests and suggestions of students. Since teachers cannot allow students to choose every aspect of a lesson, is it worth the time and effort to actively seek relevant student feedback? As high schools aim to improve the quality of the education they offer to students, student opinion may prove to be valuable.

Read and carefully consider these perspectives. Each discusses the relevance of student feedback in lesson planning.

Perspective One	Perspective Two	Perspective Three
Many colleges require students to	Students are not qualified to provide insight	Many school districts evaluate teachers

complete a course survey before they are eligible to receive their semester grades. Colleges use students' responses to evaluate course materials to ensure quality education. High schools would benefit from implementing a similar system of regular feedback on classroom lesson plans by students.

regarding lesson planning or curriculum design. Improving the quality of education is the responsibility of educators, and they are rightfully in charge of making effective changes.

using students' test scores and conducting in-classroom observations. Information gathered from student surveys could not only inform lesson design, but also provide another source of evaluation by which to measure teacher effectiveness.

Essay Task

Write a clear, well-reasoned essay evaluating multiple perspectives on student feedback in lesson planning. In your essay, be sure to:

- Assert your own perspective on the issue and evaluate the relationship between your perspective and at least one other perspective
- Use reasoning and evidence to refine and justify your ideas
- Present your ideas in an organized way
- Convey your ideas effectively using standard written English

Your perspective may be fully, somewhat, or not at all in agreement with one or more of the three perspectives in the prompt.

Planning Your Essay

These pages are not scored.

Use the space below the prompt or another piece of paper to brainstorm and plan your essay. Consider the following as you think about the prompt:

- Strengths and weaknesses of the three perspectives in the prompt
  - What observations do they offer, and what do they overlook?
  - Why are they persuasive or why are they not persuasive?

- Your own background and identity

- What is your perspective on this issue, and what are its strengths and weaknesses?
- What evidence will you use in your essay?

Answers and Explanations

ENGLISH TEST

1. *Passage I*

    1. **D**
    Difficulty: Medium

    Category: Sentence Structure

    Getting to the Answer: A comma is needed to set off the introductory phrase, so choice A cannot be correct. Choice B creates a sentence fragment, and the pronoun *it* in C does not match the subject of the sentence—Duke Ellington.

    2. **G**
    Difficulty: Low

    Category: Agreement

    Getting to the Answer: The whole passage is in past tense, and there is no reason why this verb should not be in past tense as well. Also, the

part of the sentence on the other side of the semicolon gives you a big clue by using *paid*. Choice (G) is correct.

3. **C**
   Difficulty: Medium

   Category: Sentence Structure

   Getting to the Answer: The colon is used incorrectly in the original sentence, and B does not solve the problem. Choice D is unnecessarily wordy. Therefore, choice (C) is correct.

4. **J**
   Difficulty: High

   Category: Sentence Structure

   Getting to the Answer: Commas are needed between items in a series, so eliminate F and G. A comma is also needed to set off the introductory phrase, so eliminate H. Choice (J) is therefore correct.

5. **B**
   Difficulty: Medium

   Category: Agreement

   Getting to the Answer: In order to figure out the appropriate pronoun, identify the noun to which the pronoun refers. The only

possible corresponding noun is *Ellington*; therefore, (B) is the correct answer.

6. **G**
   Difficulty: High

   Category: Sentence Structure

   Getting to the Answer: "As a teenager in Washington" is not a complete sentence, so F is incorrect. Choice H does not make sense, and J is incorrect because the comma is unnecessary. Therefore, (G) is correct.

7. **D**
   Difficulty: Medium

   Category: Sentence Structure

   Getting to the Answer: The word *then* should be *than*—(D) makes this correction.

8. **J**
   Difficulty: Low

   Category: Conciseness

   Getting to the Answer: Even though the piano teacher's name is mentioned in the preceding sentence, more information about her

name is unnecessary, and this sentence is not relevant to the passage. Therefore, choice (J) is correct.

9. **B**
   Difficulty: Medium

   Category: Organization

   Getting to the Answer: There is a contrast between Ellington's not being a good pianist and his hearing about the opportunities for musicians in New York. The correct contrast is established by (B).

10. **H**
    Difficulty: Medium

    Category: Conciseness

    Getting to the Answer: *Awaited* and *were there for* mean the same thing, so one part of the underlined portion should be deleted—that eliminates F and G. Choice J is also unnecessarily wordy. Therefore, (H) is correct.

11. **C**
    Difficulty: Medium

    Category: Sentence Structure

Getting to the Answer: Eliminate A because, as written, the sentence is a run-on. Choice (C) correctly inserts a FANBOYS conjunction (in this case, the word *but*) a er the comma to correct the run-on sentence. Choice B replaces the comma with the word *but*, which doesn't fix the run-on, and D creates a fragment.

12. **J**

Difficulty: Medium

Category: Sentence Structure

Getting to the Answer: The subject of the sentence is the Cotton Club, so choices with the pronoun *he*—F and G—should be eliminated. Choice H creates a sentence fragment. Choice (J) is correct.

13. **A**

Difficulty: Low

Category: Development

Getting to the Answer: This list of songs follows a description of Ellington's early musical career, so (A) is correct. The songs do not contradict anything, so eliminate B. The names of the songs themselves do not illustrate complexity; therefore, C is incorrect. This part of the paragraph is no longer about the Cotton Club, so eliminate D.

14. **F**

Difficulty: Medium

Category: Development

Getting to the Answer: The last paragraph of the essay lists Ellington's accomplishments. Choice (F) is the only answer choice that makes sense.

15. **D**
    Difficulty: High

    Category: Organization

    Getting to the Answer: Paragraph 4 is the only paragraph that covers elements of Ellington's music. The logical place for the insertion of this sentence that mentions both *fun* and *seriousness* is a er the sentence that claims his music appealed both to those seeking "a good time" and "good music."

7. ## *Passage II*

16. **G**
    Difficulty: Medium

    Category: Agreement

    Getting to the Answer: The subject is *animals*, so a plural pronoun is needed. Choice F is a singular pronoun, H is a contraction, and J uses

there instead of *their*. Choice (G) correctly uses the plural pronoun *their*.

17. **A**

    Difficulty: Medium

    Category: Sentence Structure

    Getting to the Answer: The comma is needed to set off the second clause from the first, so eliminate B and D. Choice C incorrectly uses a colon. Choice (A) is correct.

18. **J**

    Difficulty: High

    Category: Sentence Structure

    Getting to the Answer: The phrase “a member of the weasel family” is a nonessential clause and should be set off by commas, so (J) is correct. Choice F is incorrect because it is missing a necessary comma. Choices G and H are incorrect because they create sentence fragments.

19. **C**

    Difficulty: Medium

    Category: Agreement

Getting to the Answer: "Having changed" is the incorrect verb tense. Ermines are nonhuman, so B is incorrect. Choice (C) uses *that* correctly. The whole passage is in present tense, so eliminate D because it is in past tense.

20. **F**
    Difficulty: Medium

    Category: Sentence Structure

    Getting to the Answer: Choose the most logical order of the words. Choice (F) makes the most sense.

21. **B**
    Difficulty: Medium

    Category: Sentence Structure

    Getting to the Answer: The sentence is describing just one skunk, so the singular *visibility* is correct; eliminate A and D. To show singular possession, place the apostrophe between the noun and the letter *s,* with the resulting word being *skunk's*. Choice (B) is correct. Choice C shows plural possession, which doesn't make sense in context.

22. **J**
    Difficulty: Medium

    Category: Sentence Structure

Getting to the Answer: “By distinguishing itself from other animals” is a sentence fragment. These words make sense as an introductory phrase and should therefore be set off by a comma. Choice (J) is the only choice that accomplishes this concisely.

23. **B**
    Difficulty: Low

    Category: Conciseness

    Getting to the Answer: The unnecessary phrase “the question is” should be eliminated. Choice (B) is the simplest and most correct way to phrase the question.

24. **F**
    Difficulty: High

    Category: Agreement

    Getting to the Answer: The investigating has occurred in the past, and it is still occurring. Therefore, the present perfect progressive tense, as used in (F), is correct. Choices G and H only refer to the past, and J refers only to the present.

25. **C**
    Difficulty: Medium

    Category: Organization

Getting to the Answer: The previous sentence speaks of special glands, but this sentence says that some animals do not have these glands. This is a contrast, and *however*, (C), sets it up correctly.

26. **J**

    Difficulty: Low

    Category: Conciseness

    Getting to the Answer: *Remains* and *endures as* mean the same thing, so the correct choice will eliminate one of them. Choice (J) does just that.

27. **B**

    Difficulty: Low

    Category: Sentence Structure

    Getting to the Answer: The pronoun *it* refers to the tree frog, not a background of leaves. Choice (B) fixes this modifier error by placing "the tree frog" a er the modifying phrase.

28. **G**

    Difficulty: Medium

    Category: Conciseness

Getting to the Answer: The information pertains to the paragraph's topic, so eliminate J. Choice (G) is a simple and logical way of rephrasing all of the excess words.

29. **C**
    Difficulty: High

    Category: Organization

    Getting to the Answer: Paragraph 4 begins with an introduction, and Paragraph 3 ends with a conclusion. Choice (C) is the only option that features this correct order.

30. **F**
    Difficulty: Medium

    Category: Development

    Getting to the Answer: The author covers a range of topics in the area and uses several animals as examples, so (F) is correct. All of the other answer choices are incorrect because they contradict things that the author does in the essay.

3. *Passage III*

31. **D**
    Difficulty: Medium

Category: Sentence Structure

Getting to the Answer: The word *and* interrupts the flow of the sentence and should be removed. Choice (D) corrects the original error and does not introduce new issues. Choices B and C delete the word *and*, but each choices creates a new error; B is unnecessarily wordy, and C creates a fragment.

32. **J**
Difficulty: Medium

Category: Organization

Getting to the Answer: Based on the context of the essay, a contrast transition word is needed, which matches (J). Choices F and H are cause-and-effect transitions, and G is a continuation transition.

33. **B**
Difficulty: High

Category: Sentence Structure

Getting to the Answer: The sentences on both sides of the period are fragments. The best way to fix this mistake is to simply combine the sentences as (B) does.

34. **H**
Difficulty: High

Category: Development

Getting to the Answer: The first paragraph states that Europeans first learned of chocolate because of Cortez's exploration of Mexico in 1519, and the second paragraph provides additional information about how the cacao beans traveled to Europe. Choice (H) provides information about why Cortez was in Mexico and how it is relevant to the history of chocolate. Choices F, G, and J provide information about Cortez's exploration of Mexico but do not mention chocolate at all.

35. **D**
Difficulty: Medium

Category: Organization

Getting to the Answer: Based on the context, a continuation transition is needed: because the drink was desirable, it became popular. Choice (D) correctly includes a continuation transition and makes sense in context. Eliminate A and C because they are contrast transitions. Choice B is incorrect because it is redundant to use the word *soon* twice in the same sentence.

36. **H**
Difficulty: Medium

Category: Sentence Structure

Getting to the Answer: “Over the next century” is an introductory phrase and should be set off by a comma. Choices (H) and J add the comma, but J also adds unnecessary words.

37. **B**

    Difficulty: Medium

    Category: Development

    Getting to the Answer: This description would provide new information that is pertinent to the history of chocolate, so (B) is correct. Eliminate A and C because the description would not weaken or contradict anything. It would not say anything about the author’s opinion of chocolate either, so eliminate D.

38. **J**

    Difficulty: Low

    Category: Sentence Structure

    Getting to the Answer: Commas are needed between items in a series. Choice G is incorrect because there are too many commas.

39. **A**

    Difficulty: Medium

    Category: Organization

Getting to the Answer: The sentence provides an example of the uses of chocolate worldwide. Choices B and C set up an unwarranted contrast. Choice D is not a good transition between the two sentences.

40. **G**
    Difficulty: Medium

    Category: Conciseness

    Getting to the Answer: The word *do* is unnecessary in the sentence, especially with the presence of *nonetheless*. Choice (G) is the most concise statement of the information.

41. **C**
    Difficulty: Medium

    Category: Sentence Structure

    Getting to the Answer: The sentence is incorrect as written because the colon is not introducing a short phrase, quotation, explanation, example, or list. Eliminate B and D because they each include a colon. Choice (C) is correct.

42. **J**
    Difficulty: Low

    Category: Conciseness

Getting to the Answer: Tea has nothing to do with the topic, so the sentence should be eliminated.

43. **C**

    Difficulty: High

    Category: Sentence Structure

    Getting to the Answer: The sentence does not indicate what or who "It" refers to, so the sentence is unclear. Eliminate A and B because they have ambiguous pronouns. Because "Researchers say" appears earlier in the paragraph, it doesn't make sense to say that the research was conducted by just one scientist, so D is incorrect. Choice (C) corrects the ambiguity error and is logical in context.

44. **J**

    Difficulty: Medium

    Category: Development

    Getting to the Answer: Choices F and H use language that is too formal to match the rest of the passage and do not provide appropriate conclusions for the topic. Choices G and (J) use appropriate language, but G is off-topic, focusing on cancer and heart disease prevention rather than chocolate. Choice (J) is correct.

45. **D**

    Difficulty: Medium

Category: Development

Getting to the Answer: This essay is about only chocolate, and it does not cover any other culinary trends in history. Therefore, it would not meet the requirement. Choice (D) is correct.

9. *Passage IV*

46. **H**
Difficulty: Medium

Category: Agreement

Getting to the Answer: Here, the verb is being used as part of a modifying phrase. Choice (H) is idiomatically correct.

47. **A**
Difficulty: Medium

Category: Sentence Structure

Getting to the Answer: Commas are needed in a series, so eliminate C. A colon is not appropriate; eliminate B. Choice D incorrectly switches to the past tense. The original punctuation, (A), is correct.

48. **G**
Difficulty: Medium

Category: Sentence Structure

Getting to the Answer: The form needed is the possessive of *who,* so (G) is correct.

49. **B**
Difficulty: Medium

Category: Agreement

Getting to the Answer: This sentence is part of a list of proposed "uniform of the future" developments. The other sentences in that list use the verbs *would be* and *would become*; the correct form is (B).

50. **G**
Difficulty: High

Category: Development

Getting to the Answer: Choice (G) describes a great potential benefit of the uniform of the future. Choice J is tempting, but deep pockets are not considered a breakthrough technology. Choices F and H discuss information relevant to soldiers in general but do not present an additional feature of the uniform of the future.

MATHEMATICS TEST

1. C. Substitute $x = 8$ into the expression $5x + 12$. Calculate $5(8) + 12 = 40 + 12 = 52$.

2. G. Solve the equation $7y - 9 = 33$ by first adding 9 to both sides to get $7y = 42$. Then divide both sides by 7 to get $y = 6$.

3. A. To find 18% of 350, convert the percentage to a decimal (0.18) and multiply: $0.18 \times 350 = 63$.

4. H. Distribute 9 through the parentheses: $9(2x - 5) = 9 \cdot 2x - 9 \cdot 5 = 18x - 45$.

5. D. If the shirt costs $45 after a 25% discount, then $45 represents 75% of the original price (since 100% - 25% = 75%). Set up the equation $0.75 \times \text{original} = 45$, so original $= 45 \div 0.75 = 60$.

6. F. Use the slope formula $m = (y_2 - y_1)/(x_2 - x_1)$ with points (3, 8) and (9, 26). Substituting gives $m = (26 - 8)/(9 - 3) = 18/6 = 3$.

7. B. Substitute $x = 5$ into the function $h(x) = x^2 + 4x - 7$. Calculate $h(5) = (5)^2 + 4(5) - 7 = 25 + 20 - 7 = 38$.

8. J. First evaluate the expression inside the absolute value: $-18 + 7 = -11$. The absolute value of -11 is 11.

9. C. The area of a rectangle is length × width. Calculate $22 \times 13 = 286$ square inches.

10. G. Solve $6x + 11 = 2x + 35$ by first subtracting $2x$ from both sides to get $4x + 11 = 35$. Subtract 11 from both sides to get $4x = 24$. Divide by 4 to get $x = 6$.

11. A. The circumference of a circle with diameter d is $C = \pi d$. Substitute $d = 20$ and $\pi \approx 3.14$ to get $C = 3.14 \times 20 = 62.8$ cm.

12. H. Factor the quadratic equation $x^2 - 7x + 12 = 0$. Looking for two numbers that multiply to 12 and add to -7, we get -3 and -4. So $(x - 3)(x - 4) = 0$, giving $x = 3$ or $x = 4$. From the choices, 3 is the answer.

13. D. To find the percentage, divide the number who speak Spanish by the total: $60/150 = 0.40 = 40\%$.

14. F. The two points (4, 11) and (4, -3) have the same x-coordinate, so they lie on a vertical line. The distance between them is the absolute value of the difference in y-coordinates: $|11 - (-3)| = |14| = 14$.

15. B. If 7/9 of a number equals 63, set up the equation $(7/9)n = 63$. Multiply both sides by 9/7 to get $n = 63 \times (9/7) = 567/7 = 81$.

16. J. Calculate 2^7 by multiplying 2 by itself seven times: $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 128$.

17. C. Let the four consecutive odd integers be n, n+2, n+4, and n+6. Their sum is $n + (n+2) + (n+4) + (n+6) = 104$. Simplifying: $4n + 12 = 104$, so $4n = 92$, and $n = 23$.

18. G. Use FOIL to expand $(x + 11)(x - 7)$. First: $x \cdot x = x^2$. Outer: $x \cdot (-7) = -7x$. Inner: $11 \cdot x = 11x$. Last: $11 \cdot (-7) = -77$. Combining gives $x^2 - 7x + 11x - 77 = x^2 + 4x - 77$.

19. A. The perimeter of a square is 4 times the side length. Calculate $P = 4 \times 16.5 = 66$ cm.

20. H. For inverse variation, $y = k/x$ where k is the constant. Using $y = 6$ when $x = 8$, we get $6 = k/8$, so $k = 48$. When $x = 12$, $y = 48/12 = 4$.

21. D. Evaluate each square root separately: $\sqrt{169} = 13$ and $\sqrt{121} = 11$. Therefore $\sqrt{169} + \sqrt{121} = 13 + 11 = 24$.

22. F. The total number of balls is $12 + 8 + 10 = 30$. The probability of selecting a blue ball is $8/30 = 4/15$.

23. B. The tangent function is defined as $\tan(\theta) = \sin(\theta)/\cos(\theta)$. Calculate $\tan(\theta) = 0.6/0.8 = 0.75$.

24. J. Solve the inequality $4x - 7 > 21$ by adding 7 to both sides: $4x > 28$. Divide both sides by 4: $x > 7$.

25. C. The volume of a cylinder is $V = \pi r^2 h$. Substituting $r = 6$ and $h = 9$: $V = 3.14 \times (6)^2 \times 9 = 3.14 \times 36 \times 9 = 1017.36$ in^3.

26. G. For a right triangle with legs $a = 20$ and $b = 21$, use the Pythagorean theorem: $c^2 = a^2 + b^2 = 20^2 + 21^2 = 400 + 441 = 841$. Therefore $c = \sqrt{841} = 29$.

27. A. Substitute $x = 4$ into $(5x - 3)^2$. First calculate $5(4) - 3 = 20 - 3 = 17$. Then square: $17^2 = 289$.

28. H. The sum of interior angles of a polygon with n sides is $(n - 2) \times 180°$. For a decagon ($n = 10$): $(10 - 2) \times 180° = 8 \times 180° = 1440°$.

29. D. If $3^{(2x)} = 81$, recognize that $81 = 3^4$. So $3^{(2x)} = 3^4$, which means $2x = 4$, and therefore $x = 2$.

30. F. Simplify $\sqrt{200}$ by finding perfect square factors. Since $200 = 100 \times 2$, we have $\sqrt{200} = \sqrt{(100 \times 2)} = \sqrt{100} \times \sqrt{2} = 10\sqrt{2}$.

31. B. For an arithmetic sequence with first term $a_1 = 12$ and common difference $d = 7$, the nth term is $a_n = a_1 + (n-1)d$. For the 15th term: $a_{15} = 12 + (15-1)(7) = 12 + 98 = 110$.

32. J. To subtract matrices, subtract corresponding elements. P - Q = [8-3 5-2; 3-4 7-1] = [5 3; -1 6].

33. C. The volume of a sphere is $V = (4/3)\pi r^3$. Substituting $r = 9$ and $\pi \approx 3.14$: $V = (4/3) \times 3.14 \times (9)^3 = (4/3) \times 3.14 \times 729 = 3052.08$ cm^3.

34. G. Calculate 8 factorial: $8! = 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 40{,}320$.

35. A. The expression $(x + 7)/(x^2 - 49)$ is undefined when the denominator equals zero. Factor the denominator: $x^2 - 49 = (x + 7)(x - 7)$. This equals zero when $x = 7$ or $x = -7$.

36. H. If the angles are in ratio 2:3:4:6, let them be 2k, 3k, 4k, and 6k. The sum of angles in a quadrilateral is 360°: $2k + 3k + 4k + 6k = 360°$, so $15k = 360°$ and $k = 24°$. The largest angle is $6k = 6(24°) = 144°$.

37. D. For $f(x) = -x^2 + 8$, since $-x^2 \leq 0$ for all real x, we have $-x^2 + 8 \leq 8$. The maximum value is 8 (when $x = 0$), so the range is $y \leq 8$.

38. F. If $\log_4(x) = 5$, then by the definition of logarithm, $4^5 = x$. Calculate $4^5 = 4 \times 4 \times 4 \times 4 \times 4 = 1024$.

39. B. The volume of a rectangular prism is V = length × width × height. Calculate $V = 7 \times 9 \times 12 = 756\ cm^3$.

40. J. To find the LCM of 15 and 25, list multiples. Multiples of 15: 15, 30, 45, 60, 75... Multiples of 25: 25, 50, 75... The least common multiple is 75.

41. C. First evaluate $g(4) = (4)^2 + 3 = 16 + 3 = 19$. Then evaluate $f(19) = 4(19) - 9 = 76 - 9 = 67$.

42. G. If the mean of eight numbers is 27, their sum is $8 \times 27 = 216$. The sum of the seven known numbers is $24 + 26 + 30 + 28 + 25 + 29 + 31 = 193$. The eighth number is $216 - 193 = 23$.

43. A. In an isosceles right triangle, one angle is 90° and the other two angles are equal. Let each equal angle be x. Then $x + x + 90° = 180°$, so $2x = 90°$, and $x = 45°$.

44. H. For direct variation with y^3, $x = ky^3$ where k is the constant. Using $x = 54$ when $y = 3$, we get $54 = k(3)^3$, so $54 = 27k$, and $k = 2$. When $y = 4$, $x = 2(4)^3 = 2(64) = 128$.

45. D. Find the GCF by using prime factorization. $96 = 2^5 \times 3$ and $144 = 2^4 \times 3^2$. The GCF is $2^4 \times 3 = 16 \times 3 = 48$.

READING TEST

Passage I

1. Suggested Passage Map notes:

   ¶1-2: Esther (E) remembers love for Dolly (D)

   ¶3: E's godmother (g) - stern, churchgoing

   ¶4: E doesn't know mother

   ¶5: E doesn't have friends

   ¶6: g doesn't celebrate E's bday

   ¶7-10: g says would have been better if E never born

   ¶11-12: E cries self to sleep, thankful for D

1. **B**
   Difficulty: High

   Category: Inference

   Getting to the Answer: The narrator's opinion of herself is based purely on her godmother's words, deeds, and general negativity toward her (the narrator). The author is implying that there is no real truth to the narrator's perception of herself, which matches answer choice (B). Choice A is the opposite of the author's intention. Choices C

and D are also opposites; the narrator believes her godmother's statement, and though she calls her birthday "the most melancholy day at home in the whole year" (lines 57–58), there is no hint that the narrator hates her godmother for not celebrating her birthday.

2. **G**
   Difficulty: Medium

   Category: Function

   Getting to the Answer: From the description of Dolly in the first two paragraphs, it is clear that Esther viewed her doll as her only friend. "I was such a shy little thing that I seldom dared to open my lips, and never dared to open my heart, to anybody else" (lines 6–8). This idea is repeated in lines 84–87: "I went up to my room, and crept to bed, and laid my doll's cheek against mine wet with tears, and holding that solitary friend upon my bosom, cried myself to sleep." Choice (G) is correct. Choices F and J are opposites; Esther clearly cherishes her doll for far more than amusement, and she sleeps with her cheek touching the doll's. Choice H is a misused detail; the reference to a princess in a fairy tale describes Esther's being brought up by her godmother.

3. **B**
   Difficulty: Medium

   Category: Vocab-in-Context

Getting to the Answer: In this case, *stiff* is used to describe the tone of the letter that Esther's godmother wrote to decline the invitation to another student's birthday party. Choice (B), "rigidly formal," is the most appropriate definition in this context. Choice A, C, and D are incorrect because they don't make sense in context.

4. **G**
   Difficulty: High

   Category: Inference

   Getting to the Answer: This is a Global question. Esther mentions that her birthday was never celebrated, and the pivotal scene in the passage happens on her birthday. In lines 3–5, Esther tells her doll that she is not very clever, but that is not the focus of the passage. In lines 48–51, she mentions being invited to a friend's home for a party, so H is not correct. In lines 68–71, you find out that Esther's mother did not die on her birthday, so J is not correct. This leaves only (G), which is correct.

5. **C**
   Difficulty: Medium

   Category: Inference

   Getting to the Answer: Although Esther's godmother says that she has forgiven Esther's mother, her facial expression directly contradicts this. As it says on lines 76–80, "I see her knitted brow and pointed

finger . . . her face did not relent." This is reflected in (C). Choices A and B are not supported in the passage, and D can be inferred as opposite of the information given.

6. **G**
   Difficulty: Low

   Category: Detail

   Getting to the Answer: Esther is clearly lonely, as evidenced by her description of Dolly as her only friend and her explanation that there is a divide between her and the other girls at school. The birthday scene with her godmother also shows that Esther is quite confused about her own family's past. All this evidence matches (G). None of the other choices is supported in the passage.

7. **C**
   Difficulty: Medium

   Category: Inference

   Getting to the Answer: Her confrontation with her godmother gives Esther further reason to believe that no one loves her. The phrase before the cited line also points to (C) as the best answer: "I knew that I had brought no joy at any time to anybody's heart" (lines 88–89). The cited quote makes A and B opposites. Choice D is both irrelevant to the quote and not given any support in the passage.

8. **J**

   Difficulty: Medium

   Category: Inference

   Getting to the Answer: Choices F, G, and H are all mentioned in the fi h paragraph (lines 27–36). At the end of the passage, Esther says, “I hope it is not self-indulgent to shed these tears as I think of it” (lines 95–96), so (J) is correct.

9. **C**

   Difficulty: Low

   Category: Detail

   Getting to the Answer: Esther’s evidence that her godmother is a “good, good woman” is explained in lines 20–21: “She went to church three times every Sunday, and to morning prayers on Wednesdays and Fridays, and to lectures whenever there were lectures, and never missed.” This is reflected in (C). Esther says her grandmother never smiles, which eliminates A. It is clear that the grandmother has not truly forgiven Esther’s mother, so B is incorrect. Choice D is incorrect because we do not know that the doll was a gi from the grandmother.

10. **G**

    Difficulty: High

    Category: Detail

Getting to the Answer: In the first paragraph, Esther says, “Now, Dolly, I am not clever” (line 3). In the second paragraph, Esther describes herself as “such a shy little thing” (line 6). Both of these match (G). None of the other answers reflect how Esther thinks of herself.

2. ## *Passage II*

Suggested Passage Map notes:

¶1: jaguar (j) surprised tourist in Brazil

¶2: j comeback difficult to determine

¶3: ranchers afraid of j, kill in self-defense

¶4: ranchers want right to kill j

¶5: 1967 - Brazil outlawed j hunting, j population ↑

¶6: may be way for ranchers and j to coexist

¶7: ranchers deal with j as they see fit

11. **B**

Difficulty: Medium

Category: Vocab-in-Context

Getting to the Answer: In the phrase “the Pantanal was a vast, soggy canvas, white with gleaming herds of Nelore cattle,” (lines 61–63), *canvas* is used to mean “a background.” Choices A, C, and D don’t make sense in context.

12. **G**
    Difficulty: Medium

    Category: Function

    Getting to the Answer: Nunes’s encounter with a jaguar opens the passage and ends with his describing the experience as a “wonderful fright!” The word *wonderful* and the exclamation point suggest that this event was unexpected and thrilling, as choice (G) also reflects. Choice F may be true, but Nunes’s story is not about dangers—it is about his enjoyment of the experience. Choice H is irrelevant to the story, and choice J is out of scope; the author never suggests that ecotourism is unsafe overall.

13. **C**
    Difficulty: Medium

    Category: Detail

    Getting to the Answer: The answer to this question can be found in lines 12–17: “Exactly how dramatic a comeback is difficult to say because jaguars—*Panthera onca*, the largest feline in the New World—are solitary, secretive, nocturnal predators. Each cat needs to prowl at

least 35 square kilometers by itself," as (C) says. This is the only answer supported in the passage.

14. **G**

    Difficulty: Medium

    Category: Inference

    Getting to the Answer: The last sentence of the second paragraph provides the answer: "Hotels, campgrounds, and bed-and-breakfasts have sprung up to accommodate the half-million tourists a year . . . bent on sampling the Pantanal's wildlife, of which the great cats must be the most magnificent example" (lines 23–28). Tourists want to see the jaguars, and not having the jaguars might negatively affect the booming ecotourist business, which matches (G).

15. **A**

    Difficulty: Low

    Category: Detail

    Getting to the Answer: The "green safari" example is mentioned as a way for "scientists to fit the cats with radio collars" (lines 89–90), not a way to protect cattle. This matches (A). The other three examples provided are listed in lines 93–97 as methods the scientists are teaching the ranchers.

16. **G**

Difficulty: Medium

Category: Function

Getting to the Answer: In lines 49–50, the author says, “Hard data on cattle losses due to jaguars in the Pantanal are nonexistent.” One reason for providing anecdotal information, then, is to tell the story of the hardships that the jaguars cause for the ranchers. The author does not suggest that he empathizes with the ranchers more than the jaguars—in fact, he refers to the jaguars as “magnificent.” The only examples that show rancher violence are Abel Monteiro’s shooting an attacking jaguar that had killed his two dogs (lines 31–36) and Leonelson Ramos da Silva’s throwing burning sticks at a jaguar that was trying to invade his camp (lines 36–40), both acts of self-defense. The landscape of the Pantanal is not the focus of these two paragraphs, so J can be eliminated.

17. **C**

Difficulty: Medium

Category: Inference

Getting to the Answer: The passage explains that because of the decrease in the jaguar population, the capybara population increased. These rodents “spread trichomoniasis, a livestock disease that renders cows sterile” (lines 69–71). Lines 74–77 describe the effect of weather patterns and floods on the ranchers’ land: “Weather patterns also shi ed radically—due most likely to global warming—and drove

annual floods to near-biblical proportions. The waters are only now retreating from some inundated pasturelands." These events make only (C) correct.

18. **G**

    Difficulty: Medium

    Category: Detail

    Getting to the Answer: The last sentence of the passage reads, "When the scholars go home and the greens log off, the *pantaneiros* will still be there—le on their own to deal with the jaguars as they see fit" (lines 100–103), which matches (G). None of the other answers reflect the author's conclusion.

19. **A**

    Difficulty: Medium

    Category: Inference

    Getting to the Answer: The author's uses the most descriptive language when he introduces the jaguar in the second paragraph. He calls the animal "big" and "beautiful" (line 11), and "magnificent" (line 28). These words indicate the author's admiration for the jaguar, despite the fact that the bulk of the passage details the problems ranchers have with jaguars. Though the author notes that jaguars are "solitary, secretive, nocturnal predators" (lines 15–16), he is stating facts, not showing fear. That makes B incorrect. Choice C—revulsion,

meaning extreme dislike—is the opposite of the author's attitude. And though the author is concerned for both jaguars and ranchers, his descriptive words are mostly reserved for showing his admiration of the big cat, making D incorrect.

20. **H**

Difficulty: Medium

Category: Inference

Getting to the Answer: In the second paragraph, the author links the jaguar's comeback to a large increase in ecotourism, and in lines 67–71, he writes that as the jaguar population declined, disease and rodents took over. It can be assumed that though the jaguar was still a problem for farmers, its resurgence helped to restore ecological balance and increase tourism. Thus it is likely that the author would agree with positive aspects of the jaguar's resurgence, which matches (H). Choice F is incorrect because the author doesn't take sides. As a matter of fact, the second-to-last paragraph argues for compromise. Choice G is a distortion; though the author writes that jaguars are solitary (line 15), he doesn't say they are too shy to be seen. Choice J is the opposite; the fi h paragraph contradicts this answer.

3. *Passage III*

Suggested Passage Map notes:

¶1: 2 types of Greek instruments: string/lyre & pipe/aulos

¶2: 2 types of tuning

¶3: lyre started with 5 strings → 11 strings

¶4: similar to lyre = magadis, pectis, barbitos

¶5: kithara = intellect & aulos = passion

¶6: aulo similar to oboe

¶7: family of auloi = same range as human voice

21. **A**

Difficulty: Medium

Category: Inference

Getting to the Answer: This question asks you why the aulos was considered "the instrument of the Dionysians." In the fi h paragraph, you find out that the Dionysians "represented the unbridled, sensual, and passionate aspect of Greek culture" (lines 55–57). The passage also says that the aulos had a "far more exciting effect" (lines 61–62) than that of the lyre. The suggestion here is clearly that the aulos must have been able to express the unbridled passion and excitement of the Dionysians, making (A) the best answer. Choice B is out because the fact that the aulos was chosen as the official instrument of the Delphian and Pythian festivals doesn't explain why it was the instrument of the Dionysians. Choice C contradicts the passage. The

kithara, not the aulos, represented the intellectual, idealistic side of Greek art. Finally, the author never says when the Dionysian cult originated, so D is also out.

22. **J**
    Difficulty: Medium

    Category: Inference

    Getting to the Answer: All the author means by saying that the chelys can be "traced back to the age of fable" is that it is an ancient instrument, which matches (J). The chelys was an actual, not an imaginary, instrument, so H is incorrect. Choice G is incorrect because the kithara, not the chelys, was used to accompany epics.

23. **B**
    Difficulty: Medium

    Category: Vocab-in-Context

    Getting to the Answer: Since it's important to read the word in question in the context of the sentence in which is appears, go back to the passage and read the entire sentence. It's about the possible way in which the kithera was used, so the answer will have to do with how an instrument could be used in making music. Choice C doesn't make a lot of sense, since *increased* is not relevant to making music. Choice D is incorrect because while "to decorate" can mean "to make pretty," this definition is more relevant to something seen or used than to

making music. Choice A also means “to make more beautiful” and is incorrect for the same reason as D. Choice (B) is correct because to embellish something is to make it more interesting by adding details, which is exactly what a kithara would do if it were to embellish a singer’s voice by adding musical flourishes or other musical details.

24. **H**
Difficulty: Medium

Category: Detail

Getting to the Answer: The first thing the author says about the kithara is that it was used by “professional Homeric singers” (line 14), which matches (H). The kithara, according to the author, probably came from Egypt, so F is incorrect. Choices G and J contradict information in the paragraph that the kithara was more powerful than the chelys and was played with both hands.

25. **D**
Difficulty: Medium

Category: Detail

Getting to the Answer: Skim through the third paragraph to find the changes that occurred to the lyre between the eighth and fi h centuries b.c.e. Musicians began to use a plectrum in the seventh century b.c.e., so A is incorrect; lyres featured an increasing number of strings during this period, so B is incorrect; and musicians also began

to use different scales and modes, so C is incorrect. That leaves (D). Nothing in the paragraph indicates that lyres were used to accompany dramatic productions.

26. **F**

    Difficulty: Medium

    Category: Inference

    Getting to the Answer: The author writes that ancient Greek instruments were used by many types of people, that the "lyre was the national instrument" (line 6), and that the different instruments which represented gods were played at official festivals. All this indicates the author's belief that instruments were important and essential parts of Greek culture, which matches (F). Choices G, H and J are all out of scope; the author does not include information that supports them.

27. **A**

    Difficulty: Medium

    Category: Inference

    Getting to the Answer: The author writes about Greek instruments and music, but always in terms of history—when, how, and why they were used, and what they represented in Greek life. Match this with (A). Choice B is incorrect because a professional musician would be far less interested in history and culture than in music. Choice C would be correct only if the music teacher were also a talented historian;

teaching music is not the same has knowing ancient music's place in a culture. Choice D is incorrect because the passage is specific to music, not Greece in general.

28. **G**
    Difficulty: Medium

    Category: Detail

    Getting to the Answer: Sappho did two things that you know about from lines 38–40. She introduced a mode "in which Dorian and Lydian characteristics were blended," and she "initiated the use of the plectrum," which matches (G). None of the other answers is attributed to Sappho.

29. **B**
    Difficulty: High

    Category: Detail

    Getting to the Answer: All of the details you need to answer this question are in the sixth paragraph (lines 58–66). The first sentence states that the aulos is more like our oboe than our flute, so III is false. This means C and D can be eliminated. The second sentence of the paragraph confirms that the aulos sounded more exciting than the lyre (II). Because (B) is the only remaining answer choice that includes II, you know it has to be the correct answer.

30. **F**

Difficulty: Medium

Category: Inference

Getting to the Answer: Greek instruments are discussed as a whole at the very beginning of the passage. The author says that our knowledge of Greek instruments comes from “representations on monuments, vases, statues, and friezes and from the testimony of Greek authors” (lines 4–5). These are all secondary sources of information about the instruments, so (F) is the best answer. Choice G is incorrect because quite a bit is known about the tuning of the instruments, as represented in the second paragraph. Choice H is contradicted by the same sentence that supports (F). Finally, there is no evidence to suggest that more is known about one type of instrument than the other, J.

4. *Passage IV*

Suggested Passage Map notes:

Passage A

¶1: nonspecific defenses = 1st line of defense

¶2: microphages = type of white blood cell (wbc) called APC

¶3: neutrophil = another type of wbc, not APC

¶4: eosinophils, basophils, mast cells = other wbc

Passage B

¶1: 2 types specialized wbc (lymphocytes): B & T cells

¶2: 3 types of T cells: TH, TC, TS

¶3: T cells can't detect free antigens

¶4: B cells CAN detect free antigens

¶5: B and T cells have unique receptors

¶6: B cell clones = plasma B cells

31. **C**
Difficulty: Low

Category: Function

Getting to the Answer: The entire first paragraph lists a variety of nonspecific body defenses against infection. Along with all the others, including skin and mucous, the action of peristalsis is an example of the body's defense against infection, as stated in (C). Choice A is out of scope; though peristalsis takes place in the stomach, the author doesn't describe how the stomach functions. Choice B is a misused detail; it's mentioned along with peristalsis but not the reason why

peristalsis itself is in the passage. Choice D is also a misused detail—pH values are associated with secretions.

32. **G**

    Difficulty: High

    Category: Detail

    Getting to the Answer: According to the passage, “Macrophages are called antigen-presenting cells” (lines 27–28). In addition, “these cells can cause a more intensive immune response from other cells. This information matches (G).

33. **B**

    Difficulty: Medium

    Category: Detail

    Getting to the Answer: The second paragraph says that macrophages engulf materials through a process called phagocytosis, and the third paragraph states that neutrophils are phagocytic-like macrophages. This matches (B).

34. **J**

    Difficulty: Medium

    Category: Vocab-in-Context

Getting to the Answer: A TH cell is a “helper” cell. Additionally, clues in the passage indicate that macrophages/APCs and B cells cooperate: the third paragraph indicates that T cells interact with APCs, and the fourth paragraph indicates that helper T cells cue B cells to activate. Predict that TH cells “help” or act as intermediaries in the situation, as (J) states.

35. **A**

Difficulty: High

Category: Detail

Getting to the Answer: The fi h and sixth paragraphs discuss the activation of B and T cells. The passage states, “When a particular B or T cell gets activated, it begins to divide rapidly to produce identical clones. In the case of B cells, these clones will all produce antibodies of the same structure, capable of responding to the same invading antigens. B cell clones are known as plasma B cells and can produce thousands of antibody molecules per second as long as they live” (lines 93-100). This makes (A) correct.

36. **J**

Difficulty: Medium

Category: Detail

Getting to the Answer: The fourth paragraph states that B cells have surface receptors that can “recognize a specific set of foreign antigens

(proteins found on the surfaces of foreign cells and viruses)” (lines 82-83). This matches (J).

SCIENCE TEST

Passage I

1. **B**

   Difficulty: High

   Category: Data—Inference & Calculation

   Getting to the Answer: When a question asks about a quantity that is not given in the data, think about how that quantity relates to those that *are* given. Blood is a solution in which the solvent (the greatest part of the solution) is water and the solutes (molecules existing in smaller quantities that are dissolved in the solution) are other substances, including sugar. The highest water content per milliliter means the highest water concentration, which means the lowest concentration of other substances. Thus, the blood sample with the highest water content per milliliter is most likely the sample with the lowest sugar concentration, as in (B).

2. **H**

Difficulty: Medium

Category: Experiments—Synthesizing Data

Getting to the Answer: Compare blood color to mass in both tables. The higher blood masses generally have higher values for color, which correspond to shades closer to dark red. Therefore, the conclusion in the question stem is not supported by the data. Eliminate F and G because they state that the conclusion is supported. Choice J is incorrect because the tables show that lower masses tend to have lower color values, not higher. Choice (H) correctly states that as blood mass decreases, blood color lightens (color values are lower).

3. **C**
   Difficulty: Low

   Category: Data—Detail & Interpretation

   Getting to the Answer: The data in Tables 1 and 2 show that there is a direct relationship between sugar concentration and mass: mass goes up as sugar concentration goes up. Choice (C) is thus correct.

4. **F**
   Difficulty: Low

   Category: Data—Inference & Calculation

Getting to the Answer: Although the passage does not discuss the effects of illness on blood sugar, the question stem states that blood sugar concentration tends to increase during illness. So, the student with the cold is most likely the student with the highest blood sugar concentration. The highest sugar concentration values in both Tables 1 and 2 occur for the samples taken from Student A, so (F) is correct.

5. **D**
   Difficulty: Medium

   Category: Data—Detail & Interpretation

   Getting to the Answer: Since the volumes of the samples in both tables are the same, the heaviest 0.5 mL sample would simply be the one with the largest recorded mass. Although Student A had the sample with the overall highest mass, Student A is not represented in the choices. Student E was a close second and is included among the choices, so (D) is correct.

6. **J**
   Difficulty: Medium

   Category: Data—Inference & Calculation

   Getting to the Answer: To find the positive difference in mass, locate the mass of the before and a er samples for Student C in Tables 1 and 2. The a er sample is 1.055 and the before sample is 1.051, so the positive difference is 0.004. Choice G, however, is a trap. The question

is asking for the value in *milligrams*, but the data in the tables are in *grams*. There are 1,000 milligrams per gram. To convert the units properly, multiply 0.004 grams by 1,000 to get 4.0 milligrams. This means (J) is correct. Choice F is another trap, set for those who accidentally divide by 1,000 rather than multiply.

Passage II

7. **B**

   Difficulty: Medium

   Category: Data—Inference & Calculation

   Getting to the Answer: To answer this question, examine the data in Table 2. The pattern established in that table is that for every 0.1 moles of KCl added, the freezing point is lowered by 1.0°C. Because 0.4 moles of KCl yields a freezing point of –92.0°C, as seen in the last row of the table, choice A must be incorrect. To reach a freezing point of –93.0°C, 0.1 additional moles will be needed beyond the 0.4 present in Solution 12. Thus, the solution described in the question stem most likely contains 0.5 moles of KCl, as in (B).

8. **J**

   Difficulty: Low

   Category: Experiments—Design & Methodology

Getting to the Answer: Choices F, G, and H were all factors directly manipulated by the student: the student could have decided to use a substance other than KCl to add to the IPA; the student could have used an amount of IPA other than 200 g; and the student directly varied the amount of KCl added, with values ranging from 0.05 to 0.4 moles. Only (J) describes properties not subject to the direct control of an experimenter.

9. **C**
   Difficulty: Medium

   Category: Data—Detail & Interpretation

   Getting to the Answer: Be careful when data include negatives—it's easy to mistake moving from –80°C to –90°C as an increase, rather than recognize it as the decrease that it actually is. Start by looking at Table 2. As more KCl was added, the freezing point dropped from –88.5°C to –92°C. So, according to Experiment 2, more solute particles mean a lower freezing point, making (C) correct. Choice A is incorrect because the freezing point does indeed change as the number of solute particles changes. Choice B is incorrect because it's the opposite of what you're looking for. Choice D is incorrect because the question stem asks you to draw a conclusion based on the results of Experiment 2 alone, so it doesn't matter that only one solute was tested.

10. **F**
    Difficulty: High

Category: Experiments—Synthesizing Data

Getting to the Answer: To find the answer to this question, compare the changes reported in the relevant rows of Tables 1 and 2. According to Table 1, when 0.4 moles of KCl are added to 200 g of IPA, the change in boiling point is 119.7°C – 108°C = 11.7°C. This represents an increase. In Table 2, when 0.4 moles of KCl are added to 200 g of IPA, the change in freezing point is –92.0°C – (–88°C) = –4.0°C. This represents a decrease. Thus, the boiling point is increased more than the freezing point is decreased, and that is a match for (F).

11. **A**
    Difficulty: Low

    Category: Data—Detail & Interpretation

    Getting to the Answer: This question asks about the results of Experiment 1, so look to Table 1. With each increase in the amount of KCl (potassium chloride), the boiling point of the solution increased. Because KCl breaks up into potassium ions and chloride ions, as noted in the description of Experiment 1, more KCl means more of these ions. Choice (A) is thus correct.

12. **H**
    Difficulty: High

    Category: Data—Inference & Calculation

Getting to the Answer: The question stem says to assume "that $MgCl_2$ has the same effect on the boiling point of IPA as does KCl per particle produced when dissolved." Thus, to answer this challenging question, you must think in terms of the individual solute particles: 1 K^+ and 1 Cl^- for KCl, and 1 Mg^{2+} and 2 Cl^- for $MgCl_2$. Adding 0.2 moles of $MgCl_2$ results in 3 × 0.2 moles = 0.6 moles of solute particles (0.2 moles of Mg^{2+} and 0.4 moles of Cl^-). According to Table 1, 0.4 moles of *solute particles* (0.2 moles of K^+ plus 0.2 moles of Cl^-) result in a boiling point of 114.4°C, while 0.8 moles of solute particles (0.4 moles of K^+ plus 0.4 moles of Cl^-) result in a boiling point of 119.7°C. Since 0.4 < 0.6 < 0.8, the boiling point resulting from the addition of 0.2 moles of $MgCl_2$ will most likely be between 114.4°C and 119.7°C, as in (H).

13. **D**

Difficulty: Medium

Category: Data—Detail & Interpretation

Getting to the Answer: Table 1 shows that adding KCl increases the boiling point of both acetone and IPA. Table 2 shows that the freezing point of IPA is depressed by the addition of KCl. Therefore, it is reasonable to conclude that the freezing point of acetone would be depressed as well. The introductory paragraph states that –95°C is the freezing point of acetone, so the correct answer must be lower than this value, which eliminates A, B, and C. Choice (D), –95.5°C, must be correct.

Passage III

14. **J**

Difficulty: Low

Category: Data—Detail & Interpretation

Getting to the Answer: To answer this question, it's necessary to interpret Figure 1 correctly. For $\delta^{14}C$ values, look at the line graph portion of Figure 1. The tombs are numbered 1–10 and each is represented on the *x*-axis. The correct answer will be the pair of samples for which the C-14 index values are the closest. Go through the answer choices one by one and compare the $\delta^{14}C$ values for the tombs in each choice. The plotted points for the pair in (J) appear to be at roughly the same height, while the pairs in the other choices correspond to C-14 index values that are further apart. Choice (J) is correct.

15. **A**

Difficulty: Medium

Category: Data—Detail & Interpretation

Getting to the Answer: As with the previous question, answering this question depends on proper interpretation of Figure 1. Both age and $\delta^{14}C$ value are plotted on the *y*-axis of Figure 1, but the values for age appear along the le side while the values for $\delta^{14}C$ appear along the right. According to the key, the height of the bars represents the age of the samples, and the line with the plotted points represents the C-14 index. If you compare the height of the plotted points to the height of

the bars for the same samples, you'll see that they are directly proportional. Since both scales increase as you move from the bottom of the graph to the top, high $\delta^{14}C$ values correspond to greater ages, and lower $\delta^{14}C$ values correspond to lower ages. Choice (A), then, is correct.

16. **G**

    Difficulty: Medium

    Category: Data—Detail & Interpretation

    Getting to the Answer: The question stem doesn't provide much information, so evaluate each answer choice individually. Choice F is directly contradicted by Sample 10 in Study 1, so eliminate it. Choice (G) seems good. The descriptions of Studies 2 and 3 mention that there were 20 m and 40 m, respectively, of soil and rock accumulation over the past 11,000 years, so it's reasonable to assume that this factor was important in the selection of these sites. Choice H doesn't make sense—there was a great deal of soil and rock deposited over both sites. Choice J is out of scope for this passage—nowhere is land development mentioned. This leaves only (G), which is correct.

17. **D**

    Difficulty: Medium

    Category: Data—Detail & Interpretation

Getting to the Answer: Follow the trend in Figure 2 to extrapolate data that falls outside the graph's boundaries. The curve in Figure 2 slopes downward, but the $\delta^{14}C$ values along the *y*-axis increase as you move from top to bottom. In other words, the C-14 index *increases* as depth increases. A depth of 25 m is considerably greater than any depth appearing on the graph, so that depth's corresponding C-14 index must be considerably greater than any $\delta^{14}C$ value from the graph. Choice (D) is therefore correct.

18. **H**

Difficulty: Medium

Category: Data—Inference & Calculation

Getting to the Answer: The passage does not provide a direct answer to this question, but it can be inferred based on the information given. The description of Study 2 mentions that "layers of soil and rock were deposited at a known rate" at the Mexican site, which allowed the researchers to determine age based on depth. As noted in the passage and reiterated in the question stem, 20 m of earth accumulated at the Mexican site but the site in Mali had 40 m of earth accumulate over the same 11,000 year period. Because the average rate of soil and rock accumulation is simply equal to the amount of accumulation per unit time, the rate must have been greater in Mali than in Mexico, as in (H).

19. **C**

Difficulty: High

Category: Data—Detail & Interpretation

Getting to the Answer: To answer this question, begin by going back to the equation that describes how the C-14 index is calculated. The equation appearing a er the first paragraph of the passage shows that $\delta^{14}C$ is equal to the $^{14}C/^{12}C$ ratio of the biosphere minus the $^{14}C/^{12}C$ ratio of the sample divided by the $^{14}C/^{12}C$ ratio of the biosphere. $\delta^{14}C$ can only equal 0 if the numerator of the equation equals 0. This is only true when the $^{14}C/^{12}C$ ratio of the biosphere equals the $^{14}C/^{12}C$ ratio of the sample. Choice (C) is correct.

20. **G**

Difficulty: Medium

Category: Data—Detail & Interpretation

Getting to the Answer: This question requires you to make connections between two of the figures to reach an answer: first by moving from depth to $\delta^{14}C$ in Figure 2, and then moving from C-14 index to age in Figure 1. According to Figure 2, a depth of 5 meters corresponds to a C-14 index of approximately 32. In Figure 1, samples 1 and 2 have $\delta^{14}C$ values that are closest to 32, so their ages would be closest to the age of the new sample from the question stem. Because both tombs are slightly less than 3,000 years old, the new sample is most likely about 2,900 years old, as in (G). Be careful about choice H, which might seem right if you moved directly in Figure 1 from the C-14 index points to age in the le axis, instead of looking at the ages that correspond to the heights of the bars under each point.

Passage IV

21. **B**

    Difficulty: Low

    Category: Thinking Like a Scientist—Evaluating Hypotheses

    Getting to the Answer: The opening paragraph of the passage mentions that each scientist is discussing "events that may have caused" the extinction of the dinosaurs. Thus, it is reasonable to conclude that each of the events discussed by the scientists should have in some way contributed to this extinction. Choice (B), which suggests that the acid rain was mentioned because it is harmful to life, is consistent with this conclusion, making it the correct answer. (This is also supported by Scientist 2's suggestion that acid rain caused food and water to become toxic.) Choice A is incorrect because it suggests the opposite: that acid rain is actually beneficial, which makes little sense in a passage about extinction. Choice C contradicts the information in the passage: CO_2 in the atmosphere helped to cause the acid rain, not vice versa. Choice D also reverses the causality in the passage: fires produced CO_2, which in turn led to the acid rain.

22. **G**

    Difficulty: Medium

    Category: Thinking Like a Scientist—Evaluating Hypotheses

Getting to the Answer: The new information about sulfates could only weaken the viewpoint of a scientist who uses sulfates to support his explanation. Only Scientist 2 mentions sulfates, so you can immediately eliminate F and H, since they include Scientist 1. Scientist 2 states that atmospheric sulfates "led to a breakdown of the ozone layer, allowing high levels of ultraviolet radiation to reach the surface." If, as the new information suggests, sulfates in the atmosphere actually cause radiation to be reflected so that it never reaches the surface, Scientist 2's account would be undermined. Choice (G) is thus correct.

23. **D**

Difficulty: Medium

Category: Thinking Like a Scientist—Evaluating Hypotheses

Getting to the Answer: To answer this question, review what Scientist 2 says about the ozone layer: "SO_4 in the atmosphere led to a breakdown of the ozone layer." If heightened levels of SO_4 break down the ozone layer, then lower levels of SO_4 would help to maintain it. Choice (D) is therefore correct.

24. **H**

Difficulty: Low

Category: Thinking Like a Scientist—Evaluating Hypotheses

Getting to the Answer: Use process of elimination with this question to home in on the correct answer. Choice F is incorrect because only

Scientist 1 believes that climate change was caused by the impact of a meteorite; Scientist 2 maintains it was caused by volcanic eruptions. Choice G is incorrect because tidal waves are mentioned only in the account of Scientist 1, and even there they are not explicitly linked to climate change. Choice J can't be correct because only Scientist 2 mentions SO_4. Choice (H), then, is correct. Both scientists connect excess CO_2 to the production of acid rain, while Scientist 1 further suggests that it was responsible for global temperature increases.

25. **D**

    Difficulty: Medium

    Category: Thinking Like a Scientist—Evaluating Hypotheses

    Getting to the Answer: The very first sentence of the passage makes the only reference to the time of the dinosaurs' extinction: "The last of the dinosaurs went extinct approximately 65 million years ago." The meteor described by Scientist 1 would have to have landed at about the same time, so (D) is correct.

26. **F**

    Difficulty: High

    Category: Thinking Like a Scientist—Evaluating Hypotheses

    Getting to the Answer: Scientist 2 makes two claims about sulfates: "the mixing of sulfates with water vapor caused more acid rain" and "SO_4 in the atmosphere led to a breakdown of the ozone layer,

allowing high levels of ultraviolet radiation to reach the surface." Thus, a decrease in sulfate levels should lead to less acid rain (which eliminates G and H) and to less radiation reaching the surface (which eliminates J). Choice (F) must therefore be correct. While you can reach this conclusion using process of elimination, it also follows from an understanding of pH: lower pH values indicate greater acidity, while higher pH values indicate lesser acidity. Consequently, an increase in the average pH of rainfall would be expected with fewer sulfates, which is precisely what (F) states.

27. **B**

    Difficulty: Medium

    Category: Thinking Like a Scientist—Evaluating Hypotheses

    Getting to the Answer: Eliminate A and C, because only Scientist 2 mentions sulfates. Scientist 2 states that a large quantity of sulfates was released at the time of the dinosaurs' extinction and that the reduction in the ozone layer that these sulfates caused led to more radiation reaching the surface (which would result in higher temperatures). In such circumstances, it would be reasonable to expect inorganic sulfates to form, so the discovery of such substances dating from 65 million years ago would indeed support Scientist 2. Choice (B) is correct.

Passage V

28. **H**

Difficulty: High

Category: Data—Detail & Interpretation

Getting to the Answer: Questions like this one are easier with some chemistry knowledge, so you might want to save it for last if you don't like chemistry. Fortunately, though, there's still a way to the answer without outside knowledge. Two chemical equations appear in the passage. Both have the starting chemicals on the le and the resulting chemicals on the right. The question stem suggests that you start with NaOH and HCl and end with NaCl and H_2O, so you can eliminate F and G, both of which have the order reversed. The only difference between (H) and J is that J has two H_2Os on the right side while (H) has just one. According to the chemical equations in the passage, the total number of each element is the same on each side of the equation: there are two Hs and two Cls on the le side of the first equation, and two of each on the right. The same holds in the second equation: each side contains one Si and four each of H and Cl. So, you can determine that J is incorrect because it gives 4 Hs and 2 Os on the right side, but only 2 Hs and 1 O on the le . Choice (H), which properly balances the number of elements on both sides, is correct.

29. **B**

Difficulty: High

Category: Experiments—Synthesizing Data

Getting to the Answer: If you glance at the answer choices while thinking through this question, you'll notice that each one consists of two parts, the first concerning the pressure and the second concerning the amount of gas. It's actually easier to start with the second part and consider what happens to the amount of gas. Table 1 shows that the syringe was filled with 40 mL of H_2 and 40 mL of Cl_2 at the beginning of Trial 5, but that no H_2 or Cl_2 was le over a er the flash that caused the reaction. That means the total amount of gas has decreased (to nothing), which allows you to eliminate A and C, both of which suggest an increase. To decide between the remaining options, you'll need to determine the effect that the loss of gas has on pressure. Here, it is helpful to have a bit of scientific background knowledge, but it may also be possible to use reasoning to find the correct answer. The flash in Trial 5 leads to the conversion of all the gas to droplets of liquid HCl. This leaves behind an empty space in the syringe, otherwise known as a vacuum. Vacuums are very low pressure—this is why materials are naturally drawn into them, such as is seen in the suctioning power of a vacuum cleaner—so the pressure in the syringe a er the reaction had to have decreased. Choice (B) is thus correct.

30. **H**

Difficulty: Medium

Category: Experiments—Synthesizing Data

Getting to the Answer: While there is no trial in Experiment 1 that begins with these exact conditions, you can nevertheless reason to the answer by considering the reactions in Table 1 that use more Cl_2 than

H_2—Trials 2, 3, and 4. In each of these trials, the amount of Cl_2 le over was equal to the amount of starting Cl_2 minus the amount of starting H_2. So, you can predict that 20 mL of Cl_2 reacting with 10 mL of H_2 will leave behind 10 mL of Cl_2. This matches (H).

31. **A**

Difficulty: Medium

Category: Experiments—Design & Methodology

Getting to the Answer: It can be difficult to predict researchers' assumptions, so work backward from the answer choices on questions like this. Start by eliminating the choices that contain information not included in Experiment 1. Choices C and D refer to solid Si and $SiCl_4$, which appear only in Experiment 2, so you can eliminate both choices. Choice B is incorrect because it contradicts the results of Trials 1, 5, and 6 of Experiment 1—each of these were successful without having Cl_2 le over. Only (A), then, must be true. This makes sense because the results compiled in Table 1 would not be informative if they only reflected what was happening in the middle of the reaction.

32. **G**

Difficulty: High

Category: Data—Inference & Calculation

Getting to the Answer: This is another question that can be answered either by using background knowledge in chemistry or by making

inferences from the patterns established in the passage. The equation following Experiment 1 indicates that 1 H_2 and 1 Cl_2 combine to form 2 HCl; in other words, when there are equal amounts of each, such as in Trials 1 and 5 of Experiment 1, there will be no H_2 or Cl_2 le over a er they react. When there is an excess of one of the two, such as the excess Cl_2 in Trial 2 or the excess H_2 in Trial 6, some of that excess substance will remain unreacted. Now, the equation in the question stem states that 2 H_2 and 1 O_2 combine to form 2 H_2O; in other words, you need exactly twice as much H_2 as O_2 to ensure that neither gas is le over at the end. The reaction in the stem involves 10 mL of O_2, so you can expect that to react fully with 20 mL of H_2. However, there are 25 mL of H_2 total, which means that there should be 25 – 20 = 5 mL of H_2 le over a er the reaction. Choice (G) is therefore correct.

33. **C**

Difficulty: High

Category: Experiments—Design & Methodology

Getting to the Answer: According to the description of Experiment 2, $SiCl_4$ and H_2 combined to form liquid HCl. By measuring the changes in mass, students were able to determine the ratio of $SiCl_4$ and H_2 molecules needed to form HCl: "4 molecules of HCl were produced for every 1 molecule of $SiCl_4$ and every 2 molecules of H_2 reacted." Now consider the answer choices one by one to determine whether each could cause an error in these results, most likely by having an impact on the mass changes that the students measured. Choice A could certainly cause an error: if unanticipated reactions produced products

other than HCl, then there would be a smaller mass of HCl than there would be if it were the only product, which would impact the ratios that the students calculated. Choice B could also impact these calculations and lead to an error, since only the mass of the HCl that condensed in the condensation chamber was measured. Choice (C) is correct: *nonreactive* impurities would not react with any of the substances that the students weighed, so they should have no impact on the ratios the students calculated. Choice D is incorrect for a similar reason: *reactive* impurities in the H_2 would lead to the formation of products other than HCl, which would affect the mass measurements and the students' calculations.

34. **J**

Difficulty: Medium

Category: Thinking Like a Scientist—Applying Core Knowledge

Getting to the Answer: A limiting reagent is a substance that is completely used up in a chemical reaction, thereby limiting how much of the reaction's product can be produced and leaving unreacted any other reagents that are present in excess. According to Table 1, Cl_2 is completely used up in Trials 1, 5, and 6, with excess H_2 le over in Trial 6. Thus, Cl_2 is a limiting reagent for Trial 6, making (J) the correct answer.

Passage VI

35. **A**

Difficulty: Low

Category: Data—Detail & Interpretation

Getting to the Answer: Figure 2 compares slide time to θ. To answer this question, find a value for slide time that contains points for both Earth (represented by the square points) and Mercury (represented by the triangular points). For a slide time of about 0.6 seconds, Earth has a θ of 45° and Mercury has a θ of 85°. Choice (A) is thus correct. Watch out for choices C and D: choice C offers θ values for which Neptune and Earth have approximately equal slide times, while D offers θ values for which Neptune and Mercury are roughly equal.

36. **H**

Difficulty: Medium

Category: Data—Detail & Interpretation

Getting to the Answer: Follow the shape of the given curve to extrapolate beyond the boundaries of the graph. Mercury is represented by the triangular points, so follow the triangles to the far le of the graph in Figure 1 and estimate where the next one would appear for d_0 = 25 cm. The slide time is just over 0.7 seconds for d_0 = 35 cm and just under 0.7 seconds for d_0 = 30 cm. So the slide time for 25 cm should be less than 0.1 seconds lower than the slide time for 30 cm. Choice (H), 0.6 seconds, makes for the best approximation. You could have immediately eliminated J because it is higher than 0.7 seconds, while choices F and G would both be too low.

37. **C**

Difficulty: Medium

Category: Data—Detail & Interpretation

Getting to the Answer: With a question like this that requires interpolating a data point, it can help to draw directly on the figures provided. First draw a curve in Figure 2 that smoothly connects the triangular points representing Mercury's slide times. Then, trace the horizontal line that corresponds to a *y*-value of 1.2 seconds until it intersects the Mercury curve. Finally, draw a line straight down from that point to the *x*-axis. The line hits the *x*-axis somewhere between $\theta = 35°$ and $\theta = 45°$. Only (C) falls within this range, making it correct.

38. **F**

Difficulty: Medium

Category: Data—Detail & Interpretation

Getting to the Answer: To answer this question, examine Diagram 1, which shows the box on the track. The distance between the end of the track and the beginning of the box is labeled d_0. If the box slides a distance *x* down the track, you know that it must be closer to the edge of the track than it started, so eliminate G (which would increase the distance remaining) and H (which would keep the distance remaining constant). As the box slides farther down the track, *x* increases while the distance remaining must decrease. Thus, J could not be correct, because it suggests that the distance to the end of the track would

increase as the box slid farther down the track. Choice (F), then, must be correct, which you can see if you imagine x to be equal to 0, in which case the distance remaining would appropriately be d_0 (because the box hasn't moved yet); and if you imagine x to be equal to d_0, in which case the distance remaining would appropriately be 0 (because the box will have slid all the way down).

39. **D**

Difficulty: High

Category: Data—Detail & Interpretation

Getting to the Answer: This is another question that requires interpolation, so drawing on the figure is again recommended. The question stem mentions a slide time of 0.8 seconds, so trace the line in Figure 2 that corresponds to a y-value of 0.8. This intersects one of Mercury's triangular points at a θ value of 55°, but it does not intersect any of Earth's square points. To find the θ value for Earth, sketch in the curve to connect the squares and then drop down a line to determine the x-value for where the Earth curve intersects 0.8 seconds. You should find that a slide time of 0.8 seconds on Earth corresponds to a θ of approximately 38°. Because 38° is 17° less than 55°, (D) is correct.

40. **F**

Difficulty: Medium

Category: Data—Detail & Interpretation

Getting to the Answer: Apply trends from the figures to make deductions about similar experiments. Based on the acceleration values listed in Table 1 and the results in Figures 1 and 2, slide times are shorter on the surfaces of planets with larger accelerations due to gravity. The acceleration due to gravity on Jupiter is larger than that on any of the given planets, so the slide times on Jupiter should be less than those on any of the three planets, as suggested in (F).

WRITING TEST

Model Essay

Below is an example of what a high-scoring essay might look like. Notice the author states her position clearly in the introductory paragraph and supports that position with evidence in the following paragraphs. This essay also uses transitions, some advanced vocabulary, and an effective "hook" to draw in the reader.

Teenagers have lots of opinions, many of which we share rather loudly. Taking into consideration the students' feelings about the courses they study in high school has both pros and cons. Some argue that schools should provide students a way to make their preferences known, others feel students are too young to make good decisions about what to study, and others argue that surveying students can help make the curriculum more relevant to them and provide another way to evaluate a teacher's effectiveness. I agree that students' interests should be surveyed as long as they are not, in and of themselves, the basis for creating a curriculum.

From the first perspective, it is argued that high schools should do what colleges do and survey students to see how they feel about their classroom lessons. Studies show that when high school students are engaged because they enjoy their studies and understand the relevance of what they are learning, they are more participatory in class and remember more of what they learn. However, one problem is that schools cannot let students create the lessons, since this would lead to chaos with so many students expressing different opinions. However, if it were made clear that not all suggestions would be used but that there would be some way to pare down the suggestions, implementing only those with most student support, it would be possible for the students' preferences to be included in a lesson. Schools could survey students, compile a list of five top suggestions, then have students vote on them. In this way at least some student suggestions, and hopefully the most popular ones, would be part of the curriculum and promote more interaction and learning in a classroom. Surely this is the goal of education, and therefore it should be encouraged.

On the other hand, there are those who think that only the teachers should be in charge of the curriculum because students are not qualified to make those changes. It's true that students don't have the education, knowledge, and maturity to design lessons, but the argument doesn't say that the curriculum would be totally in the hands of the students, but only that student preferences should be considered. Those who argue that students aren't capable of designing the curriculum have misunderstood the statement. Everybody can benefit from suggestions, including educators, so there is nothing wrong with finding out what students want and trying to incorporate at least some of it into the curriculum. Any good

teacher does this already. For example, she tries to make her examples relevant to what the students are interested in, such as teaching math by using basketball or baseball examples. So the argument is already partially in force, and those who misread it by thinking that the entire curriculum would be made up by students are misinterpreting the argument and coming to a wrong conclusion.

Finally, some argue that allowing student surveys could make lessons more interesting and also be a way of evaluating a teacher's effectiveness. I personally think that this would be a better way to evaluate teachers than using test scores, which don't always reflect real learning. But surveys are completely subjective, and it would be very difficult to tell which responses really reflect student satisfaction and which are just written because the student needs to write something. So this option is better than cold test scores, but I also see problems in it and so can't support it fully.

If a school administration makes it really clear that, just because students are being asked to make lesson plan suggestions doesn't mean that all suggestions will be used and that students are not in charge of making the curriculum, then the first perspective—allowing students to give their opinion about what they would like to study—is a good one. This one will make at least some lesson plans more interesting and relevant, and that will lead to better learning.

You can evaluate your essay and the model essay based on the following criteria:

- Is the author’s own perspective clearly stated?
- Does the body of the essay assess and analyze each perspective?
- Is the relevance of each paragraph clear?
- Does the author start a new paragraph for each new idea?
- Is each sentence in a paragraph relevant to the point made in that paragraph?
- Are transitions clear?
- Is the essay easy to read? Is it engaging?
- Are sentences varied?
- Is vocabulary used effectively?
- Is college-level vocabulary used?