

# **FULL-LENGTH PRACTICE TESTS 19**

# 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 often 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

### My Cousin Nicola

My father and his two younger brothers emigrated from Italy to New York in the early 1970s. Only their older sister Lucia, which<sup>1</sup> was already married, remained behind in their small home town, this village<sup>2</sup> lies in the shadow of Mount Vesuvius. Growing up in America, my cousins and I were as close as brothers and sisters, but we hardly known<sup>3</sup> our family across the Atlantic. When I was a young child, my parents and I went to Italy to visit Aunt Lucia and her family for a week. I first met my cousin Nicola however,<sup>4</sup> I remember that we were not only about the same age, and<sup>5</sup> we also got along well. But because I being<sup>6</sup> so young, I remember little else. I hadn't seen him again up until this last summer.

Nicola decided that he wanted to join the Italian Air Force after finishing high school. Before beginning his service, though, he wanted to travel for a bit.

He had never been to America, even though so many of his relatives live here,<sup>7</sup>  
but he had been to England already.

When the rest of the cousins heard the news, they were ecstatic.<sup>8</sup> Most of them

had never met Nicola or, like me, hadn't seen him, since we were kids; they were eager to get to know him.

Two weeks later, we picked Nicola up at JFK Airport. Right away, I was surprised by his height. I am the tallest of all the cousins in America, and Nicola was easily a couple of inches taller than me. In addition to our height, he and I had another similarity: we were both musicians. The moment I saw the acoustic guitar slung over his shoulder, I knew he and I would get along just fine. None of them plays an instrument, and I always thought that I was the only musician in the family (even though some relatives have lovely singing voices). I was happy to find out I was wrong.

Throughout that summer, Nicola and I shared the gift of music. We would sing and play our guitars long into the night, only stopping when my mother came downstairs and forced us to quit. We liked many of the same bands, and we taught each other to play our favorite songs.

Taught to him as a child before she passed away in Italy, I was taught by him the Italian folk songs of our grandmother more importantly.

It was through those songs that I truly connected to the beauty of our ancestry.

On the night before Nicola returned to Italy, my father would have thrown a  
13  
big party for all of the relatives.

Nicola and I played the folk songs of our grandmothers country for the  
14  
American side of our family. When we were done, my Uncle Vittorio had a  
tear in his eye. Since coming to America so long ago, he had never been able  
to return to Italy. In the music and our singing, Nicola and I brought the  
beautiful country back to Uncle Vittorio.

1. A. NO CHANGE  
B. whom  
C. who  
D. she who
  
2. F. NO CHANGE  
G. town, it can be seen where it  
H. town it  
J. town that
  
3. A. NO CHANGE  
B. knew  
C. had knew  
D. been known

4. F. NO CHANGE  
G. Nicola, so then  
H. Nicola because  
J. Nicola then.

5. A. NO CHANGE  
B. so  
C. but  
D. then

6. F. NO CHANGE  
G. I, who was  
H. I was  
J. I,

7. Assuming that each choice is true, which one provides the most relevant information about Nicola's travel plans?

- A. NO CHANGE  
B. He had never been to America, so he called my father and asked if he could come spend the summer with us in New York.  
C. He had never been to America, which is most easily reached from Italy by plane.  
D. Because it was expensive for his whole family to travel overseas, Nicola had never been to America before.

8. Three of these choices indicate that the cousins looked forward to meeting Nicola. Which choice does NOT do so?

- F. NO CHANGE
- G. excited
- H. apprehensive
- J. thrilled

9. A. NO CHANGE  
B. hadn't seen him since we were kids  
C. hadn't seen him since we were kids;  
D. hadn't seen, him since we were kids,

10. F. NO CHANGE  
G. us  
H. the Americans  
J. my American cousins

11. A. NO CHANGE  
B. in the family, which has at least 20 members that I know of.  
C. in the family.  
D. DELETE the underlined portion (ending the sentence with a period).

12. F. NO CHANGE

G. Teaching him as a child before she passed away, our grandmother in Italy more importantly taught to me many of the Italian folk songs.

H. Teaching him as a child, more importantly, by our grandmother in Italy, I was taught by him many Italian folk songs.

J. More importantly, however, he taught me many of the Italian folk songs our grandmother in Italy had taught him as a child before she passed away.

13. A. NO CHANGE

B. will have thrown

C. threw

D. throws

14. F. NO CHANGE

G. our grandmother's

H. our grandmothers'

J. are grandmother's

Question 15 asks about the preceding passage as a whole.

15. Suppose the writer's goal had been to write a personal narrative that emphasizes the value of family. Would this passage accomplish this purpose?

- A. Yes, because it shows how connecting with distant family can be meaningful.
- B. Yes, because it shows how much closer the narrator is to Nicola than to his American cousins.
- C. No, because the narrator and Nicola are not closely related.
- D. No, because the passage does not mention any family members besides Nicola.

## *Passage II*

### The Handsome Bean

On the ground floor of the apartment building where, I live, the Handsome  
16  
Bean coffee shop is almost always bustling with customers. During the warm months, the shop sets up outdoor tables on the sidewalk, and the chatter of conversation mixed with the aroma of coffee often floats in through my window to wake me in the mornings. Next to the Handsome Bean is a used bookstore, and the two shops share many of the same customers. People come to find a book and stay to enjoy a cup of coffee. Across the street from the building is the neighborhood Little League field. [17] The Handsome Bean often sponsors  
18  
a local team. During the games, the coffee shop offers a discount to parents whose children are competing across the street. [19] It is a pleasure to have as a neighbor a business that children. And adults enjoy so  
20  
much.

Over the past few years, I have become friends with Mary, the owner of the  
shop.

21

The store's main counter is a century-old antique that Mary bought and restored to its originally conditional, and the photos that adorn the back wall depicts our town during the 1920s and 1930s. My favorite detail of the shop, however, is the original tin ceiling. One afternoon, while staring at the intricate patterns etched into the tin tiles, I noticed a name camouflaged within the ornate design: Harvey. I pointed it out to Mary, and she said the original owner of the building was named Harvey Wallaby. Her guess was that he had probably written it there more than 70 years ago. [24] That night after the coffee shop had closed, Mary and I etched our names into the ceiling right next to Harvey's, hoping that our names would similarly be discovered in the far-off future.

On Friday nights, the Handsome Bean has live entertainment, usually in the form of, a band or a poetry reading. For a small-town coffee shop, the Handsome Bean attracts a good amount of talented musicians and poets. It being that I am amazed by the performances, they transpire within its cozy walls.

25

26

27

[1] The clientele of the coffee shop is as varied as the selection of flavored brews. [2] In the mornings, the Handsome Bean is abuzz with the 9-to-5 crowd stopping in for some java before heading off to work. [3] During the day, the tables are home to local artists lost in their thoughts and cappuccinos. [4] The evening finds the Handsome Bean filled with bleary-eyed college students loading up on caffeine so they can cram all night for their upcoming exams or finishing their research papers with looming due dates. [5] Then there's me, <sup>28</sup> sitting in the corner, maybe talking to Mary or reading the paper, smiling at the thought that the best cup of coffee in town is found right beneath my bedroom window. [6] In the afternoons, a group of high school students who <sup>29</sup> stops by to have an ice cream cone or an egg cream. 30

16. F. NO CHANGE

- G. building where I live,
- H. building, where I live
- J. building where I live

17. The purpose of including the location of the Little League field is to:

- A. introduce the kind of team the Handsome Bean sponsors.
- B. transition from a discussion of the Handsome Bean to a discussion of baseball.
- C. add a detail that helps the reader picture the scene.
- D. downplay the importance of the Handsome Bean.

18. F. NO CHANGE  
G. had sponsored  
H. was a sponsor of  
J. supported

19. At this point, the writer wants to add a sentence that provides additional detail about the customers who come to the Handsome Bean. Which of the following sentences would best achieve the writer's purpose?

- A. In addition to this discount, the shop offers all patrons a punch card to receive a tenth coffee for free.  
B. The shop also sells ice cream, so it often gets very crowded with children and parents after the Little League games are over.  
C. The Handsome Bean also provides uniforms for an elementary school soccer team.  
D. The Little League field doesn't have a concession stand, so the coffee shop doesn't have much competition for the parents' business.

20. F. NO CHANGE  
G. children and adults  
H. children and that adults  
J. children. Adults

21. Which choice most effectively leads the reader into the topic of this paragraph?
- A. NO CHANGE
  - B. Mary, the shop's owner, has a great appreciation for history.
  - C. The Handsome Bean has only been open for a couple of years, but the owner, Mary, has taken great care to make it look like it has been there for decades.
  - D. Before Mary, the shop's owner, opened the Handsome Bean, the space had been unoccupied for six months.

22. F. NO CHANGE
- G. original conditional
  - H. original condition
  - J. conditionally original

23. A. NO CHANGE
- B. depict
  - C. has depicted
  - D. shows

24. The writer is considering deleting the sentence below from the passage:

Her guess was that he had probably written it there more than 70 years ago.

If the writer were to delete this sentence, the essay would primarily lose:

- F. an additional detail about the building that houses the coffee shop.
  - G. a depiction of the action taken by Mary and the writer.
  - H. an emphasis on the original owner's influence.
  - J. a description of the shop's interior.
25. A. NO CHANGE
- B. form; of a
  - C. form, of a
  - D. form of a
26. F. NO CHANGE
- G. better amount
  - H. better number
  - J. good number
27. A. NO CHANGE
- B. Amazing the performances, it is that I know they
  - C. I am amazed by the performances that
  - D. Amazing the performances, they

28. F. NO CHANGE

G. finish

H. finishes

J. finalizing

29. A. NO CHANGE

B. students that

C. students, and they

D. students

30. For the sake of logic and coherence, Sentence 6 should be placed:

F. where it is now.

G. before Sentence 2.

H. before Sentence 4.

J. before Sentence 5.

### *Passage III*

#### Mr. Midshipman Marryat

The paragraphs below may or may not be in the most logical order. A number in brackets appears above each paragraph. At the end of the passage, Question 45 will ask you to determine the most logical place for Paragraph 1.

[1]

Born to an upper-class English family in 1792, Marryat had a thirst for naval adventure and exploration very early in his childhood. As a young boy at private school, he tried to run away to sea a number of times.

Finally, his exasperated parents at last granted him his wish in 1806; they were enlisted in the British Royal Navy as a midshipman. Marryat had the luck to be assigned to sail upon the frigate *HMS Imperieuse* under the command of Lord Cochrane. Cochrane, that's naval exploits are legendary, would later serve as the inspiration for a number of Marryat's fictional characters. [36]

[2]

Unlike most of the other famous authors who have spun tales of brave British naval officers fighting for king and country on the high seas, Frederick Marryat actually served as a captain in the British navy. While others could only use their imagination and accounts to describe what life must have been like for a young man rising through the ranks from lowly midshipman to all-powerful captain from historical records, Marryat needed only to dip into the vast library of adventure stored in his memory.

[3]

Marryat's three years aboard the *Imperieuse* were filled with experiences that would later serve him well in his writing career. The *Imperieuse* saw much

action off the coast of Spain, where Marryat took part in capturing a Spanish castle and numerous vessels in the Mediterranean. Marryat willingly accepted any chance to distinguish himself in the eyes of his revered captain and literary inspiration, Cochrane.<sup>39</sup> In fact, Marryat once jumped into the turbulent sea to save the life of another midshipman who had fallen<sup>40</sup> overboard. Not only did Marryat have the privilege of knowing first-hand a character as illustrious as Cochrane, but his own bold experiences as a midshipman would also be the basis for his most famous novel, *Mr. Midshipman Easy*.

[4]

As Marryat quickly climbed through the ranks of the British navy, many feats were accomplished by him.<sup>41</sup> These included single-handedly saving his ship during a horrific storm and fighting in a number of sea battles against the United States Navy during the War of 1812. He therefore earned a medal<sup>42</sup> from the Royal Humane Society for inventing a special lifeboat.

[5]

Marryat earned his greatest acclaim for his novels and short stories during th<sup>43</sup>  
time,

which were published in England while he was at sea. He retired from the

navy shortly after being awarded the rank of post captain in 1825 to concentrate for writing full-time. Marryat's thrilling stories of sea adventure still live today because, as the old cliché goes, the best stories are the ones that are true.

44

31. A. NO CHANGE  
B. naval, adventure,  
C. naval, adventure  
D. naval adventure;
32. F. NO CHANGE  
G. His exasperated parents  
H. In the end, his exasperated parents  
J. Ultimately, the result was that his exasperated parents
33. A. NO CHANGE  
B. they  
C. he  
D. and he
34. F. NO CHANGE  
G. who's  
H. whose  
J. who the

35. The writer is considering deleting the phrase “a number of.” If the writer decided to delete the phrase, would the meaning of the sentence change?

- A. Yes, because without this phrase, the reader would think that all of Marryat’s fictional characters were based on Cochrane.
- B. Yes, because without this phrase, the reader would not understand that Marryat used Cochrane as a model for more than one fictional character.
- C. No, because this phrase is an example of wordiness that should be eliminated from the sentence.
- D. No; although the phrase adds a detail about Marryat’s character, this detail is not essential to the meaning of the sentence.

36. At this point, the writer is considering adding the sentence below:

The well-known writer Patrick O’Brian also modeled his Captain Jack Aubrey after Cochrane.

Should the writer make this addition?

- F. Yes, because if readers know that other writers were inspired by Cochrane, they will better understand that Cochrane was an impressive person.
- G. Yes, because the added detail provides information about a writer who used a style similar to Marryat's.
- H. No, because the essay doesn't reveal the relationship between O'Brian and Marryat.
- J. No, because the detail distracts from the main focus of the essay.

37. Which of the following would NOT be an equivalent replacement for the underlined portion?

- A. prominent
- B. beloved
- C. well-known
- D. noteworthy

38. The best placement for the underlined portion is:

- F. where it is now.
- G. after the word "accounts."
- H. after the word "others."
- J. after the word "adventure."

39. A. NO CHANGE  
B. captain, and literary inspiration Cochrane.  
C. captain and literary inspiration Cochrane.  
D. captain and, literary inspiration,  
Cochrane.
40. F. NO CHANGE  
G. would have fallen  
H. had been falling  
J. falls
41. A. NO CHANGE  
B. his accomplishment of many feats occurred.  
C. his many feats were accomplished.  
D. he accomplished many feats.
42. F. NO CHANGE  
G. also  
H. again  
J. thirdly

43. A. NO CHANGE  
B. During this time, Marryat earned his greatest acclaim for his novels and short stories,  
C. His greatest acclaim was earned by him, for his novels and short stories during this time,  
D. During this time for his novels and short stories, earned him his greatest acclaim,
44. F. NO CHANGE  
G. at writing  
H. on writing  
J. with writing of

Question 45 asks about the preceding passage as a whole.

45. The most logical placement of Paragraph 1 is:
- A. where it is now.  
B. after Paragraph 2.  
C. after Paragraph 3.  
D. after Paragraph 4.

## *Passage IV*

### The Toughest Task in Sports

[1]

I've often heard others make the comment that the hardest single act in all of sports is to hit a major league fastball. I'm not going to deny that hitting a ball traveling at upwards of 95 miles per hour is a daunting task, but I can think of something even tougher than taking a major league at-bat: stopping a crank shot in lacrosse.

Football quarterbacks facing oncoming defensive linemen are also in a difficult position.

46

[2]

Lacrosse that is often referred to as “the fastest sport on two feet,” and with good reason. The game is often brutally, and the best players normally possess a bit of toughness and a bit of finesse. Using sticks known as “crosses” to pass a hard rubber ball back and forth through the air, players on two teams sprint around a field; they then attempted to set up a shot on the opposing team's goal. As in hockey or soccer, the only thing that stands between the ball and the goal is the goalkeeper. Using just his body and his crosse, the goalie must protect the six-foot by six-foot goal from being penetrated by a ball that is less than eight inches in circumference.

47

48

49

50

[3]

This brings me to the heart of my argument. A regulation lacrosse ball is almost an inch narrower than a regulation baseball, with an unstitched, smooth rubber surface. The fastest baseball pitch on record was clocked at 105.1 mph, because<sup>51</sup> the average pitching speed is in the low nineties. In men's lacrosse, because the crosse acts as a lever, the fastest crank shots on goal, can<sup>52</sup> reach more than 110 mph. Even at the high school level, crank shots of more than 90 mph made by high school players<sup>53</sup> are not uncommon. Unlike a baseball pitcher throwing his fastball from a fixed position on the mound, a lacrosse player may shoot from anywhere on the field. [54] This means that a lacrosse goalie may be asked to stop a crank shot from only six feet away! To make the goalie's job even more absurd,<sup>55</sup> a lacrosse player may shoot from over his shoulder, from his side, or drop his stick down and wind up from the ground. On top of that,<sup>56</sup> the best players often employ a variety of fakes, and most have the ability to shoot left-handed or right-handed, depending upon their angle to the goal.

[4]

Like hitting a major league fastball, stopping a crank shot in lacrosse is tough<sup>57</sup>  
Both of these endeavors, however, require<sup>58</sup> the same set of skills. One must possess superlative athleticism, great hand-eye coordination, and catlike quickness. Above all, you must be fearless.<sup>59</sup>

46. F. NO CHANGE  
G. Also in a challenging position are football quarterbacks facing oncoming defensive linemen.  
H. (Football quarterbacks also face a daunting task when they are rushed by defensive linemen.)  
J. DELETE the underlined portion.
47. A. NO CHANGE  
B. which has been  
C. is  
D. DELETE the underlined portion.
48. F. NO CHANGE  
G. brutal  
H. brute  
J. brutality
49. A. NO CHANGE  
B. toughness; and  
C. toughness  
D. toughness, and,

50. F. NO CHANGE  
G. they must attempt  
H. one then attempts  
J. one must attempt

# 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. A bakery sells cupcakes for \$3.50 each. If Sarah buys 8 cupcakes and pays with a \$50 bill, how much change does she receive?

- A. \$18.00
- B. \$22.00
- C. \$28.00
- D. \$32.00

2. Simplify:  $3x^2 \cdot 4x^3 \cdot 2x$

- A.  $9x^6$
- B.  $24x^6$
- C.  $24x^5$
- D.  $9x^5$

3. If  $5x - 7 = 3x + 11$ , what is the value of  $x$ ?

- A. 4
- B. 6
- C. 9
- D. 12

4. A store marks up its products by 40% above cost. If a jacket costs the store \$75, what is the selling price?

- A. \$95
- B. \$105
- C. \$115
- D. \$125

5. What is  $\frac{3}{5} + \frac{2}{3}$ ?

- A.  $\frac{5}{8}$
- B.  $\frac{5}{15}$
- C.  $\frac{19}{15}$
- D.  $\frac{6}{8}$

6. The mean of 5 test scores is 82. If four of the scores are 78, 85, 90, and 75, what is the fifth score?

- A. 80
- B. 82
- C. 88
- D. 92

7. If  $\log_5(x) = 3$ , what is  $x$ ?

- A. 15
- B. 25
- C. 75
- D. 125

8. A car travels 240 miles using 8 gallons of gas. At this rate, how many gallons are needed to travel 360 miles?

- A. 10
- B. 12
- C. 14
- D. 16

9. Factor:  $x^2 - 13x + 42$

- A.  $(x - 6)(x - 7)$
- B.  $(x - 3)(x - 14)$
- C.  $(x - 2)(x - 21)$
- D.  $(x - 1)(x - 42)$

10. What is 15% of 480?

- A. 48
- B. 60
- C. 72
- D. 84

11. If  $2^{x+1} = 32$ , what is  $x$ ?

- A. 3
- B. 4
- C. 5
- D. 6

12. The ratio of boys to girls in a class is 3:5. If there are 15 girls, how many boys are there?

- A. 9
- B. 12
- C. 18
- D. 25

13. Simplify:  $(2a - 3b) - 2(a - 4b)$

- A.  $-5b$
- B.  $5b$
- C.  $11b$
- D.  $-11b$

14. A triangle has a base of 12 inches and a height of 8 inches. What is its area in square inches?

- A. 20
- B. 48
- C. 60
- D. 96

15. If  $f(x) = 3x^2 - 2x + 5$ , what is  $f(2)$ ?

- A. 13
- B. 15
- C. 17
- D. 19

16. Three consecutive odd integers have a sum of 87. What is the largest of these integers?

- A. 27
- B. 29
- C. 31
- D. 33

17. What is  $|-8| + |-12|$ ?

- A.  $-20$
- B.  $-4$
- C. 4
- D. 20

18. A laptop is on sale for 25% off its original price of \$800. What is the sale price?

- A. \$200
- B. \$400
- C. \$600
- D. \$750

19. If  $\sin \theta = 3/5$ , and  $\theta$  is in the first quadrant, what is  $\cos \theta$ ?

- A.  $4/5$
- B.  $5/3$
- C.  $3/4$
- D.  $5/4$

20. The sum of two numbers is 45 and their difference is 13. What is the larger number?

- A. 16
- B. 23
- C. 29
- D. 32

21. Express 0.000045 in scientific notation:

- A.  $4.5 \times 10^{-5}$
- B.  $4.5 \times 10^{-4}$
- C.  $45 \times 10^{-6}$
- D.  $0.45 \times 10^{-4}$

22. A rectangle has length  $3x + 2$  and width  $x - 1$ . What is its perimeter?

- A.  $4x + 1$
- B.  $8x + 2$
- C.  $6x + 2$
- D.  $8x + 4$

23. If  $3/x = 7/21$ , what is  $x$ ?

- A. 7
- B. 9
- C. 12
- D. 15

24. A bag contains 4 red, 6 blue, and 5 green marbles. What is the probability of drawing a blue marble?

- A.  $2/5$
- B.  $1/3$
- C.  $6/15$
- D.  $4/15$

25. Solve for  $x$ :  $2(x - 3) = 3(x - 2)$

- A. 0
- B. -1
- C. 1
- D. 2

26. If  $i = \sqrt{-1}$ , what is  $i^4$ ?

- A.  $i$
- B.  $-i$
- C. 1
- D. -1

27. A circle has a radius of 7 units. What is its circumference?

- A.  $7\pi$
- B.  $14\pi$
- C.  $21\pi$
- D.  $49\pi$

28. The median of  $\{3, 5, 7, 9, 11, 13, 15\}$  is:

- A. 7
- B. 8
- C. 9
- D. 11

29. If  $2x + 3y = 18$  and  $x = 3$ , what is  $y$ ?

- A. 3
- B. 4
- C. 5
- D. 6

30. What is  $\sqrt{144} + \sqrt{64}$ ?

- A. 16
- B. 18
- C. 20
- D. 24

31. A company's profit increased from \$45,000 to \$54,000. What is the percent increase?
- A. 9%
  - B. 15%
  - C. 20%
  - D. 25%
32. If  $x^2 - 5x + 6 = 0$ , what are the values of  $x$ ?
- A. 1 and 6
  - B. 2 and 3
  - C. -2 and -3
  - D. -1 and -6
33. The slope of a line passing through (2, 5) and (6, 13) is:
- A. 1
  - B. 2
  - C. 3
  - D. 4
34. What is  $5!$  (5 factorial)?
- A. 25
  - B. 60
  - C. 120
  - D. 150
35. If  $\tan \theta = 4/3$ , what is  $\sin \theta / \cos \theta$ ?
- A.  $3/4$
  - B.  $4/3$
  - C.  $5/3$
  - D.  $3/5$
36. A cube has a volume of 216 cubic inches. What is the length of one edge?
- A. 6 inches
  - B. 8 inches
  - C. 12 inches
  - D. 36 inches

37. Simplify:  $(x^3)^4$

- A.  $x^7$
- B.  $x^{12}$
- C.  $x^{81}$
- D.  $4x^3$

38. If the average of  $x$  and  $y$  is 20, and the average of  $x$ ,  $y$ , and  $z$  is 25, what is  $z$ ?

- A. 30
- B. 35
- C. 40
- D. 45

39. What is the least common multiple of 12 and 18?

- A. 24
- B. 36
- C. 48
- D. 72

40. If 30% of a number is 45, what is the number?

- A. 100
- B. 120
- C. 135
- D. 150

41. The equation of a line is  $y = 2x + 5$ . What is the  $y$ -intercept?

- A. 2
- B. 5
- C. -2
- D. -5

42. How many different 3-digit numbers can be formed using the digits 1, 2, 3, 4, 5 without repetition?

- A. 20
- B. 30
- C. 60
- D. 125

43. If  $\cos 60^\circ = 1/2$ , what is  $\sin 30^\circ$ ?

- A.  $1/2$
- B.  $\sqrt{2}/2$
- C.  $\sqrt{3}/2$
- D. 1

44. A worker earns \$18 per hour for regular time and \$27 per hour for overtime. If she works 40 regular hours and 5 overtime hours, what is her total pay?

- A. \$810
- B. \$855
- C. \$900
- D. \$945

45. The distance between points (3, 4) and (7, 7) is:

- A. 4
- B. 5
- C. 6
- D. 7

# Reading Test

40 Minutes — 36 Questions

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

## *Passage I*

### Literary Narrative

*This passage is adapted from the novel *My Doggie and I* by R.M. Ballantyne.*

I possess a doggie—not a dog, observe, but a doggie. If he had been a dog I would not have presumed to intrude him on your notice. A dog is all very well in his way—one of the noblest of (5) animals, I admit, and preeminently fitted to be the companion of man, for he has an affectionate nature, which man demands, and a forgiving disposition, which man needs—but a dog, with

all his noble qualities, is not to be compared to a  
(10) doggie.

Freely admit that you don't at once perceive  
the finer qualities, either mental or physical, of  
my doggie, partly owing to the circumstance that  
he is shapeless and hairy. The former quality is  
(15) not attractive, while the latter tends to veil the  
amiable expression of his countenance and the  
luster of his speaking eyes. But as you come to  
know him he grows upon you; your feelings are  
touched, your affections stirred, and your love  
(20) is finally evoked. As he resembles a doormat, or  
rather a scrap of a very ragged doormat, and has  
an amiable spirit, I have called him "Dumps." I  
should not be surprised if you did not perceive  
any connection here. You are not the first who  
(25) has failed to see it; I never saw it myself.

When I first met Dumps, he was scurrying  
towards me along a sequestered country lane. It  
was in the Dog Days. Dust lay thick on the road;  
the creature's legs were remarkably short though  
(30) active, and his hair being long he swept up the  
dust in clouds as he ran. He was yelping, and I  
observed that one or two stones appeared to be  
racing with, or after, him. The voice of an angry  
man also seemed to chase him, but the owner of  
(35) the voice was at the moment concealed by a turn  
in the lane, which was bordered by high stone  
walls.

Rabies, of course, flashed into my mind. I

grasped my stick and drew close to the wall. The  
(40) hairy whirlwind, if I may so call it, came wildly  
on, but instead of passing me, or snapping at my  
legs as I had expected, it stopped and crawled  
towards me in a piteous, supplicating manner  
that at once disarmed me. If the creature had lain  
(45) still, I should have been unable to distinguish its  
head from its tail; but as one end of him whined,  
and the other wagged, I had no difficulty.

Stooping down with caution, I patted the end  
that whined, whereupon the end that wagged  
(50) became violently demonstrative. Just then the  
owner of the voice came round the corner. He  
was a big, rough fellow, in ragged garments, and  
armed with a thick stick, which he seemed about  
to fling at the little dog, when I checked him with  
(55) a shout—

“You’d better not, my man, unless you want  
your own head broken!”

You see, I am a pretty well-sized man myself,  
and, as I felt confidence in my strength, my stick,  
(60) and the goodness of my cause, I was bold.

“What d’you mean by ill-treating the little  
dog?” I demanded sternly, as I stepped up to the  
man.

“A man may do as he likes with his own,  
(65) mayn’t he?” answered the man, with a sulky  
scowl.

“A ‘man’ may do nothing of the sort,” said I  
indignantly, for cruelty to dumb animals always

has the effect of inclining me to fight, though I  
(70) am naturally of a peaceable disposition. “There  
is an Act of Parliament,” I continued, “which  
goes by the honored name of Martin, and if you  
venture to infringe that Act I’ll have you taken up  
and prosecuted.”

(75) While I was speaking I observed a peculiar  
leer on the man’s face, which I could not account  
for. He appeared, however, to have been affected  
by my threats, for he ceased to scowl, and assumed  
a deferential air as he replied, “Well, sir, it  
(80) do seem rather hard that a man’s head should be  
broken for kindness.”

“Kindness!” I exclaimed, in surprise.

“Ay, kindness, sir. That there animal loves me,  
it do, like a brother, and the love is mutual. We’ve  
(85) lived together now—off an’ on—for the matter of  
six months. Well, I get employment in a factory  
about fifteen miles from here, in which no dogs  
is allowed. Of course, I can’t give up that employment,  
sir, can I? Neither can my doggie give up  
(90) his master that he’s so fond of, so I’m obliged to  
leave him in the charge of a friend, with strict  
orders to keep him locked up till I’m fairly gone.  
Well, off I goes, but he manages to escape and  
runs after me. Now, what can a feller do but drive  
(95) him home with sticks an’ stones, though it do get  
to my heart to do it? But if he goes to the factory,  
he’s sure to be shot, or dragged, or drowned, or  
something; so you see, sir, it’s out of pure kindness

I'm chasing him.”

(100) I confess that I felt somewhat doubtful of the truth of this story; but, in order to prevent any expression of my face betraying me, I stooped and patted the dog while the man spoke. It received my attentions with evident delight. A

(105) thought suddenly flashed on me:

“Will you sell your little dog?” I asked.

1. The narrator implies that his “doggie” differs from a “dog” in that his “doggie”:

- A. may be less impressive at first sight.
- B. is older than a puppy but not a dog.
- C. is forgiving of humans, no matter what.
- D. is a majestic creature, both handsome and good-natured.

2. According to paragraph 2, which of the following accurately describes Dumps?

- F. His eyes are dull, and his body is shapeless.
- G. Observers are quickly struck by his wise demeanor.
- H. He has kind-looking eyes that are often hidden behind his hair.
- J. His abundant hair gives him the appearance of a well-groomed carpet.

3. The description in paragraphs 3–4 suggests that Dumps was running:

- A. at a leisurely pace, stopping to sniff the grass.
- B. in a desperate manner, looking for help.
- C. as though compelled by immobilizing terror.
- D. to fetch a stick as part of his favorite game.

4. As it is used in line 53, *checked* most nearly means:

- F. prevented.
- G. square patterned.
- H. verified.
- J. assaulted.

5. The author places the word *man* in quotes (line 63) in order to:

- A. compare the narrator's recognition of the dog owner's large size to his own stature.
- B. indicate that the narrator is ironically agreeing with the dog owner's assertion.
- C. signal that the narrator is attempting to start a violent fight with the dog owner despite his typical peaceful nature.
- D. imply that the narrator considers the dog owner inhumane regarding his treatment of animals.

6. According to lines 66–70, the dog's owner stops scowling at the narrator because:

- F. after listening to the narrator, he decides that the dog is unlikely to bite the narrator.
  - G. he shifts his concern away from his dog's behavior to anxiety about being late for his job at the factory.
  - H. he is concerned about the narrator's mention of breaking the law and wants to make a better impression.
  - J. the narrator has stopped threatening to hit the dog with a stick and is offering to help.
7. Throughout the passage, the narrator's attitude toward the reader is best described as:
- A. considerate and wanting the reader to think well of him.
  - B. argumentative about how pets are commonly perceived.
  - C. fearful that the reader will disagree with his unorthodox views.
  - D. deceptive in order to gain a favorable opinion from the reader.
8. Which choice best reflects the dog owner's explanation as to why chasing the dog with a stick is actually a demonstration of kindness?

- F. The dog belongs to the owner, so the owner is entitled to treat the dog as he chooses.
- G. The owner cannot take the dog to his factory job, but the dog escapes and runs after him so he must drive the dog back.
- H. Dogs love running after thrown sticks, and this activity will provide the dog with exercise before the owner goes to work at the factory.
- J. The men who work at the factory have a record of mistreating animals, especially dogs.

9. The narrator most likely doubts the dog owner's story (lines 88–94) because:

- A. the owner is so eager to sell the dog that the narrator doubts he really cares for it.
- B. the narrator cannot believe that a man with his temperament could hold down a job.
- C. it seems unlikely that the dog would actually be harmed as the owner claims.
- D. the owner seems to claim he loves the dog only after being threatened with legal prosecution.

10. The passage implies that the narrator wants to buy the dog primarily because:

- F. he believes the dog will make the great companion he's been looking for.
- G. he cares for animals and suspects that the dog's owner is treating it badly.
- H. he fears the dog's owner and hopes to appease him by offering him money.
- J. the dog's owner wishes that the dog didn't have to be alone while he's at work.

## *Passage II*

### Social Studies

*The following two passages were written in the early 1990s and present two viewpoints about the ways that the public responds to the results of scientific research.*

#### *Passage A*

The way that people in present-day industrial societies think about science in the modern world actually tends to cultivate the very unscientific perception that science supplies us with unques-

(5) tionable facts. If there is one unquestionable fact about science, it is that science is inherently uncertain. Research consists not so much of a search for truth as a search for some degree of certainty in an uncertain world. Every research study,

(10) every experiment, and every survey incorporates an extensive statistical analysis that is meant to be

taken as qualifying the probability that the results are consistent and reproducible. Yet policy makers, public relations interests, and so-called experts in  
(15) the popular media continue to treat the results of every latest study as if they were surefire truths.

History is filled with examples of the fallibility of scientific certainties. From the medieval monks who believed the sun orbited around Earth and the  
(20) world was only 4,000 years old, to the early twentieth-century scientists who thought that X-rays were a hoax and that exploding a nuclear bomb would set off a chain reaction that would destroy all matter in the universe, it has been demonstrated repeatedly  
(25) that science deals primarily with possibilities and is subject to the same prejudices as other kinds of opinions and beliefs. Yet statistics are complicated, and in our need to feel that we live in a universe of predictable certainties, it is tempting to place our  
(30) faith in the oversimplified generalities of headlines and sound bites rather than the rigorous application of probabilities. Ironically, even though the intent of science is to expand the realm of human knowledge, an unfounded prejudice stemming from a  
(35) desire for scientific constancy can actually discourage inquiry.

Science serves an important practical function; predictability and reproducibility are vital to making sure that our bridges remain standing, our  
(40) nuclear power plants run smoothly, and our cars start in the morning so we can drive to work. When

these practicalities become everyday occurrences, they tend to encourage a complacent faith in the reliability and consistency of science. Yet faced  
(45) with so many simple conveniences, it is important to remember that we depend on the advance of science for our very survival. With progress expanding into those gray areas at the boundaries of scientific exploration, caution and prudence are  
(50) just as important as open-mindedness and imagination. As technological advances engage increasingly complex moral questions within fields such as pharmaceutical developments, indefinite extension of life, and the potential for inconceivably potent  
(55) weapons, an understanding of the limitations of science becomes just as important as an understanding of its strengths.

### *Passage B*

While it is important that scientific knowledge be taken into consideration in significant matters  
(60) of public interest, such consideration must be tempered with critical rigor. In the early days during the ascendance of science as a practical discipline, the public was inclined to view every new advance and discovery with a healthy skepticism. In the late  
(65) 19th century, when Italian astronomer Giovanni Schiaparelli first detected seas and continents on the planet Mars, many people balked at the idea of Earth-like topography on the Red Planet. Just a few decades later, when fellow Italian astronomer

(70) Vincenzo Cerulli provided evidence that the seas and continents Schiaparelli observed were merely optical illusions, public disbelief proved to be entirely appropriate.

Since then, the historic tendency of the public  
(75) to question scientific findings has unfortunately been lost. Yet in present-day industrial societies, and especially where public policy is at issue, response to scientific research needs more than ever to pursue an informed, critical viewpoint. Who  
(80) performs a research study, what kind of study it is, what kinds of review and scrutiny it comes under, and what interests support it are every bit as important as a study's conclusions.

Studies of mass media and public policy reveal  
(85) that, all too often, scientific findings presented to the public as objective and conclusive are actually funded at two or three degrees of removal by corporate or political interests with a specific agenda related to the outcome of those findings. For  
(90) example, some critics question the issue of whether a study of the effectiveness of a new drug is more likely to produce favorable results when the study is funded by the pharmaceutical company that owns the drug patent. In cases where such findings  
(95) conflict with the interests of the funding parties, analysts sometimes wonder if information was repressed, altered, or given a favorable public relations slant in order to de-emphasize dangerous side effects. Some critics of company-funded studies

(100) argue that the level of misrepresentation included in such studies borders on immoral.

Part of the problem grows from the public's willingness to place blind faith in the authority of science without an awareness of the interests that (105) lie behind the research. Public officials then, in turn, may sometimes be too willing to bend in the face of public or private political pressure rather than pursuing the best interests of the constituency. Issues such as genetics, reproductive health, (110) and preventative care are particularly fraught with political angst. Where the safety of individuals is at stake, a precautionary principle of allowing for unpredictable, unforeseen negative effects of technological advances should be pursued. It is the (115) duty of active citizens in a free society to educate themselves about the real-world application of risk-assessment and statistical analysis, and to resist passive acceptance of the reassurances of self-styled scientific authorities. The most favorable approach (120) to policy decisions based on realistic assessments finds a middle ground between the alarmism of political "Chicken Littles" and the recklessness of profit-seeking risk takers.

Questions 11–13 ask about Passage A.

11. According to the passage, policy makers consider the results of studies:

- A. with concern.
- B. as unquestioned truth.
- C. as debatable.
- D. as false.

12. The word “probabilities” in line 33 is used to express the author’s belief that:

- F. scientific theories will eventually be proven true.
- G. current scientific findings will be regarded as outdated by future scientists.
- H. viewing scientific results as possibly wrong is a wise approach.
- J. refusing to question science is unavoidable because people prefer certainty.

13. As it is used in line 44, the word *complacent* most nearly means:

- A. conceited.
- B. dangerous.
- C. unquestioned.
- D. dissatisfied.

Questions 14–16 ask about Passage B.

14. Which of the following is an example of a scientific discovery greeted with skepticism by the public?
- F. A pharmaceutical study funded by drug patent holder
  - G. Schiaparelli's detection of continents on Mars
  - H. The statement that x-rays are a hoax
  - J. Darwin's theory of evolution
15. The author of Passage B uses the first paragraph to explain:
- A. a new scientific hypothesis.
  - B. a historical contrast.
  - C. a public policy generality.
  - D. the underlying cause of an issue.
16. With which of the following statements would the author of Passage B most likely agree?
- F. People should not unquestioningly accept the results of scientific studies.
  - G. More government control and regulation are needed to ensure that science serves the best interests of the public.
  - H. Society should place less emphasis on modern conveniences and more on understanding the limitations of science.
  - J. The results that scientists derive from research are less reliable now than they were in former times.

Questions 17–20 ask about both passages.

17. What does the author of Passage A believe is the biggest obstacle to reaching the solution described by the author of Passage B in lines 115–120 (“It is the duty...authorities”)?
- A. Policy makers are too willing to bend to public pressure when it comes to regulating scientific research.
  - B. The interests that fund research are the same interests that stand to profit by favorable results, making impartiality impossible.
  - C. Statistics are too abstract when compared with the concrete evidence of technological conveniences.
  - D. Unanswered ethical questions are increasingly coming under scrutiny at the forefront of our most advanced scientific research.
18. Both passages refer to which of the following?
- F. Present-day industrial societies
  - G. Early twentieth-century scientists
  - H. Critics of company-funded studies
  - J. Significant matters of public interest
19. According to Passage B, which of the following is an example of the “fallibility of scientific certainties” (lines 18–19) mentioned in Passage A?

- A. Medieval monks who believed the sun orbited around Earth
  - B. People who balked at the idea of Earth-like topography on Mars
  - C. Issues such as genetics, reproductive health, and preventative care
  - D. Early twentieth-century scientists who thought that x-rays were a hoax
20. The authors of both passages mention the term “pharmaceutical” in order to:
- F. highlight a particular scientific field in which moral questions may arise.
  - G. point out an example of the recklessness of profit-seeking risk takers.
  - H. identify unfounded prejudice stemming from a desire for scientific constancy.
  - J. cite the usefulness of the current approach regarding drug testing and analysis.

## *Passage III*

### Humanities

*This passage is adapted from a Wikipedia article titled “Walter Scott.”*

Born in Edinburgh in 1771, the young Walter Scott survived a childhood bout of polio that would leave him lame in his right leg for the rest of his

life. After studying law at Edinburgh University,  
(5) he followed in his father's footsteps and became  
a lawyer in his native Scotland. Beginning at age  
25, he started dabbling in writing, first translating  
works from German, then moving on to poetry. In  
between these two phases of his literary career, he  
(10) published a three-volume set of collected Scottish  
ballads, *The Minstrelsy of the Scottish Border*. This  
was the first sign of his interest in Scotland and his-  
tory in his writings.

After Scott had founded a printing press, his  
(15) poetry, beginning with *The Lay of the Last Minstrel*  
in 1805, brought him great fame. He published a  
number of other poems over the next ten years,  
including in 1810 the popular *Lady of the Lake*,  
portions of which (translated into German) were  
(20) set to music by Franz Schubert. Another work from  
this time period, *Marmion*, produced some of his  
most quoted (and most often misattributed) lines,  
such as

*Oh! what a tangled web we weave*

(25) *When first we practise to deceive!*

When Scott's press became embroiled in  
financial difficulties, Scott set out, in 1814, to write  
a successful (and profitable) work. The result was  
*Waverley*, a novel that did not name its author. It  
(30) was a tale of the last Jacobite rebellion in the United  
Kingdom, the "Forty-Five," and the novel met with  
considerable success. There followed a large num-  
ber of novels in the next five years, each in the same

general vein. Mindful of his reputation as a poet,  
(35) he maintained the anonymity he had begun with  
*Waverley*, always publishing the novels under a  
name such as “Author of *Waverley*” or attributed as  
“Tales of...” with no author. Even when it was clear  
that there would be no harm in coming out into  
(40) the open, he maintained the façade, apparently out  
of a sense of fun. During this time, the nickname  
“The Wizard of the North” was popularly applied  
to the mysterious best-selling writer. His identity as  
the author of the novels was widely rumored, and  
(45) in 1815, Scott was given the honour of dining with  
George, Prince Regent, who wanted to meet “the  
author of *Waverley*.”

In 1820, Scott broke away from writing about  
Scotland with *Ivanhoe*, a historical romance set in  
(50) twelfth-century England. It, too, was a runaway suc-  
cess and, as he did with his first novel, he unleashed  
a slew of books along the same lines. As his fame  
grew during this phase of his career, he was granted  
the title of Baronet, becoming Sir Walter Scott. At  
(55) this time, he organized the visit of King George IV  
to Scotland, and when the King visited Edinburgh  
in 1822, the spectacular pageantry Scott had  
concocted to portray the King as a rather tubby  
reincarnation of Bonnie Prince Charlie made  
(60) tartans and kilts fashionable and turned them into  
symbols of national identity.

Beginning in 1825, Scott fell into dire financial  
straits again, and his company nearly collapsed.

That he was the author of his novels became general knowledge at this time as well. Rather than  
(65) declare bankruptcy he placed his home, Abbotsford House, and income into a trust belonging to his creditors, and proceeded to write his way out of debt. He kept up his prodigious output of fiction  
(70) (as well as producing a biography of Napoleon Bonaparte) through 1831. By then his health was failing, and he died at Abbotsford in 1832. Though not in the clear by then, his novels continued to sell, and he made good on his debts from beyond the  
(75) grave. He was buried in Dryburgh Abbey; nearby, fittingly, a large statue can be found of William Wallace—one of Scotland's great historical figures.

Scott was responsible for two major trends that carry on to this day. First, he popularized the  
(80) historical novel; an enormous number of imitators (and imitators of imitators) would appear in the nineteenth century. It is a measure of Scott's influence that Edinburgh's central railway station, opened in 1854, is called Waverley Station. Second,  
(85) his Scottish novels rehabilitated Highland culture after years in the shadows following the Jacobite rebellions.

Scott was also responsible, through a series of pseudonymous letters published in the *Edinburgh*  
(90) *Weekly News* in 1826, for retaining the right of Scottish banks to issue their own banknotes, which is reflected to this day by his continued appearance on the front of all notes issued by the Bank of

Scotland.

21. The main idea of the passage is that:

- A. historical novels can be very successful in rehabilitating a country's culture.
- B. Sir Walter Scott's writings achieved both financial success and cultural impact.
- C. Scott became known more for his financial failures than for his literary talents.
- D. the success of Scott's novels was largely due to the anonymity of the author.

22. According to the passage, Walter Scott turned to writing novels because:

- F. his childhood bout with polio made it difficult for him to continue working as a lawyer.
- G. his printing press business was being sued over copyright violations.
- H. his three-volume set of Scottish ballads did not sell well.
- J. his printing press business was losing money.

23. According to the author, Scott published *Waverly* anonymously because:

- A. he didn't want to damage his reputation as a lawyer.
- B. he had fun watching people try to determine who the author was.
- C. his novels sold faster without an author's name on them.
- D. he was afraid writing fiction would take away from his reputation as a poet.

24. The author would most likely describe Scott's effect on how Scotland was viewed as:

- F. damaging, since Scott degraded Scottish culture by popularizing tartans and kilts.
- G. unimportant, since Scott's novels were no more than popular fiction.
- H. ground-breaking, since Scott was the first to write serious analyses of Scottish history.
- J. positive, since Scott made Scottish culture acceptable again after years of neglect.

25. Based on the passage, it is reasonable to assume that Scott's reputation after his death:

- A. remained favorable.
- B. waned because there were no more of his novels being published.
- C. declined because he died without paying all of his debts.
- D. was debased because of all his imitators.

26. As it is used in line 40, the word *façade* most nearly means:

- F. pretense.
- G. building front.
- H. bluff.
- J. character.

27. The author most likely uses “fittingly” (line 75) when describing the presence of a statue of William Wallace near Scott’s grave in Dryburgh Abbey because:

- A. Scott’s first major novel was about the achievements of William Wallace.
- B. Scott wrote novels about Scottish history and Wallace is a famous historical figure from Scotland.
- C. Scott was a very religious man and deserved to be buried in an abbey.
- D. Wallace was an avid fan of Scott’s poetry.

28. The passage suggests that the author’s attitude toward Sir Walter Scott is:

- F. restrained and skeptical.
- G. derisive and contemptuous.
- H. interested and appreciative.
- J. passionate and envious.

29. Based on the fifth paragraph (lines 62–77), it is reasonable to infer that Sir Walter Scott’s attitude toward his debts was:
- A. irresponsible, since he left them to be taken care of after his death.
  - B. resentful, for he believed that they were caused by his partners.
  - C. impatient, because he became annoyed that his creditors hounded him so.
  - D. accepting, since he acknowledged his responsibility and tried to pay them back.
30. The author’s use of “dabbling” in line 7 suggests that:
- F. Scott sought to establish himself in a field in which he had little experience.
  - G. the financial losses eventually suffered by Scott’s printing press began with this activity.
  - H. Scott’s inexperience led to the poor quality of his literary work.
  - J. Scott’s initial work led to his interest in Scottish history.

## *Passage IV*

### Natural Science

*The following is adapted from Wikipedia articles titled “Lemur” and “Ring-tailed Lemur.”*

Lemurs are part of a suborder of primates

known as prosimians, and make up the infraorder Lemuriformes. This type of primate was the evolutionary predecessor of monkeys and apes (5) (simians). The term “lemur” is derived from the Latin word *lemures*, which means “spirits of the night.” This likely refers to many lemurs’ nocturnal behavior and their large, reflective eyes. It is generically used for the members of the four lemuriform (10) families, but it is also the genus of one of the lemuriform species. The two flying lemur species are not lemurs, nor are they even primates.

Lemurs are found naturally only on the island of Madagascar and some smaller surrounding islands, (15) including the Comoros (where it is likely they were introduced by humans). While they were displaced in the rest of the world by monkeys, apes, and other primates, the lemurs were safe from competition on Madagascar and differentiated into a number of (20) species. These range in size from the tiny 30-gram pygmy mouse lemur to the 10-kilogram indri. The larger species have all become extinct since humans settled on Madagascar, and since the early twentieth century the largest lemurs reach about seven (25) kilograms. Typically, the smaller lemurs are active at night (nocturnal), while the larger ones are active during the day (diurnal).

All lemurs are endangered species, due mainly to habitat destruction (deforestation) and hunting. (30) Although conservation efforts are underway, options are limited because of the lemurs’ limited range and

because Madagascar is desperately poor. Currently, there are approximately 32 living lemur species.

(35) The ring-tailed lemur is a relatively large prosimian, belonging to the family Lemnridae. Ring-tailed lemurs are the only species within the genus *Lemur* and are found only on the island of Madagascar. Although threatened by habitat destruction and therefore listed as vulnerable by the IUCN (40) Red List, ring-tailed lemurs are the most populous lemurs in zoos worldwide; they reproduce readily in captivity.

Mostly grey with white underparts, ring-tailed lemurs have slender frames; their narrow faces are (45) white with black lozenge-shaped patches around the eyes and black vulpine muzzles. The lemurs' trademark, their long, bushy tails, are ringed in black and white. Like all lemurs, ring-tailed lemurs have hind limbs longer than their forelimbs; their (50) palms and soles are padded with soft, leathery skin and their fingers are slender and dexterous. On the second toe of their hind limbs, ring-tailed lemurs have claws specialized for grooming purposes.

The very young animals have blue eyes while (55) the eyes of all adults are a striking yellow. Adults may reach a body length of 46 centimeters (18 inches) and a weight of 5.5 kilograms (12 pounds). Their tails are longer than their bodies, at up to 56 centimeters (22 inches) in length.

(60) Found in the southwest of Madagascar and ranging farther into highland areas than any

other lemur, ring-tailed lemurs inhabit deciduous forests with grass floors or forests along riverbanks (gallery forests); some may also inhabit dry, open  
(65) brush where few trees grow. Ring-tailed lemurs are thought to require primary forest (that is, forests that have remained undisturbed by human activity) in order to survive; such forests are now being cleared at a troubling rate.

(70) While primarily frugivores (fruit-eating), ring-tailed lemurs will also eat leaves, seeds, and the odd insect. Ring-tailed lemurs are diurnal and primarily arboreal animals, forming troops of up to 25 individuals. Social hierarchies are determined  
(75) by sex, with a distinct hierarchy for each gender; females tend to dominate the troop, while males will alternate between troops. Lemurs claim a sizeable territory, which does not overlap with those of other troops; up to 5.6 kilometers (3.5 miles) of this  
(80) territory may be covered in a single day's foraging.

Both vocal and olfactory signals are important to ring-tailed lemurs' communication: 15 distinct vocalizations are used. A fatty substance is exuded from the lemurs' glands, which the lemurs run  
(85) their tails through; this scent is used by both sexes to mark territory and to challenge would-be rivals amongst males. The males vigorously wave their tails high in the air in an attempt to overpower the scent of others.

(90) The breeding season runs from April to June, with the female fertile period lasting for only a day.

Gestation lasts for about 146 days, resulting in a litter of either one or two. The young lemurs begin to eat solid food after two months and are fully (95) weaned after five months.

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### **BIG PICTURE SUMMARY:**

**Main idea:** Several species of lemurs inhabit Madagascar and are endangered. The characteristics of ring-tailed lemurs in particular are described.

**Author's purpose:** To describe the classification, location, status, and characteristics of lemurs, particularly the ring-tailed lemur

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31. According to the passage, lemurs survived on the island of Madagascar because:
- A. their large, reflective eyes allowed them to move around at night when predators were asleep.
  - B. their ability to mark their territory by scent gave them adequate territory for foraging.
  - C. monkeys, apes, and other primates were not a threat to them on Madagascar.
  - D. their strong social hierarchy allowed them to band together for safety.
32. According to the passage, the social organization of the ring-tailed lemur:

- F. places females at the top of the hierarchy.
- G. functions to ensure adequate food supplies.
- H. has followed the same structure since antiquity.
- J. is notable for its equality of the sexes.

33. As it is used in line 73, the word *odd* most nearly means:

- A. strange.
- B. unusual.
- C. eerie.
- D. occasional.

34. According to the passage, why are ring-tails the most populous species of lemurs in zoos?

- F. They inhabit deciduous forests, which make the lemurs' capture relatively easy.
- G. They have no difficulty giving birth in a zoo environment.
- H. Their attractive appearance makes them popular with patrons.
- J. Their eating preferences are easily accommodated.

35. The passage suggests that the rate at which primary forests are being cleared is "troubling" (line 70) because:

- A. it is causing significant soil erosion in the lemurs' primary habitat.
- B. valuable hardwoods are being destroyed.
- C. lemurs' predators inhabit the cleared area.
- D. lemurs need to live in primary forests to survive.

36. All of the following are given as ways in which ring-tailed lemurs use olfactory signals EXCEPT:

- F. to put male challengers on notice.
- G. to mask the scent of other lemurs.
- H. to signify group identification.
- J. to mark their territory.

# Science Test

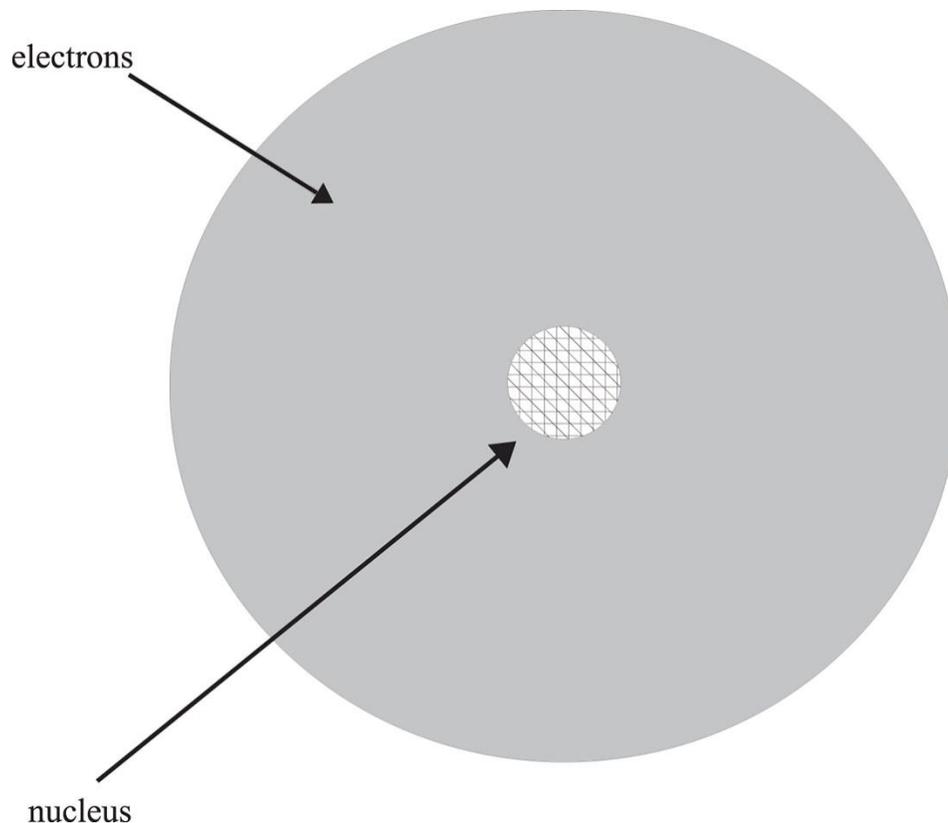
40 Minutes — 40 Questions

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

You may NOT use a calculator on this test.

## Passage I

In the 1920s, scientists developed numerous models of the atom, most of which posited a central nucleus surrounded by electrons. See Figure 1.



**Figure 1**

The protons and neutrons in the atom's nucleus have positive and neutral charges, respectively, whereas electrons have a negative charge. In the process of becoming ionized, an atom gains or loses electrons, thereby obtaining an overall positive or negative charge. Additionally, after atoms have become energized, they release such energy in the form of light. Electrons are thought to be responsible for this process.

In the 1920s, two scientists debated the way in which electrons surround an atom's nucleus.

### Scientist 1: Bohr model

Electrons move around an atom's nucleus in precise co-planar, concentric circular orbits. Any given orbit can only hold a certain number of electrons.

Once the orbit is filled with electrons, the next level orbit must be used. For this reason, some atoms will be larger (have a larger radius) than others.

Additionally, if electrons become energized, they will “jump” from one orbit to the next. When they return to their normal energy level, they emit energy in the form of light. This accounts for the fact that excited atoms emit very specific and well-defined colors of light. If the position of electrons is not specified, the precise wavelengths of light that are emitted cannot be explained.

## Scientist 2: Electron cloud model

The precise location of electrons cannot be detected. Electrons move around a nucleus in a cloud. In this cloud, certain regions have a higher probability of containing electrons than others. The cloud extends all around the nucleus in 3 dimensions. The uncertainty of any one electron’s position and the nature of its existence as a charged particle contribute to an understanding of the wave-particle nature of matter and energy.

Though this model is seemingly at odds with a number of assumptions about the stability of matter in larger-scale reality, it is anchored to a concept called the *wave function*. The wave function helps to specify the distinct shape of the probability clouds surrounding a nucleus. This explains how the position of the electrons can be random and yet localized.

1. Which of the following statements is most consistent with the electron cloud model?

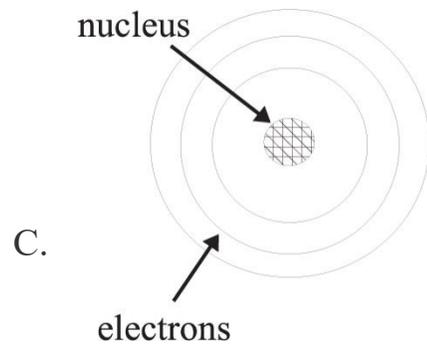
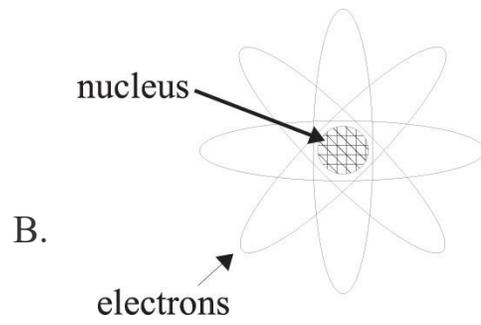
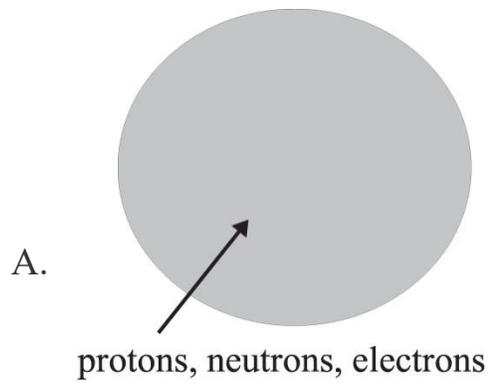
- A. Electrons orbit the nucleus of an atom in fixed paths.
  - B. Electrons are found in the nucleus of an atom.
  - C. Electrons exhibit almost random patterns of movement around a nucleus.
  - D. Electrons have a fixed position outside the nucleus.
2. By suggesting that the position of an electron follows the wave function, Scientist 2 supports which of the following claims?
- F. The probability of an electron's position depends on its orbit.
  - G. The color of emitted light depends on the charge of an atom.
  - H. Protons and neutrons are also subject to the wave-particle duality.
  - J. Electron configuration affects an atom's shape and corresponding properties.
3. According to the passage, a similarity between the Bohr model and the electron cloud model is that:
- A. electrons do not have a fixed position.
  - B. the charge of electrons is based on probability.
  - C. protons and neutrons are composed of many smaller particles.
  - D. the atom is indivisible.
4. According to Scientist 1, which of the following observations provides the strongest evidence that electrons do NOT lie in a

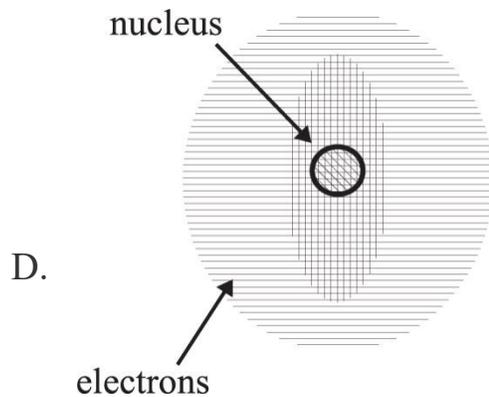
probability cloud surrounding the nucleus?

- F. Electrons have a fixed position around the nucleus.
  - G. The light emitted by energized electrons is specific and predictable.
  - H. Electrons behave according to the wave function.
  - J. The charge of electrons is constant.
5. After the 1920s, it was observed that a single electron will exhibit patterns of motion that imply both that it is a distinct particle and also that the path it takes correlates to a probability. Which model does this observation strengthen?
- A. The electron cloud model, because the observation supports wave-particle duality.
  - B. The electron cloud model, because the observation shows that an electron travels in a distinct path.
  - C. The Bohr model, because the observation indicates that electrons travel in orbits.
  - D. The Bohr model, because the observation confirms that electrons behave according to probability.
6. Scientist 2 implies that the Bohr model is *weakened* by observing that:

- F. electrons have a greater chance of lying in specific areas around the nucleus than others.
- G. electrons behave like photons.
- H. the precise position of electrons cannot be known.
- J. the orbits of electrons are not circular.

7. Which of the following diagrams is most consistent with the Bohr model of the atom?





## Passage II

Scientists noted an increase in acid rainfall and reports of respiratory ailments in a certain community. They suspected that both of these outcomes were due to increased levels of airborne pollutants, such as carbon monoxide and sulfur dioxide, entering the atmosphere in that community. Common sources of gaseous pollutants are factories, motor vehicles, or industrial processes that burn fossil fuels and release byproducts of their reactions into the air. To determine the sources of these pollutants, scientists conducted the following studies.

### Study 1

The scientists found that one likely source of pollutant gases was a network of highways located near the community. Sampling stations at ground level were set up near two major highways so that air samples could be measured and analyzed daily. The results of these analyses, with pollutant levels in parts per million (ppm), are shown in Table 1.

Table 1		
Date	Carbon monoxide level (ppm)	Sulfur dioxide level (ppm)
Highway 1		
January 6	2.3	0.002
January 7	3.2	0.002
January 8	2.9	0.003
January 9	2.6	0.002
January 10	2.1	0.004
Highway 2		
January 6	3.4	0.004
January 7	3.8	0.006
January 8	4.9	0.004
January 9	3.4	0.003
January 10	3.2	0.002

## Study 2

Scientists also suspected that another source of pollutants was from the community’s power plant, an older coal-burning plant. Air samples were recorded from the tops of two different monitoring towers near the power plant’s two main smokestacks, which emit most of the byproducts created in the electricity-generating process. The results are shown in Table 2.

Table 2

Date	Ozone level (ppm)	Carbon monoxide level (ppm)	Sulfur dioxide level (ppm)
Date	Ozone level (ppm)	Carbon monoxide level (ppm)	Sulfur dioxide level (ppm)
Tower 1			
January 6	0.05	3.3	0.005
January 7	0.06	3.2	0.006
January 8	0.11	3.3	0.009
January 9	0.15	4.3	0.013
January 10	0.10	4.2	0.009
Tower 2			
January 6	0.04	2.0	0.004
January 7	0.05	2.9	0.005
January 8	0.06	3.0	0.008
January 9	0.05	2.8	0.006
January 10	0.04	2.1	0.004

8. How is the design of Study 1 different from the design of Study 2, in terms of sampling methods?

- F. In Study 1, sampling was done weekly, while in Study 2, sampling was done every day.
  - G. In Study 1, air was sampled at ground level, while in Study 2, air was sampled at the tops of two towers.
  - H. In Study 1, ozone levels were sampled, while in Study 2, ozone levels were not sampled.
  - J. In Study 1, only carbon monoxide was sampled, while in Study 2, only sulfur dioxide was sampled.
9. In order to obtain more information about the relationship between carbon monoxide, sulfur dioxide, and respiratory ailments, which of the following studies should be carried out next?
- A. Studying how asthma is affected by changes in temperature throughout the year.
  - B. Assessing the rates of respiratory illness in communities with different average levels of carbon monoxide and sulfur dioxide.
  - C. Adding large amounts of carbon monoxide and sulfur dioxide to the air surrounding Highway 1.
  - D. Encouraging carpools to decrease traffic levels in the highways around this community.
10. Scientists suspected that sulfur dioxide emissions from the power plant were contributing to acid rain, which in turn was affecting the acidity of lakes in the surrounding countryside. In order to test this hypothesis, which of the following should the scientists do next?

- F. Sample sulfur dioxide levels near the power plant's smaller smokestacks.
- G. Measure the number of respiratory ailments suffered by people living near the lakes.
- H. Increase the amount of coal burned by the power plant.
- J. Measure the acidity of the water at a number of lakes with varying levels of atmospheric sulfur dioxide.

11. What hypothesis concerning respiratory ailments were the scientists hoping to test in Study 1 ?

- A. Pollutants from vehicular highway traffic cause an increase in respiratory ailments.
- B. Emissions from coal-burning power plants cause a decrease in respiratory ailments.
- C. Rainfall in the communities located near the highways causes a decrease in respiratory ailments.
- D. Acid rain tends to deposit pollutants into areas where highway traffic is least frequent.

12. Given the results of Studies 1 and 2, all of the following actions would help to reduce levels of airborne pollutants EXCEPT:

- F. building more highways in the areas surrounding the community.
- G. placing limits on the amount of highway traffic near the community.
- H. reducing the amount of coal burned at the power plant.
- J. installing filters in the power plant's smokestacks that remove sulfur dioxide from the plant's emissions.

13. As carbon monoxide emissions are carried away from their sources, they tend to diffuse (become less concentrated). Which of the following would be the most likely approximate carbon monoxide level near Highway 1 on January 7 if the sampling station were set up closer to the roadway?

- A. 1.0 ppm
- B. 2.0 ppm
- C. 3.0 ppm
- D. 4.0 ppm

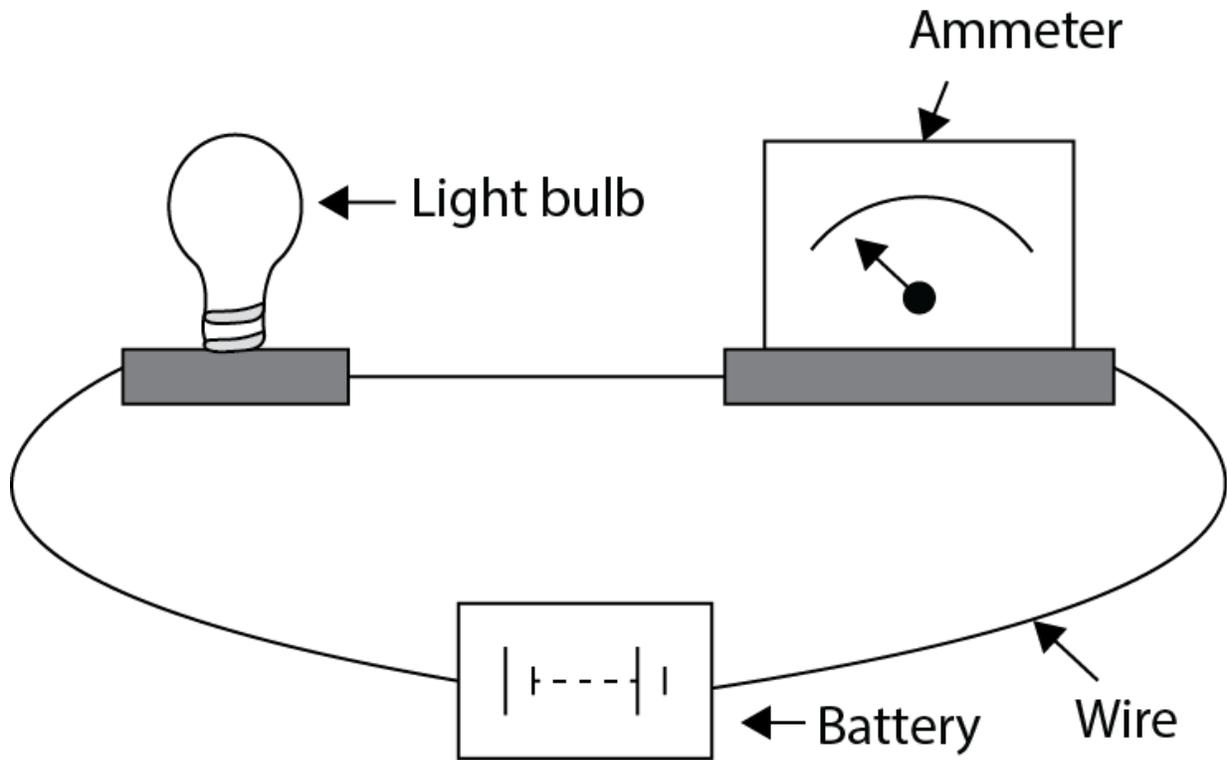
14. Which of the following accurately describe(s) the results of Study 2 ?

- I. Ozone levels and sulfur dioxide levels increased then decreased in both towers.
- II. Carbon monoxide levels in Tower 2 were always greater than those in Tower 1.
- III. January 9 showed the highest emissions for all pollutants at both towers.

- F. I only
- G. II only
- H. I and II only
- J. I, II, and III

### *Passage III*

*Conductivity* is the ability of a sample of a material to transmit electricity. All materials have electrical properties that divide them into three broad categories: *conductors*, *insulators*, and *semiconductors*. A conductor is a substance that allows an electric charge to travel from one object to another. An insulator is a substance that prevents an electric charge from traveling between objects. Substances with levels of conductivity between that of a conductor and that of an insulator are called semi-conductors. The unit of current is the ampere (A), and an *ammeter* is an instrument used to measure the current flowing in a circuit, as can be seen in Diagram 1.



**Diagram 1**

A scientist carried out three studies to determine the validity of the hypothesis that a wire conducts more current when the diameter of the wire increases or when the temperature of the wire decreases.

### Study 1

Wires were made from five different materials. Each strand of wire had a diameter of exactly 4 millimeters (mm). The strands of wire connecting the battery, light bulb and ammeter were a total of 0.5 meters (m) long and were kept at a temperature of 50°C. Table 1 displays the current, in milliamps (mA) recorded by the ammeter.

Table 1

Material	Table 1	Current (mA)
----------	---------	--------------

Material	Current (mA)
Silicon carbide (SiC)	4.6
Copper (Cu)	9.4
Rubber	0.0
Zinc telluride (ZnTe)	5.2
Steel	3.5

## Study 2

The conditions in Study 1 were repeated, except the diameter of the wires was increased to 6 mm. The length between the battery and the light bulb and the ammeter was held constant at 0.5 m and the wires were kept at 50°C.

Table 2 displays the findings.

Table 2	
Material	Current (mA)
Silicon carbide (SiC)	6.5
Copper (Cu)	11.3
Rubber	0.0
Zinc telluride (ZnTe)	7.1
Steel	5.4

### Study 3

Study 2 was repeated at 30°C. Table 3 displays the findings.

Material	Current (mA)
Silicon carbide (SiC)	7.3
Copper (Cu)	12.1
Rubber	0.0
Zinc telluride (ZnTe)	8.9
Steel	6.6

15. Which of the following ranges represents the amperage of all five wires with diameters of 6 mm at 30°C ?

- A. 5.4 mA to 11.3 mA
- B. 0.0 mA to 9.4 mA
- C. 0.0 mA to 11.3 mA
- D. 0.0 mA to 12.1 mA

16. The scientist hypothesized that increasing the diameter of a wire increases the amount of current it conducts. The results from the studies for each of the following materials support the scientist's hypothesis EXCEPT the results for:

- F. silicon carbide.
- G. rubber.
- H. copper.
- J. steel.

17. According to the results of the studies, a wire made from ZnTe would conduct the most current under which of the following conditions?

- A. 1 mm diameter, 0.5 m length at 40°C
- B. 4 mm diameter, 0.5 m length at 40°C
- C. 4 mm diameter, 0.5 m length at 20°C
- D. 8 mm diameter, 0.5 m length at 20°C

18. What would the ammeter read if the scientist used wires of 4 mm diameter at 30°C and a total length of 0.5 m, but if the material for the wire from the battery to the ammeter was copper, the wire from the ammeter to the light bulb was rubber, and the light bulb back to the battery was steel?

- F. 0.0 mA
- G. 3.5 mA
- H. 9.4 mA
- J. 12.9 mA

19. How would the current conducted by the materials most likely be affected if Study 3 was repeated and the temperature of the wires was

increased to 100°C ?

- A. The current would decrease with the exception of rubber.
- B. The current would remain unchanged.
- C. The current would either increase or decrease, depending on the type of material.
- D. The current would increase with the exception of rubber.

20. Based on the results of the studies, which of the following best describes the properties of rubber?

- F. Rubber's capacity as a conductor increases with temperature.
- G. Rubber's capacity as an insulator increases with temperature.
- H. Rubber's capacity as an insulator increases with diameter.
- J. Rubber's capacity as an insulator is unaffected by temperature or diameter.

21. Which of the following effects would be the most appropriate for the scientist to investigate next in order to learn more about the ability of wires to conduct current?

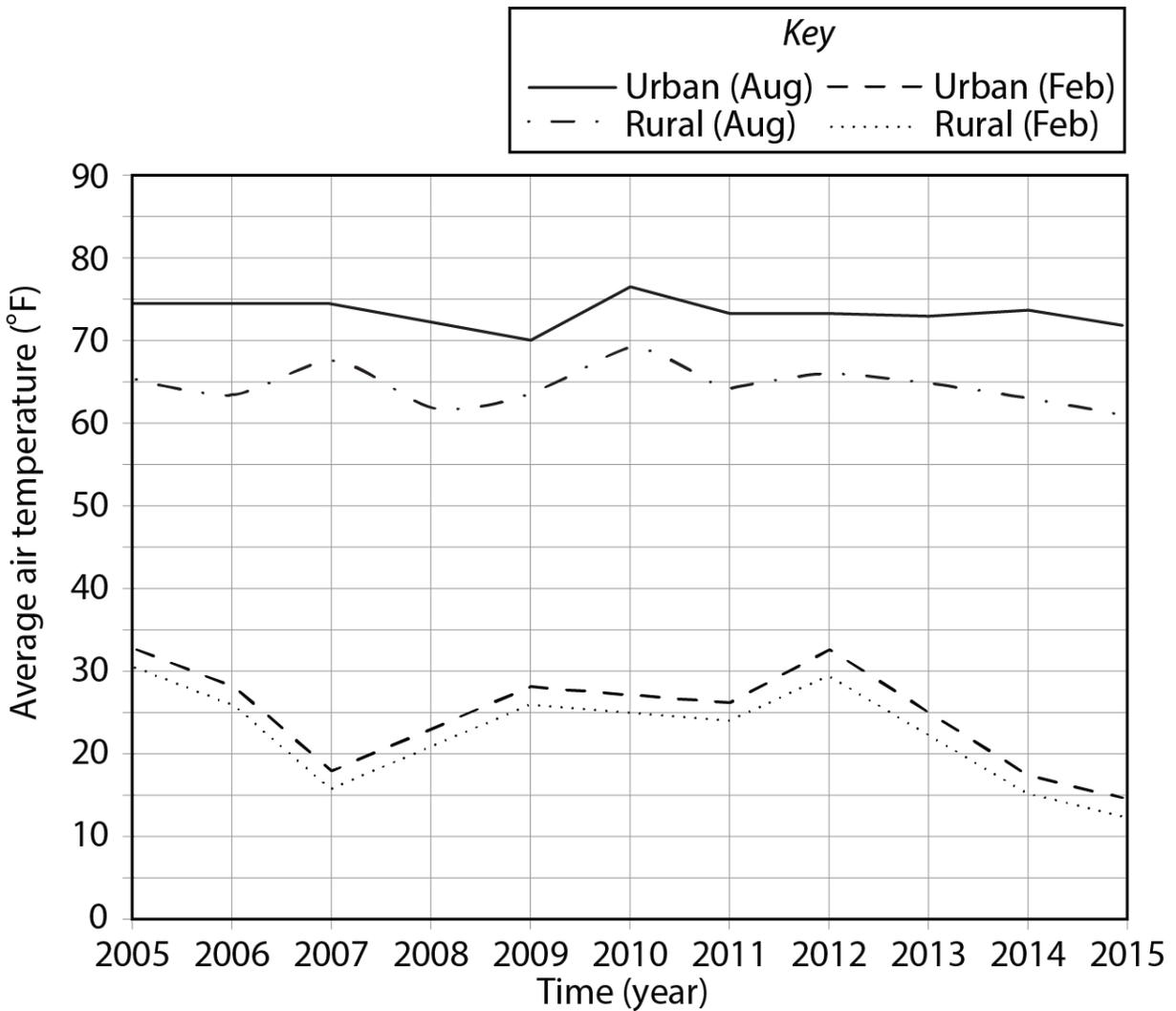
- A. The effect of temperature on conductivity
- B. The effect of diameter on conducted current
- C. The effect of choice of material on conductivity
- D. The effect of wire length on conducted current

## Passage IV

The climate (long-term meteorological conditions) of a region consists of the average weather (short-term meteorological conditions) in that region over a period of years. Climate is measured by monitoring the variation in temperature, humidity, atmospheric pressure, wind, and precipitation. A microclimate is a smaller area within a climate region that has its own unique climate. Scientists performed the following studies to investigate the microclimates of neighboring rural and urban (population greater than 50,000 people) areas.

### Study 1

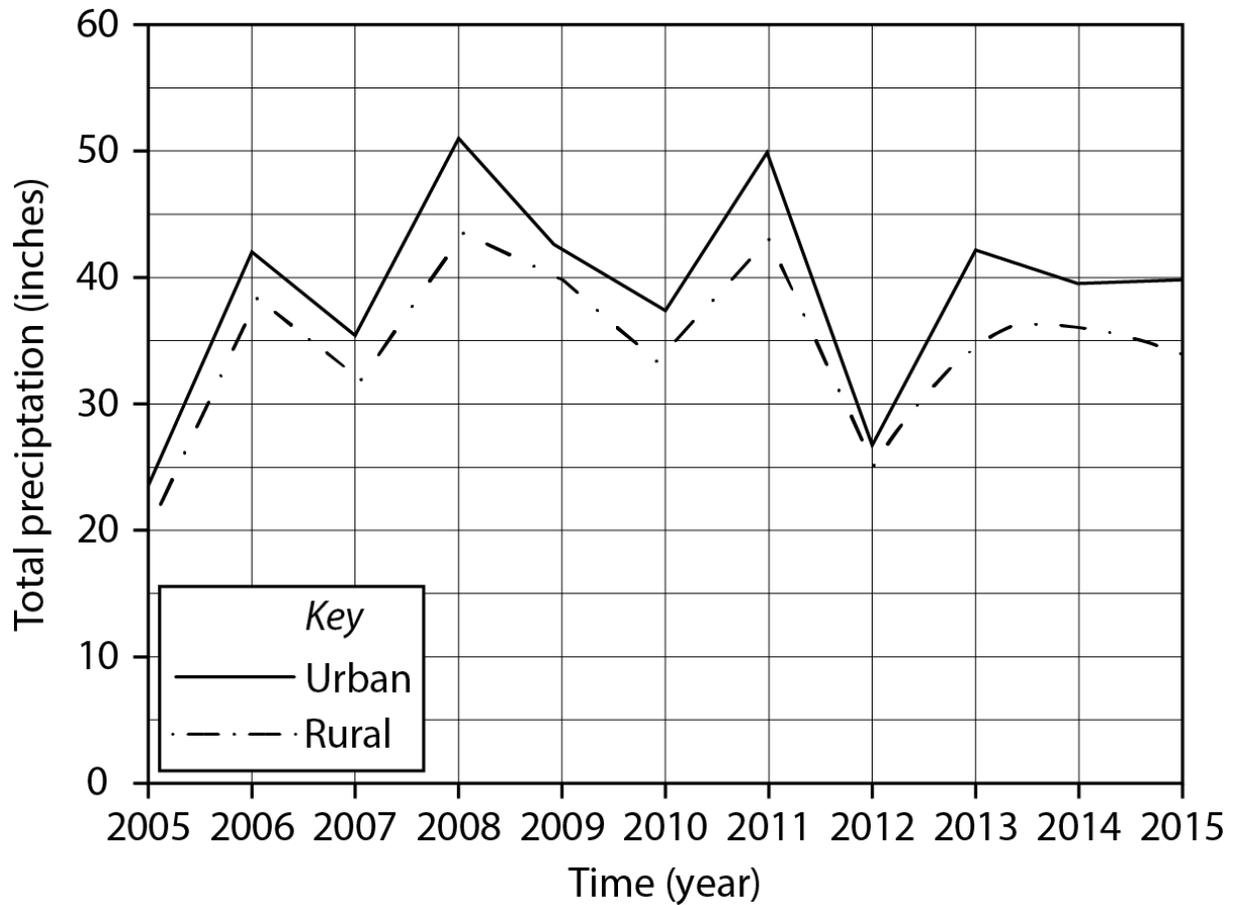
Monthly average air temperatures and relative humidity for neighboring rural and urban areas were collected over a period of 11 years. Results indicated that, compared to the relative humidity of the rural area, the relative humidity of the urban area was 2% lower in the winter and 6% lower in the summer. Figure 1 shows the average temperature for August (summer) and February (winter) for the rural and urban areas.



**Figure 1**

## Study 2

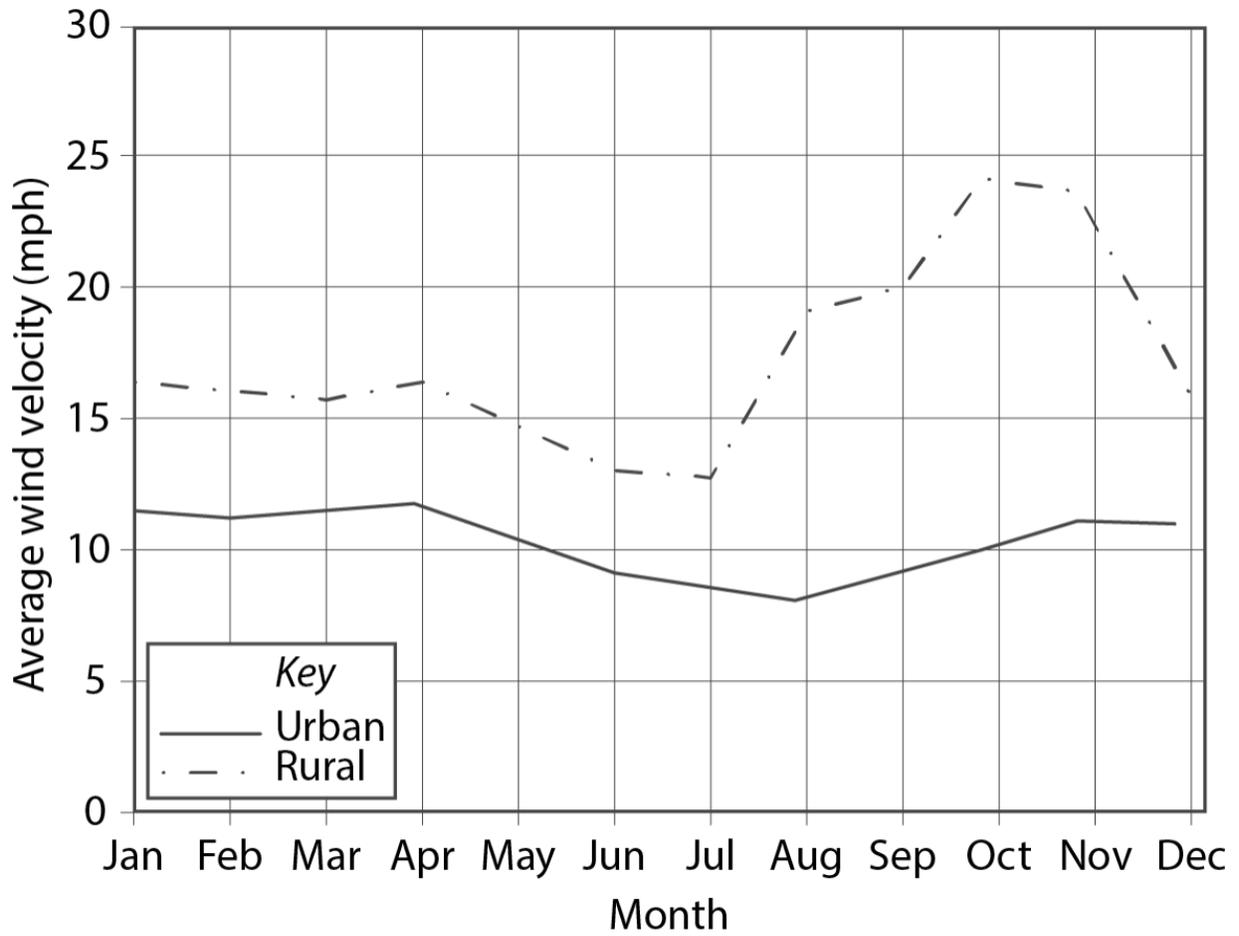
Annual precipitation and cloud cover were recorded for the same neighboring rural and urban areas over the same period of 11 years. Results showed that the rural area had on average 5% fewer cloudy or hazy days than the urban area for each year. Figure 2 shows the total accumulated precipitation for each year.



**Figure 2**

### Study 3

An anemometer was used to measure the wind velocity at a standard height of 33 feet for the same neighboring rural and urban areas. Figure 3 shows the monthly average wind velocity over a year. The scientists also measured air quality and found that urban air had about 10 times more dust particles than rural air.



**Figure 3**

22. According to Study 1, the greatest difference in average air temperature during the summer between the urban and rural areas occurred in which year?

- F. 2007
- G. 2010
- H. 2012
- J. 2014

23. According to Study 3, average wind velocities in the rural area were closest for which of the following pairs of months?
- A. January and April
  - B. April and July
  - C. July and September
  - D. September and November
24. Suppose new evidence showed that buildings increase frictional drag on air flowing over built-up terrain. Based on Study 3, would it be justified to conclude that the rural area has more buildings than the urban area?
- F. Yes, because the average wind velocity is lower for the rural area than for the urban area.
  - G. Yes, because the average air temperature is lower for the rural area than for the urban area.
  - H. No, because the average wind velocity is higher for the rural area than for the urban area.
  - J. No, because the average air temperature is higher for the rural area than for the urban area.
25. Based on Study 1, what conclusion can be drawn from the fact that the difference in relative humidity between the urban and rural areas is less in the winter than in the summer?

- A. The relative humidity is higher for the urban area than for the rural area.
- B. The average winter air temperature is higher for the urban area than for the rural area.
- C. Relative humidity differences correlate with average air temperature differences.
- D. Relative humidity differences correlate with average wind velocity differences.

26. Scientists hypothesized that building materials and road surfaces in urban areas absorb heat during the day and release it at night, increasing the air temperature. Do the results of Study 1 support this hypothesis?

- F. Yes; the recorded summer temperatures in the urban area were lower than those in the rural area.
- G. Yes; the recorded summer temperatures in the urban area were higher than those in the rural area.
- H. No; the recorded humidity in the urban area was lower than that in the rural area.
- J. No; the recorded humidity in the urban area was higher than that in the rural area.

27. Given that dust particles act as hygroscopic nuclei, encouraging rain production, which of the following best explains why the rural area received less rain than the urban area in Study 2 ?

- A. The wind velocity was higher at the urban area than the rural area.
  - B. There were more dust particles in the air at the urban area to become nuclei.
  - C. There were fewer cloudy days in the urban area.
  - D. Higher relative humidity in the urban area allowed the air to hold more moisture.
28. At a third area located near the other two, the scientists determined the average summer air temperature to be 75°F and the average annual precipitation to be 40 inches. Based on the data from the studies, the scientists should predict that the average wind velocity is most likely:
- F. between 8 and 12 mph.
  - G. between 12 and 15 mph.
  - H. between 15 and 20 mph.
  - I. between 20 and 25 mph.

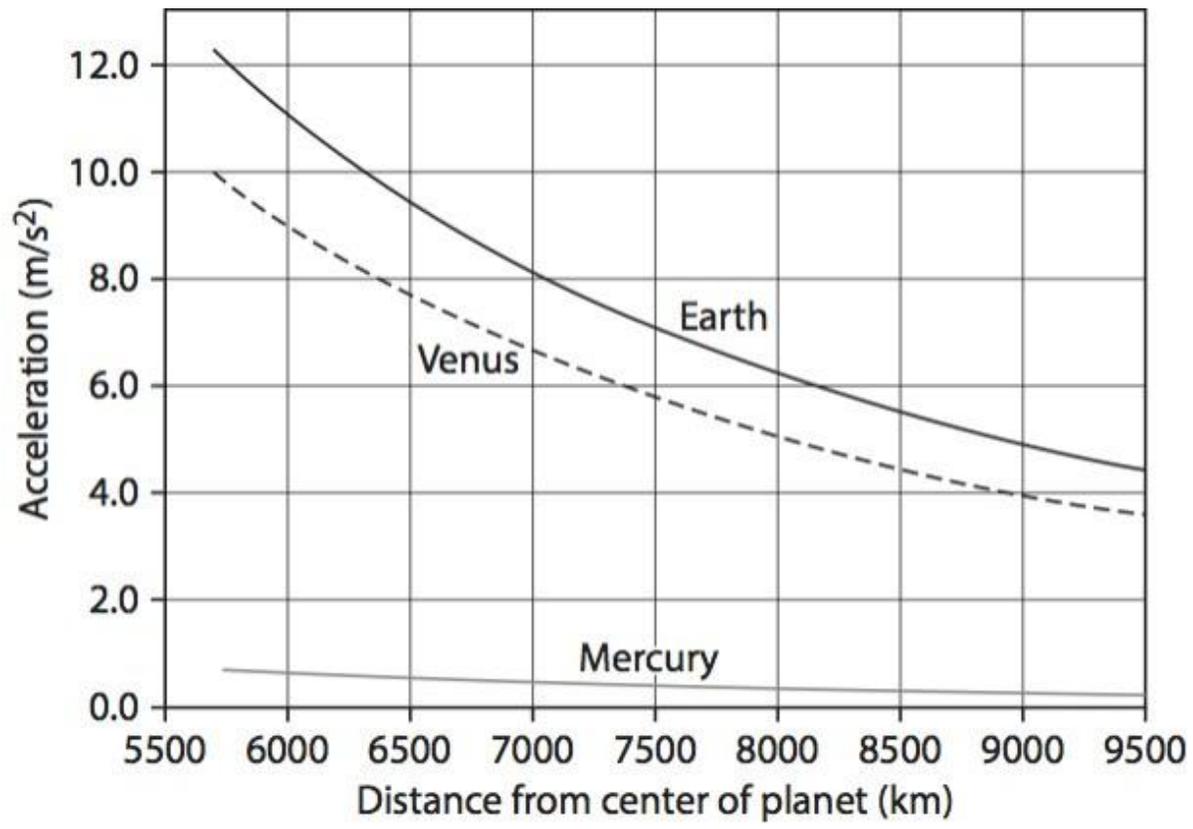
## *Passage V*

The movement of planets and other celestial bodies in the solar system is governed by the force of gravity. Gravitational effects are determined by considering many factors, such as a body's mass and the distance between bodies. Table 1 lists the masses and radii for several planets.

Table 1

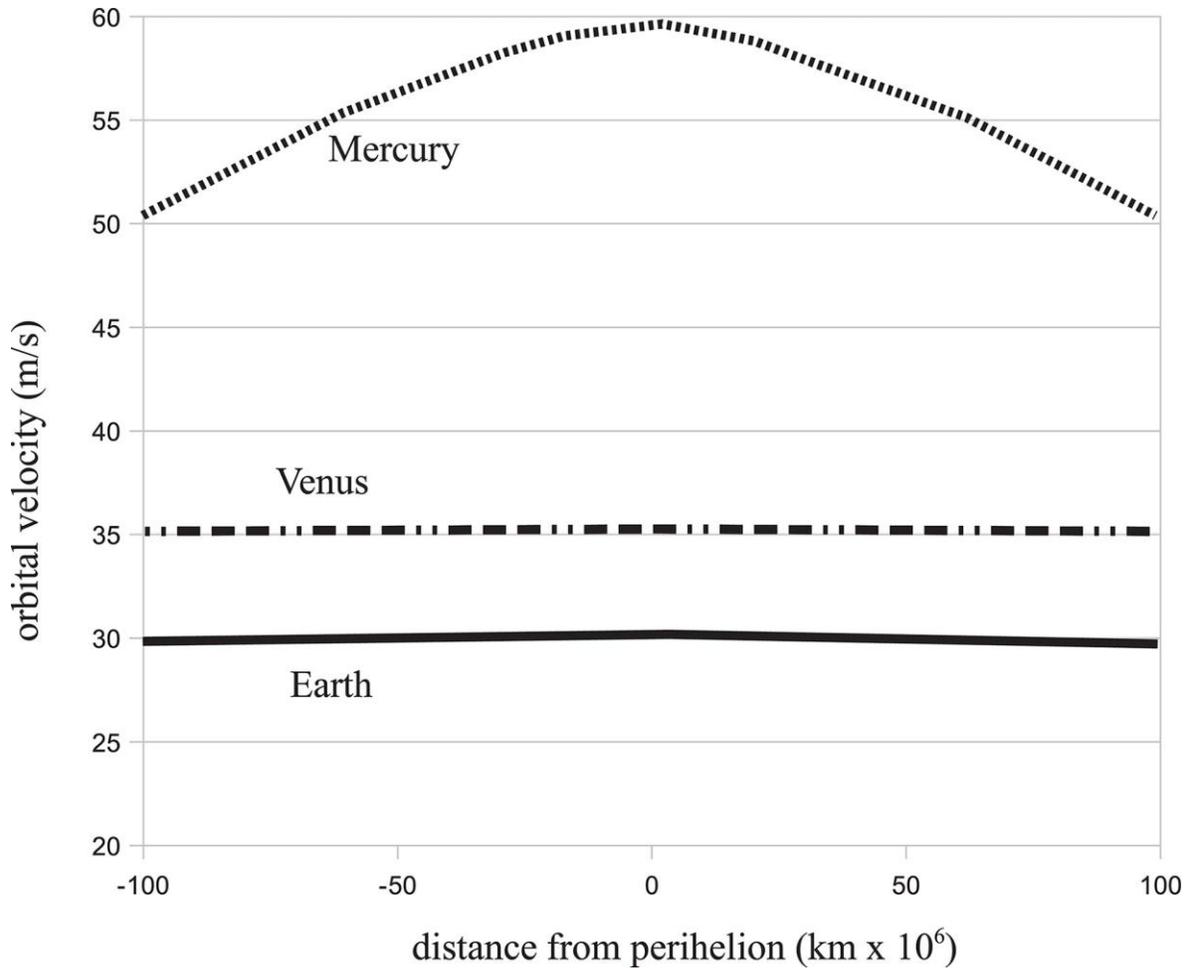
Planet	Mass (kg)	Radius (km)
Saturn	$5.68 \times 10^{26}$	58,232
Jupiter	$1.90 \times 10^{27}$	69,911
Earth	$5.97 \times 10^{24}$	6,371
Venus	$4.87 \times 10^{24}$	6,052
Mercury	$3.29 \times 10^{23}$	2,440

Figure 1 shows the acceleration due to gravity of an object at various distances from the center of 3 planets.



**Figure 1**

*Perihelion* is the point in a planet's orbit at which it is closest to the sun. Figure 2 shows how the orbital velocity of the same 3 planets varies as each planet approaches and recedes from perihelion (a negative distance means the planet is approaching perihelion, positive means the planet is receding).



**Figure 2**

29. According to Figure 2, as Mercury approaches perihelion and then recedes from it, its orbital velocity:

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

30. Suppose that a planet was found to have a mass between that of Saturn and Jupiter. Based on Table 1 and assuming a similar density, which of the following would be the most likely radius for the planet?

- F. 2,240 km
- G. 6,197 km
- H. 63,452 km
- J. 87,128 km

31. Which of the planets listed on Table 1 has the greatest mass?

- A. Saturn
- B. Jupiter
- C. Earth
- D. Mercury

32. According to Figure 2, the orbital velocity of Mercury  $75 \times 10^6$  km away from perihelion, approaching, is closest to the orbital velocity of \_\_\_\_\_ which \_\_\_\_\_ of \_\_\_\_\_ the \_\_\_\_\_ following?

- F. The orbital velocity of Mercury  $100 \times 10^6$  km away from perihelion, approaching.
- G. The orbital velocity of Mercury  $75 \times 10^6$  km away from perihelion, receding.
- H. The orbital velocity of Mercury  $50 \times 10^6$  km away from perihelion, receding.
- J. The orbital velocity of Mercury  $50 \times 10^6$  km away from perihelion, approaching.

33. According to Figure 1, does an object fall faster towards Earth or towards Venus from a distance of 8,000 km ?

- A. Venus, because the acceleration due to gravity from Venus is higher.
- B. Venus, because the acceleration due to gravity from Venus is lower.
- C. Earth, because the acceleration due to gravity from Earth is higher.
- D. Earth, because the acceleration due to gravity from Earth is lower.

34. If a new planet were found in the solar system with a mass of  $8.5 \times 10^{23}$  kg and a radius of 5,423 km, which of the following would be most reasonable, based on the information provided in the passage, to predict as its velocity at perihelion?

- F. 60 m/s
- G. 45 m/s
- H. 30 m/s
- J. 15 m/s

## Passage VI

The following chemical equation represents a typical acid-base neutralization reaction:

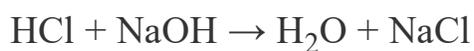
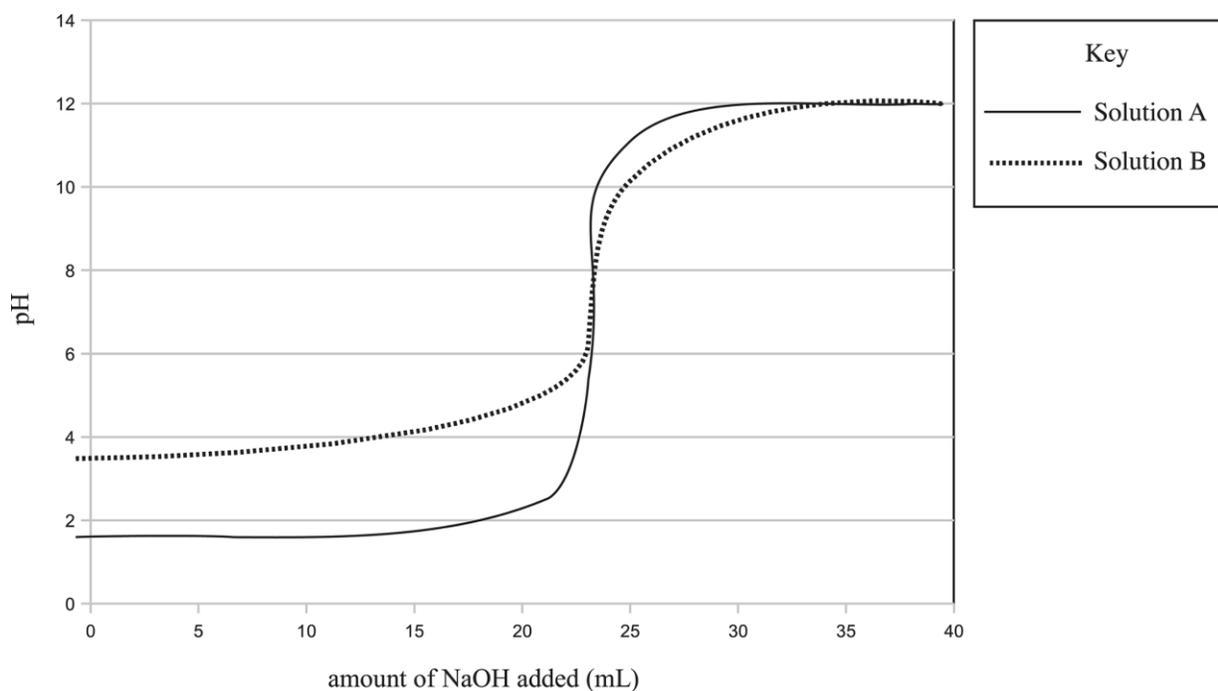


Table 1 lists common pH indicators and the pH ranges over which a distinct color change occurs.

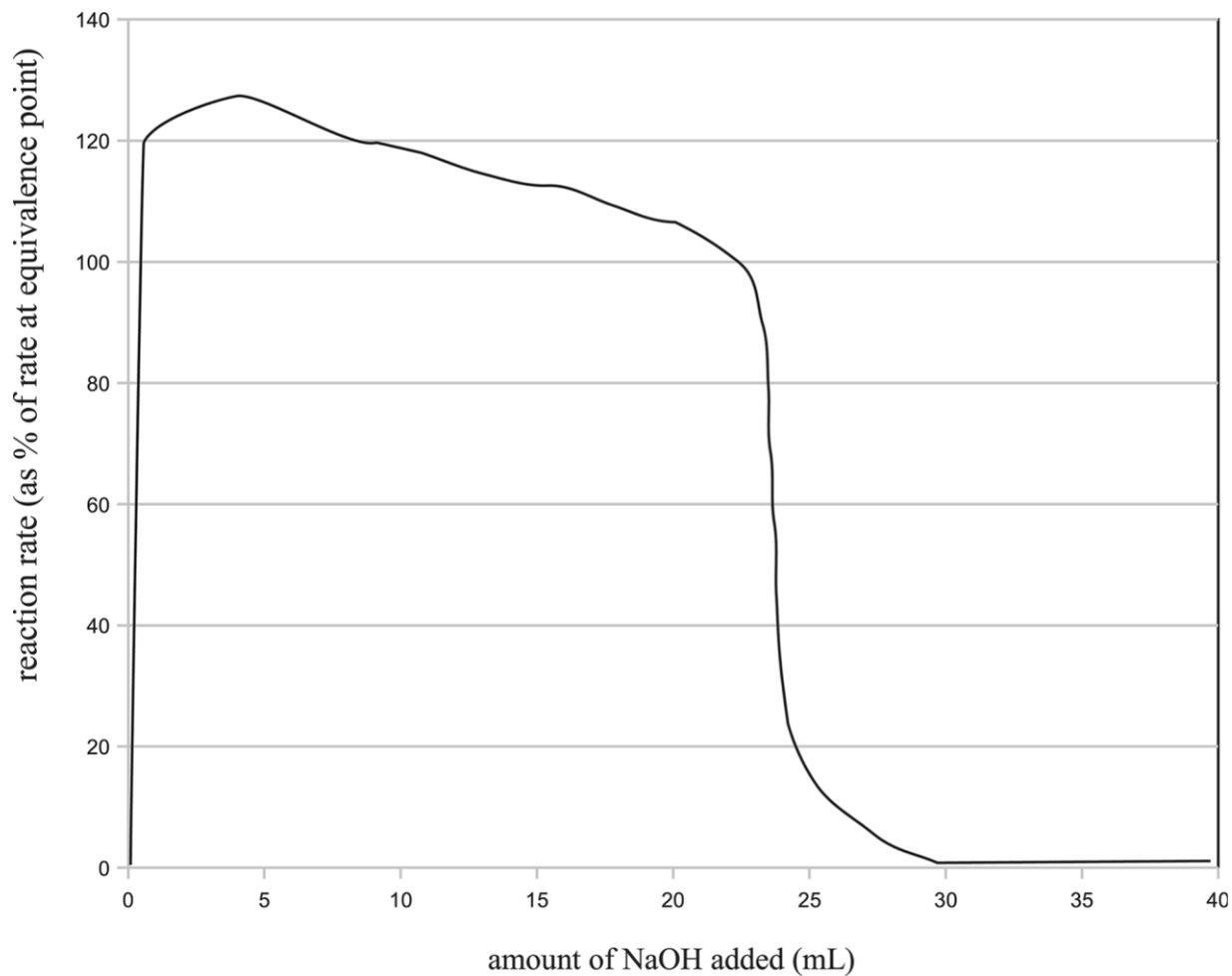
Table 1	
Indicator	pH range
Methyl yellow	2.9 – 4.0
Bromocresol green	3.8 – 5.4
Methyl red	4.4 – 6.2
Phenol red	6.8 – 8.4
Phenolphthalein	8.3 – 10.0
Alizarine	10.1 – 12.0

In the process of acid-base titration, the *equivalence point* is the point at which equal concentrations of an acid and base are present. When an acid or base is added to a solution at its equivalence point, changes in pH are typically much more drastic than they are at other points in the titration process. Figure 1 shows the pH of Solution A and Solution B versus the amount of an NaOH solution added.



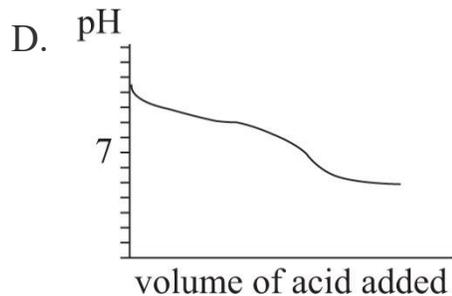
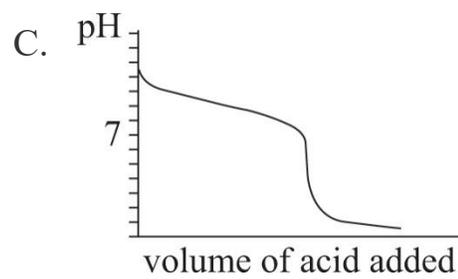
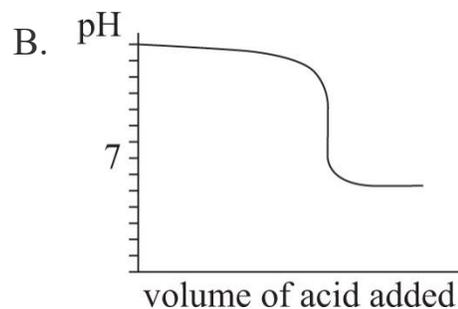
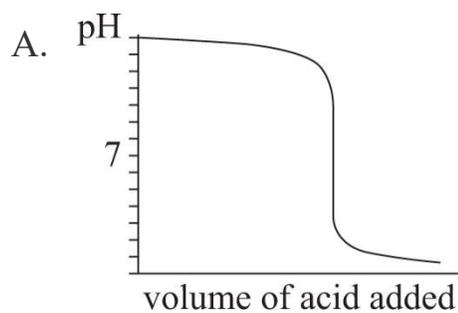
**Figure 1**

Figure 2 shows the reaction rate for Solutions A and B (as a percentage of the reaction rate at their equivalence point) versus the amount of NaOH solution added.



**Figure 2**

35. If the experimental setup were reversed and Solution A were titrated into a beaker of NaOH, which of the following graphs would best represent the corresponding titration curve?



36. Based on Table 1 and Figure 1, which indicator changes color in a pH range that includes the equivalence point of Solution A ?

- F. Bromocresol green
- G. Methyl red
- H. Phenol red
- J. Alizarine

37. If the chemical reaction associated with the chemical equation shown in the passage takes place completely (with negligible unused reactants), the pH of the resulting solution should be approximately:

- A. 0.
- B. 2.
- C. 7.
- D. 14.

38. According to Figure 2, for which of the following volumes of NaOH does the reaction rate exceed the reaction rate at the equivalence point?

- F. 0 mL
- G. 5 mL
- H. 25 mL
- J. 30 mL

39. In the chemical equation shown in the passage, the sodium in NaOH becomes part of which of the following compounds?

- A. Water
- B. Table salt
- C. Hydrochloric acid
- D. Sodium hydroxide

40. Based on Figures 1 and 2, the amount of NaOH for which the reaction rate is highest also corresponds to:

- F. the equivalence point of Solution A.
- G. the equivalence point of Solution B.
- H. a high pH in Solution A.
- J. a low pH in Solution B.

# 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.

**DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO.**

## **Student Loans**

Despite the rising cost of higher education, financial experts agree that a college diploma is worth the investment. As students enroll in college to increase their lifetime earning potential, broaden their opportunities, and pursue careers, many worry about the challenge of paying off student loans once they graduate. Student loan repayment includes both the original amount borrowed as well as interest accrued over time, which often takes students years to repay. Should colleges and financial institutions be expected to develop programs and policies to address student concern regarding loans? Given the fact that affording college is a primary factor in deciding whether or not to pursue higher education, it is prudent for institutions to develop practices to better assist students in financing their degrees.

*Read and carefully consider these perspectives. Each suggests a particular way of thinking about student loans.*

### **Perspective One**

Student loans should not be subject to interest rates if a

### **Perspective Two**

Higher education is a commodity and

### **Perspective Three**

The amount of money students can borrow

student is able to pay off the loan within a reasonable amount of time.

Financial lenders, including the United States government, should not be making a profit on loans that students need to complete their degrees. Should a student request additional time to repay the loan beyond the agreed-upon repayment schedule, interest or a penalty fee can then be applied to the remaining balance.

is subject to supply and demand principles inherent in a capitalist market. Colleges, financial institutions, and the United States government should not make special accommodations for college students. All loans should be held to the same standard and should not differ according to a borrower's intended use.

should be proportion the annual salary they projected t earn once graduate. Students s not be allo to borrow money tha they can p back in a reasonable amount of Reducing eliminatin interest rat does not address th more concerning issue of disproport debt and f earning potential.



## *Essay Task*

Write a clear, well-reasoned essay evaluating multiple perspectives on student loans. 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 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. *My Cousin Nicola*

1. **C**

**Difficulty:** Medium

**Category:** Agreement

**Getting to the Answer:** Use *who* or *whom* to refer to a person. The underlined word begins a description of Lucia; the correct pronoun is *who*, because Lucia is a person. Choice (C) is correct. *Which*, in A, is incorrect when used to refer to a person. Choice B uses the objective case *whom*; you wouldn't say "*her* was already married," so "*whom* was already married" is incorrect. *She who*, in D, makes the sentence unnecessarily wordy and awkward.

2. **J**

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** Independent clauses should either be joined by a semicolon or connected with a coordinating conjunction; otherwise, one of the clauses must be made subordinate. As written, the sentence is a run-on. None of the answer choices offers a semicolon or a comma and a coordinating conjunction, but (J) makes the second clause dependent by using *that*. Choices G and H do not address the run-on error.

3. **B**

**Difficulty:** Medium

**Category:** Agreement

**Getting to the Answer:** Use context to determine appropriate verb tenses. This sentence uses the simple past tense *were* and doesn't indicate any time shift, so the simple past tense *knew* makes the most sense. Choice (B) is correct. Choice A uses the past participle *known* without the necessary helping verb *had*. Choice C incorrectly uses *had knew*; the past participle of *know* is *known*. Choice D uses *been known* without the necessary helping verb *had*; it also creates a sentence that is grammatically incorrect.

4. **J**

**Difficulty:** Medium

**Category:** Organization

**Getting to the Answer:** Remember to read for logic, as well as grammar and usage. This sentence inappropriately uses the contrast word *however*. Choice (J) correctly uses *then*, a transition word indicating time. Choices G and H use cause-and-effect transitions, which are inappropriate in context.

5. **C**

**Difficulty:** Medium

**Category:** Agreement

**Getting to the Answer:** When an idiomatic construction begins with *not only*, it must conclude with *but also*. Only (C) correctly completes the idiom. *And*, *A*, *so*, *B*, and *then*, *D*, all fail to correctly complete the idiom.

6. **H**

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** The *-ing* form can serve several functions; when used as a verb, it requires a helping verb to be correct. *I being* here is grammatically incorrect; (H) substitutes the correct verb form *was*. Choice G creates a grammatically incorrect sentence, and J omits the verb.

7. **B**

**Difficulty:** Medium

**Category:** Development

**Getting to the Answer:** With Writer’s Purpose questions like this one, you need to identify the choice that matches the purpose stated in the question stem. The question asks you to select the sentence that gives the most relevant information about Nicola’s travel plans. Only (B) tells you about Nicola’s plans; he intends to spend the summer with his family in New York. Choice A mentions Nicola’s trip to England, which is out of scope for the passage. Choice C provides general information about the easiest way to travel from Italy to America, but it doesn’t tell you anything about Nicola’s specific plans to visit America. Choice D also focuses on the past, explaining why Nicola had not previously come to America; this doesn’t match the question stem’s call for information about Nicola’s travel plans.

8. H

**Difficulty:** Medium

**Category:** Development

**Getting to the Answer:** Always read question stems carefully; it’s easy to miss an important word like NOT or EXCEPT. The question asks for the word that does NOT show that the cousins looked forward to meeting Nicola. The only negatively charged word here is *apprehensive*, which suggests that the cousins feared Nicola’s arrival.

Choice (H) is correct. Choices F, G, and J all use positively charged words that indicate the cousins were looking forward to Nicola’s visit.

9. C

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** A phrase set off between commas must be nonessential: the sentence must still make sense without it. As written, this sentence treats the phrase “hadn’t seen him” as nonessential, but “like me, since they were kids” does not make sense—this phrase must remain in the sentence. Choice (C) eliminates the incorrect comma without introducing any additional errors. Choices B and D create run-on sentences; additionally, D incorrectly inserts a comma between a verb and its object.

10. J

**Difficulty:** High

**Category:** Agreement

**Getting to the Answer:** When a pronoun is underlined, first determine to what or whom it refers. In this case, the reference is unclear. The last plural noun is *musicians*, but that refers to the narrator and Nicola, who do play instruments. Eliminate F. Choice G clearly refers to the narrator and Nicola, so it should also be eliminated. Choice H is ambiguous: to which Americans does the sentence refer? Choice (J)

correctly identifies the group mentioned earlier in the paragraph: the narrator’s American cousins.

11. **C**

**Difficulty:** Medium

**Category:** Conciseness

**Getting to the Answer:** The shortest answer isn’t always correct—D omits a phrase necessary for the sentence to make sense. Choices A and B include information irrelevant to the topic of the writer meeting Nicola. That leaves (C), which eliminates the irrelevant information without losing the logic of the sentence.

12. **J**

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** As a general rule, descriptive phrases modify the nouns that immediately follow them. As written, this sentence tells us that *I* was “Taught to him before she passed away in Italy.” Choice (J) is the most concise and logical version of this sentence. Choice G incorrectly indicates that the grandmother, not Nicola, taught the songs to the writer. Choice H gives the introductory phrase no logical noun to modify, making its grammatical structure incorrect.

13. **C**

**Difficulty:** Low

**Category:** Agreement

**Getting to the Answer:** A verb is underlined, so start by checking to see if the tense is correct. The simple past tense is used in this paragraph: *shared* and *connected*. The correct tense here is the simple past *threw*, as in (C). Choice A uses the conditional tense “would have thrown,” but the sentence describes something the writer’s father actually did, not something hypothetical. Choice B uses the future perfect tense, but the sentence describes something that happened in the past, not an upcoming event. Choice D uses the present tense, but the action happened in the past.

14. G

**Difficulty:** Low

**Category:** Sentence Structure

**Getting to the Answer:** “Possessive versus plural” questions can often be answered quickly: does the sentence refer to more than one grandmother or something belonging to a grandmother? This sentence is discussing the country that *belongs* to the grandmother, so an apostrophe is needed to make *grandmother* possessive. Only (G) does this without introducing an additional error. Choice F is missing the necessary apostrophe; *grandmothers* is plural, not possessive. Choice H uses the plural possessive *grandmothers’*, but only one grandmother is discussed in the paragraph. Choice J corrects the

punctuation error but substitutes the homophone *are* for the plural possessive pronoun *our*.

15. **A**

**Difficulty:** Medium

**Category:** Development

**Getting to the Answer:** When asked about the purpose of the passage as a whole, consider its topic and tone. The narrator describes a personal experience getting to know his cousin from Italy. The tone is positive, emphasizing their similarities and ending with a scene in which family members are touched emotionally by the singing of family folk songs. Thus, the passage accomplishes the stated purpose; eliminate C and D. Choice B is a distortion; the differences between Nicola and the narrator's American cousins are not the reason the essay accomplishes the stated purpose. Thus, (A) is correct.

7. *The Handsome Bean*

16. **G**

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** When the only difference in the answer choices is the use of commas, focus on sentence structure. Are there items in a list that need to be separated by commas? A nonessential

phrase that needs to be set off from the rest of the sentence with a pair of commas? An introductory phrase or clause that needs to be separated from the rest of the sentence? This sentence treats the phrase *I live* as nonessential, but removing it creates a sentence fragment. Choice (G) properly places a comma between the introductory phrase describing the location of the Handsome Bean coffee shop and the sentence's independent clause. Choice H creates an introductory clause with no noun to modify, which is grammatically incorrect. Choice J fails to set off the introductory phrase from the body of the sentence, making the sentence difficult to understand.

17. **A**

**Difficulty:** Medium

**Category:** Development

**Getting to the Answer:** When you're asked the purpose of including a detail, read around that detail for context. By describing the proximity of the Little League field, the writer provides a context for the teams the Handsome Bean often sponsors. Without this information, the following sentence would not fit well in the context. Thus, (A) is correct. There is no change of topic, so B is incorrect. While the information helps the reader picture the scene, C misses the function of introducing the sponsored team in the following sentence. Choice D does not match the tone of the passage, which portrays the Handsome Bean positively.

18. **F**

**Difficulty:** Low

**Category:** Agreement

**Getting to the Answer:** Use context to determine the answers to questions with underlined verbs. The verbs in this paragraph are in the present tense: *come*, *stay*, *is*, and *offers*. The present tense *sponsors* is correct, so no change is needed, and (F) is correct. Choice G uses the past perfect *had sponsored*, incorrectly suggesting that the coffee shop sponsored the Little League team before another past event. Choices H and J use the past tense, which is inconsistent with the rest of the paragraph.

19. **B**

**Difficulty:** Medium

**Category:** Development

**Getting to the Answer:** Read question stems carefully. Often, all four answer choices to Supporting Material questions will be relevant to the passage, but only one will fulfill the specific requirements of the question. The question asks for additional detail about the customers who come to the coffee shop. Only (B) focuses on customers—the parents and children who come for ice cream after the Little League games. Choice A focuses on an additional discount provided by the coffee shop, not on the customers of the shop. Choice C provides a detail about another sport supported by the coffee shop; this doesn't match the purpose stated in the question stem. Choice D provides

more information about the Little League field, not about the coffee shop’s customers.

20. **G**

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** When the end of one sentence and the beginning of the next are underlined, consider whether one or both are sentence fragments. As written, both of these sentences are fragments, since neither expresses a complete thought. Choice (G) correctly combines the two fragments into a single sentence. Choice H is unnecessarily wordy. Choice J does not address the error.

21. **C**

**Difficulty:** Medium

**Category:** Development

**Getting to the Answer:** Remember the first step in the Kaplan Method: read the passage and identify the issue. Here, you need to select the sentence that best introduces the topic of the paragraph, so you’ll need to read the paragraph. The paragraph describes the antique décor of the coffee shop—its “century-old” counter, the photos from the 1920s and 1930s, and the “original tin ceiling.” Choice (C) effectively leads into this description by explaining that the owner wants the shop to “look like it has been there for decades.” Choice A

focuses on the friendship between the writer and Mary; this doesn't connect with the details of the antique counter, old photos, and original tin ceiling. Choice B is too general; (C) provides a more specific reason for the decorating decisions Mary has made. Choice D explains that the space was vacant before the Handsome Bean opened, but this doesn't introduce the description of the décor.

22. **H**

**Difficulty:** Low

**Category:** Agreement

**Getting to the Answer:** The object of a preposition must be a noun, pronoun, or gerund (*-ing* verb form functioning as a noun). For this sentence to make sense, the noun *condition* is required as the object of *to*. Since nouns can only be modified by adjectives, (H) is correct. Choices F and G use the adjective *conditional* as the object of the preposition, which is grammatically incorrect. Although *original* can function as a noun, it could not then be modified by an adverb, so J is incorrect.

23. **B**

**Difficulty:** Medium

**Category:** Agreement

**Getting to the Answer:** The ACT will often separate a tested verb from its subject with an intervening phrase or clause. Make sure that you've

correctly identified the subject with which an underlined verb must agree. As in many sentences on the ACT, a description separates the subject and verb here; the subject of the verb *depicts* is the plural *photos*. The plural form *depict* is needed; (B) is correct. Choices C and D do not address the error; additionally, C introduces an unwarranted verb tense change.

24. **F**

**Difficulty:** High

**Category:** Development

**Getting to the Answer:** To answer this type of question, focus on the function of the sentence. What purpose does it serve in the paragraph? The sentence provides the reader with the information that the building is at least 70 years old. Therefore, if the sentence were deleted, you would lose information about the age of the building. Choice (F) is correct. Choice G refers to Mary and the writer etching their names in the ceiling, but the sentence does not describe this action. Choice H relates the sentence to the influence of the original owner; however, the time at which Harvey etched his name has little to do with his influence on Mary, the writer, or anyone else. Choice J treats the sentence as a description of the interior of the coffee shop, but no description of the ceiling is given in this sentence.

25. **D**

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** A comma should not be inserted between a preposition and its object. This sentence requires no comma; (D) is correct. Choice B uses a semicolon, which is only correct when used to connect two independent clauses. Choice C treats “usually in the form” as a nonessential phrase. However, deleting this phrase does not leave a logical sentence, so C is incorrect.

26. J

**Difficulty:** Medium

**Category:** Agreement

**Getting to the Answer:** Use *number* for items that are countable and *amount* for quantities that are not. The talented musicians and poets are countable, so *number* should be used instead of *amount*. Since the number of talented performers isn’t compared to anything, *good* is the correct adjective. The answer is (J). Choices F and G use *amount* where *number* would be correct; additionally, Choice G uses the comparative adjective *better*, but nothing is compared here. Choice H also uses *better*, which is correct only in a comparison.

27. C

**Difficulty:** Medium

**Category:** Conciseness

**Getting to the Answer:** Be aware of phrases like “It being that”; they add no real meaning to the sentence and provide no clear antecedent for the pronoun. “It being that” is unnecessary here, but eliminating it creates a run-on sentence. Choice (C) eliminates the unnecessary language and makes the second clause subordinate. Choices B and D both use incorrect grammatical structure.

28. **G**

**Difficulty:** Medium

**Category:** Agreement

**Getting to the Answer:** Elements in a compound must be parallel in structure. The conjunction “or” creates a compound: students load up on caffeine “so they can cram all night . . . or finishing their research papers.” Choice (G) makes the two verbs, *cram* and *finish*, parallel. Choices H and J do not address the parallelism error.

29. **D**

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** A sentence may have multiple nouns and verbs and still be a fragment. A complete sentence requires a subject and a verb in an independent clause that expresses a complete thought. The subject here is “a group of high school students,” but the clause “who stops by to have an ice cream cone or an egg cream”

describes the students without providing a predicate verb. Choice (D) eliminates the pronoun, making *stops* the predicate verb. Choice B does not address the error and incorrectly uses *that* to refer to people. Choice C creates an error in subject-verb agreement; the plural pronoun *they* does not agree with the verb *stops*.

30. **H**

**Difficulty:** Medium

**Category:** Organization

**Getting to the Answer:** When you need to add or move information, read the new information into the passage at the suggested points to determine its logical placement. The paragraph describes different customers at the coffee shop throughout a typical day, starting in the morning and ending in the evening. This sentence talks about customers who come to the coffee shop in the afternoon, so it should be placed between Sentence 3, which talks about daytime customers, and Sentence 4, which describes customers in the evening. Choice (H) is correct. Choices F and J both place the information about customers in the afternoon after information about customers in the evening. Choice G places the information about afternoon customers before the information about morning customers.

3. *Mr. Midshipman Marryat*

31. **A**

**Difficulty:** Low

**Category:** Sentence Structure

**Getting to the Answer:** Remember your tested comma rules. If a sentence doesn't satisfy a tested condition, the comma will be incorrect. No change is needed here. Choice B treats *naval*, *adventure*, and *exploration* as three items in a list, but *naval* is an adjective, not a noun. Choice C places a comma between the adjective *naval* and *adventure*, the noun it describes. Choice D adds a semicolon, but the second clause is not independent.

32. **G**

**Difficulty:** Low

**Category:** Conciseness

**Getting to the Answer:** Always read until you have enough information to identify the issue. A problem that isn't apparent in the underlined portion may be clear when you consider the whole sentence. The sentence is grammatically correct, but it uses redundant language: *Finally* and *at last* mean the same thing. Choice (G) is the most concise and is therefore correct. Choice H changes *Finally* to *In the end*, but this doesn't correct the redundancy problem. Choice J makes the redundancy problem worse by using both *Ultimately* and *the result*.

33. **C**

**Difficulty:** Medium

**Category:** Agreement

**Getting to the Answer:** Every pronoun must have a clear and logical antecedent. Marryat, not his parents, enlisted in the British navy, so the pronoun here should be *he*, not *they*. Both (C) and D correct the pronoun, but D introduces a new error; a comma, not a semicolon, is used with a coordinating conjunction (*and*). Choice B does not address the error.

34. **H**

**Difficulty:** Low

**Category:** Agreement

**Getting to the Answer:** Remember the difference between *who's* and *whose*. *Who's* always stands for *who is* or *who has*, while *whose* shows possession. The *naval exploits* were Cochrane's, so the pronoun *whose* is correct here, as in (H). Choice F uses *that's*, which is a contraction for *that is*; "that is naval exploits are legendary" doesn't make sense in context. Choice G uses *who's*, a contraction for *who is* or *who has*; "who is (or has) naval exploits are legendary" doesn't make sense. Choice J creates a grammatically incorrect sentence.

35. **A**

**Difficulty:** Medium

**Category:** Development

**Getting to the Answer:** Use your elimination skills here. Once you've answered the question *yes* or *no*, you can immediately eliminate two choices and focus your attention on the remaining two. The question asks you if the phrase “a number of” adds meaning to the sentence, so take a look at the sentence without the phrase. Omitting the phrase leaves you with Cochrane “as the inspiration for Marryat’s fictional characters.” A reader could easily assume that this means that Cochrane was the inspiration for all of Marryat’s characters, which definitely changes the meaning of the sentence. Choice (A) provides the correct answer. Choice B is incorrect because *characters* is plural, which indicates that Cochrane was a model for more than one character. Choices C and D incorrectly state that omitting the phrase would not change the meaning of the sentence.

36. J

**Difficulty:** Medium

**Category:** Development

**Getting to the Answer:** When you're asked about adding a new phrase or sentence, consider both relevance and tone. The focus of this essay is Marryat and how his adventures at sea influenced his writing. The description of Cochrane as an inspiration for Marryat is directly related to the essay's focus, but the information that Cochrane inspired another writer is irrelevant. The sentence should not be added because it is not connected to the main idea of the essay, so (J) is correct. Choices F and G would both incorrectly add the sentence to the essay. Choice H is incorrect because even adding an explanation of

the relationship between O'Brian and Marryat would not make this detail relevant to the topic of the essay.

37. **B**

**Difficulty:** Medium

**Category:** Development

**Getting to the Answer:** The question asks which choice would NOT be equivalent, so determine which answer choice stands out from the rest. Choices A, C, and D all convey that the authors are widely known. Choice (B) has a different sense. *Beloved* means well-loved, which is not the same as being widely known. Thus, (B) is correct.

38. **G**

**Difficulty:** Medium

**Category:** Organization

**Getting to the Answer:** The question asks you to correctly place the prepositional phrase in the sentence, so start by determining what came “from historical records.” The sentence explains that Marryat had vast experiences at sea, while other writers had only “their imaginations and accounts.” It makes sense that these accounts came “from historical records,” so the placement in (G) is correct. Choice F indicates that the captain himself, not stories about him, came “from historical records.” Choice H indicates that the other writers came “from historical records,” which doesn’t make sense. Choice J indicates

that Marryat’s memories of adventures came “from historical records”; this contradicts the information in the passage.

39. **A**

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** Not every underlined portion will contain an error; about 25% of English Test questions will require no change. In this sentence, “captain and literary inspiration” describes Cochrane; (A) correctly sets “Cochrane” off from the rest of the sentence. Choices B and D incorrectly place commas within a compound; commas are used to set off items in a series of three or more. Choice C omits the comma necessary to set off “Cochrane” from the rest of the sentence.

40. **F**

**Difficulty:** Medium

**Category:** Agreement

**Getting to the Answer:** Verb tenses must make sense in the context of the sentence, so consider whether one action logically occurs before another. This sentence tells you about two past events—a midshipman falling overboard and Marryat jumping into the sea to save him. The first event was the midshipman falling, so the past perfect “had fallen” in (F) is correct. Choice G uses the conditional “would have fallen,” but Marryat didn’t prevent the midshipman from falling into the sea; he

jumped in a er the midshipman. Choice H illogically suggests that the midshipman was still in the process of falling overboard when Marryat jumped in to save him. Choice J incorrectly uses the present tense; all of the actions in this sentence took place in the past.

41. **D**

**Difficulty:** Low

**Category:** Conciseness

**Getting to the Answer:** The passive voice is not always incorrect, but it is generally wordier than the active. If a passive construction can be easily made active, the correct answer choice will do so. Marryat is the one who accomplished the feats, so an active sentence will focus on him, rather than his actions. Choice (D) makes *he* the subject and uses the active verb *accomplished*. Choices A and C make *feats*, not Marryat, the subject, requiring passive and unnecessarily wordy constructions. Choice B is also unnecessarily wordy.

42. **G**

**Difficulty:** Medium

**Category:** Organization

**Getting to the Answer:** When a transition word is underlined, check both the grammar and the logic of the transition. The underlined word connects Marryat's successes at sea with his earning a medal for inventing a special lifeboat. The second idea does not follow from the

first, making F incorrect. Choice H suggests that Marryat won medals for his earlier feats, which is not supported by the paragraph. Choice J inappropriately begins a list with its third item. Choice (G) is correct; the best transition is simply to add the final item to Marryat’s list of successes.

43. **B**

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** Modifying words and phrases should be as close as possible to the person, thing, or action they describe. Marryat’s “novels and short stories” were published in England while he was at sea; (B) makes this clear. In A, “during this time” seems to be what was published in England, which is illogical. Choice C is awkwardly worded, and “by him” is redundant with “His greatest acclaim.” The sentence created by D is grammatically incorrect.

44. **H**

**Difficulty:** Medium

**Category:** Agreement

**Getting to the Answer:** Many ACT Usage questions hinge on preposition choice. The correct idiom here is “concentrate on writing,” as in (H). Choice F uses “concentrate for”; you might concentrate for a period of time, but you don’t concentrate *for* writing. Choice G uses

“concentrate at”; you might concentrate at a place, such as school, but you don’t concentrate *at* writing. Choice J uses two prepositions that are inappropriate in context. You don’t concentrate *with* writing; additionally, “writing of full-time” suggests that Marryat was writing about the topic of full-time.

45. **B**

**Difficulty:** Medium

**Category:** Organization

**Getting to the Answer:** The first paragraph in a passage typically introduces the passage’s topic. Only Paragraph 2 uses Marryat’s full name: *Frederick Marryat*. This paragraph also introduces the topic: Marryat wrote about the adventures he had at sea. This makes Paragraph 2 a better opening paragraph than Paragraph 1; (B) is correct. Choice C interrupts the chronology by placing information about Marryat’s enlistment in the navy after details about his first few years in the navy. Choice D similarly disrupts the chronological order by placing information about Marryat’s enlistment in the navy after all of the details about his experiences in the navy.

9. *The Toughest Task in Sports*

46. **J**

**Difficulty:** Low

**Category:** Conciseness

**Getting to the Answer:** When DELETE is an option, read the underlined selection for relevance. The first paragraph compares the challenge of hitting a major league fastball to that of stopping a crank shot in lacrosse. The rest of the passage focuses on lacrosse, returning to the comparison to baseball in the third and fourth paragraphs. The description of quarterbacks is out of scope, so it should be deleted, (J). Choices G and H also concern the challenges faced by quarterbacks.

47. **C**

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** The words *that* and *which* often begin dependent clauses; when one of these words is included in an underlined portion, make sure it doesn't create a sentence fragment. As written, this sentence has no predicate verb. *Lacrosse* is the subject, but "is often referred to" is the verb for the clause that begins with *that* and describes *Lacrosse*. Removing *that* makes "is often referred to" the main verb; (C) is correct. Choices B and D do not correct the fragment error.

48. **G**

**Difficulty:** Medium

**Category:** Agreement

**Getting to the Answer:** An adverb can modify a verb, adjective, or another adverb; it cannot be used to modify a noun. Here, the adverb *brutally* is used to modify the noun *game*. The adjective form *brutal* in (G) is correct. Although *brute*, H, can be used as an adjective, it is incorrect in this context. Choice J uses *brutality*, which is a noun, where the adjective form is needed.

49. **A**

**Difficulty:** Medium

**Category:** Sentence Structure

**Getting to the Answer:** When the main difference in the answer choices is punctuation, remember your tested rules. A comma is not needed to separate two items connected with *and*. No change is needed, making (A) correct. Choice B uses a semicolon, which would only be correct if an independent clause followed it. Choice C omits the conjunction, making the meaning of the sentence unclear. Choice D inserts a comma after *and*; commas are incorrect after the conjunctions in compounds.

50. **G**

**Difficulty:** High

**Category:** Agreement

**Getting to the Answer:** A pronoun and a verb are underlined, so you have several things to check. Make sure that the pronoun has a clear

antecedent and is used consistently. Then make sure that the verb agrees with its subject and is in the correct tense. The pronoun *they* correctly refers to the *players*, but this paragraph is written in the present tense (*is, possess, stands, sprint*). The present tense *attempt* in (G) is correct. Choice F incorrectly uses the past tense. Choices H and J both incorrectly use the pronoun *one*, which does not agree with its plural antecedent *players*.

# MATHEMATICS TEST

1. **B.** Sarah buys 8 cupcakes at \$3.50 each. Total cost =  $8 \times \$3.50 = \$28.00$ . She pays with \$50, so change =  $\$50 - \$28 = \$22.00$ .
2. **B.** When multiplying powers of the same variable, add the exponents. Coefficients:  $3 \times 4 \times 2 = 24$ . Variables:  $x^2 \times x^3 \times x^1 = x^{(2+3+1)} = x^6$ . Final answer:  $24x^6$ .
3. **C.** Start with  $5x - 7 = 3x + 11$ . Subtract  $3x$  from both sides:  $2x - 7 = 11$ . Add 7 to both sides:  $2x = 18$ . Divide by 2:  $x = 9$ .
4. **B.** A 40% markup means the selling price is 140% of the cost. Cost = \$75, so selling price =  $\$75 \times 1.40 = \$105$ .
5. **C.** To add fractions, find common denominator. LCD of 5 and 3 is 15. Convert:  $\frac{3}{5} = \frac{9}{15}$  and  $\frac{2}{3} = \frac{10}{15}$ . Add:  $\frac{9}{15} + \frac{10}{15} = \frac{19}{15}$ .
6. **D.** Mean of 5 scores is 82, so total =  $82 \times 5 = 410$ . Sum of given scores:  $78 + 85 + 90 + 75 = 328$ . Fifth score =  $410 - 328 = 92$ .
7. **D.**  $\log_5(x) = 3$  means "5 to what power equals x?" Since  $5^3 = 125$ ,  $x = 125$ .
8. **B.** Rate =  $240 \text{ miles} \div 8 \text{ gallons} = 30 \text{ miles per gallon}$ . For 360 miles:  $360 \div 30 = 12 \text{ gallons}$ .
9. **A.** Need two numbers that multiply to 42 and add to -13. These are -6 and -7. Factor:  $(x - 6)(x - 7)$ .
10. **C.**  $15\% = 0.15$ . Calculate:  $0.15 \times 480 = 72$ .
11. **B.** Rewrite 32 as a power of 2:  $32 = 2^5$ . So  $2^{(x+1)} = 2^5$ , meaning  $x + 1 = 5$ , therefore  $x = 4$ .
12. **A.** Set up proportion:  $\frac{3}{5} = \frac{\text{boys}}{15}$ . Cross multiply:  $5 \times \text{boys} = 3 \times 15 = 45$ . Boys = 9.
13. **B.** Distribute the negative:  $2a - 3b - 2a + 8b$ . Combine like terms:  $(2a - 2a) + (-3b + 8b) = 5b$ .
14. **B.** Triangle area formula:  $A = (\frac{1}{2}) \times \text{base} \times \text{height} = (\frac{1}{2}) \times 12 \times 8 = 48 \text{ square inches}$ .
15. **A.** Substitute  $x = 2$ :  $f(2) = 3(2^2) - 2(2) + 5 = 3(4) - 4 + 5 = 12 - 4 + 5 = 13$ .
16. **C.** Let the three consecutive odd integers be  $n, n+2, n+4$ . Sum:  $n + (n+2) + (n+4) = 87$ . Simplify:  $3n + 6 = 87$ , so  $3n = 81, n = 27$ . Largest integer =  $27 + 4 = 31$ .
17. **D.** Absolute value makes numbers positive:  $|-8| = 8, |-12| = 12$ . Sum:  $8 + 12 = 20$ .
18. **C.** 25% off means you pay 75% of original price. Sale price =  $0.75 \times \$800 = \$600$ .
19. **A.** In a right triangle,  $\sin^2\theta + \cos^2\theta = 1$ . If  $\sin \theta = \frac{3}{5}$ , then  $(\frac{3}{5})^2 + \cos^2\theta = 1$ . So  $\frac{9}{25} + \cos^2\theta = 1$ ,  $\cos^2\theta = \frac{16}{25}$ ,  $\cos \theta = \frac{4}{5}$ .

20. C. Let the numbers be  $x$  and  $y$ .  $x + y = 45$  and  $x - y = 13$ . Add equations:  $2x = 58$ , so  $x = 29$ .
21. A. Move decimal point to right of first non-zero digit.  $0.000045 = 4.5 \times 10^{-5}$  (moved 5 places right).
22. B. Perimeter =  $2(\text{length} + \text{width}) = 2[(3x + 2) + (x - 1)] = 2(4x + 1) = 8x + 2$ .
23. B. Cross multiply:  $3 \times 21 = 7 \times x$ . So  $63 = 7x$ , therefore  $x = 9$ .
24. A. Total marbles =  $4 + 6 + 5 = 15$ . Probability of blue =  $6/15 = 2/5$ .
25. A. Expand:  $2x - 6 = 3x - 6$ . Subtract  $2x$  from both sides:  $-6 = x - 6$ . Add 6:  $x = 0$ .
26. C.  $i^2 = -1$  by definition. Therefore  $i^4 = (i^2)^2 = (-1)^2 = 1$ .
27. B. Circumference =  $2\pi r = 2\pi(7) = 14\pi$  units.
28. C. The median is the middle value. With 7 numbers, it's the 4th value: 9.
29. B. Substitute  $x = 3$ :  $2(3) + 3y = 18$ . So  $6 + 3y = 18$ ,  $3y = 12$ ,  $y = 4$ .
30. C.  $\sqrt{144} = 12$  and  $\sqrt{64} = 8$ . Sum =  $12 + 8 = 20$ .
31. C. Increase =  $\$54,000 - \$45,000 = \$9,000$ . Percent increase =  $(9,000/45,000) \times 100\% = 20\%$ .
32. B. Factor:  $(x - 2)(x - 3) = 0$ . Solutions:  $x = 2$  or  $x = 3$ .
33. B. Slope =  $(y_2 - y_1)/(x_2 - x_1) = (13 - 5)/(6 - 2) = 8/4 = 2$ .
34. C.  $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$ .
35. B. By definition,  $\tan \theta = \sin \theta / \cos \theta$ . Therefore  $\sin \theta / \cos \theta = 4/3$ .
36. A. If volume = 216, then  $\text{edge}^3 = 216$ . Taking cube root:  $\text{edge} = 6$  inches.
37. B. When raising a power to a power, multiply exponents:  $(x^3)^4 = x^{(3 \times 4)} = x^{12}$ .
38. B. Average of  $x$  and  $y$  is 20, so  $x + y = 40$ . Average of  $x$ ,  $y$ ,  $z$  is 25, so  $x + y + z = 75$ . Therefore  $z = 75 - 40 = 35$ .
39. B. Prime factorization:  $12 = 2^2 \times 3$ ,  $18 = 2 \times 3^2$ . LCM =  $2^2 \times 3^2 = 36$ .
40. D. If 30% of  $n = 45$ , then  $0.3n = 45$ . Divide:  $n = 45/0.3 = 150$ .
41. B. In slope-intercept form  $y = mx + b$ ,  $b$  is the  $y$ -intercept. Here  $b = 5$ .
42. C. First digit: 5 choices. Second digit: 4 remaining choices. Third digit: 3 remaining choices. Total =  $5 \times 4 \times 3 = 60$ .

**43. A.**  $\cos 60^\circ$  and  $\sin 30^\circ$  are complementary angle relationships. Both equal  $1/2$ .

**44. B.** Regular pay =  $40 \times \$18 = \$720$ . Overtime pay =  $5 \times \$27 = \$135$ . Total =  $\$720 + \$135 = \$855$ .

**45. B.** Distance formula:  $d = \sqrt{(7-3)^2 + (7-4)^2} = \sqrt{16 + 9} = \sqrt{25} = 5$ .

# READING TEST

## *Passage I*

1. Suggested Passage Map notes:

¶1: dog vs. doggie

¶2: describes doggie look; doggie grows on you; called “Dumps”

¶3: meeting Dumps: dog running; angry man

¶4: afraid of dog, but dog whines

¶5: owner wants to hurt dog

¶6–9: argue about dog

¶10: narrator threatens owner

¶11–12: owner changes and claims kindness to dog

¶13: owner story: loves dog, got new job, dog escapes, must drive dog back

¶14–15: narrator doubts story, offers to buy dog

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### **BIG PICTURE SUMMARY:**

**Main idea:** Despite his rough appearance, Dumps the doggie evokes affection. The author met Dumps when the dog was running from his possibly abusive former owner.

**Author's purpose:** To describe his dog, his affection for his dog, and the circumstances under which he first met his dog

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1. A

**Difficulty:** High

**Category:** Inference

**Getting to the Answer:** Review the narrator’s discussion of dogs in paragraph 1. In paragraph 2, the narrator notes that people may not initially notice his doggie’s “finer qualities,” but they will see his “amiable spirit” after getting to know him. Predict that while both dogs and the narrator’s doggie are companionable, the main distinction is that his doggie must be less initially appealing; this matches (A). Choice B is incorrect because the narrator never discusses the relative ages of any dog or doggie. Choice C cannot be correct because a “forgiving disposition” (lines 7–8) is attributed to dogs, while the correct answer must reflect a trait of his doggie. Likewise, D reflects the narrator’s description of dogs in paragraph 1.

2. H

**Difficulty:** Medium

**Category:** Detail

**Getting to the Answer:** List the characteristics of Dumps before looking at the answer choices. The narrator states that his “finer qualities” are not obvious but goes on to describe his other features in lines 11–25. Predict: Dumps is mangy-looking, but friendly. This matches (H). Choice F is incorrect because his eyes are described as having a “luster” rather than being “dull.” Choice G is the opposite; the narrator claims “you don’t at once perceive” his mental qualities. Choice J is a distortion because while the dog is certainly hairy, he resembles a “ragged doormat” rather than something “well-groomed.”

3. **B**

**Difficulty:** Medium

**Category:** Inference

**Getting to the Answer:** Consider the scene in paragraphs 3–4. Dumps is described as “active,” “yelping,” and running so quickly that he was kicking up stones. The narrator also notes hearing “the voice of an angry man.” Though the narrator expects the dog to “snap” at him, the dog instead approaches him in a “piteous” manner. This matches (B). Choice A does not match the description of a dog running “wildly.” Choice C is too extreme; the dog is trying to escape the “angry man,” but he is running away, so he is clearly not so upset that he is “immobilized.” Choice D is a distortion: the narrator states in the next paragraph that the owner “seemed about to fling” a “thick stick” at the dog (lines 52–53), not toss a stick in a playful manner.

4. **F**

**Difficulty:** Low

**Category:** Vocab-in-Context

**Getting to the Answer:** The dog’s owner is ready to throw a stick at the dog, so the narrator “checks” him by shouting a threat. The narrator is trying to stop the owner from hurting the dog, so predict “checked” means stopped. This matches (F), “prevented.” The scene has nothing to do with a square design, G, and the narrator is not merely “verifying” something, H, but shouting to prevent an act of

violence. “Assaulted,” J, is too extreme for a verbal response and lacks the necessary connotation of preventing the throw.

5. **D**

**Difficulty:** High

**Category:** Function

**Getting to the Answer:** When stopped, the owner scowls and claims that “A man may do as he likes with his own.” The narrator responds with indignation, showing the owner and the reader that animal welfare is important to him. The word “man” is emphasized to indicate that the narrator is using it sarcastically; he does not think the owner is acting like a “man” at all, which matches (D). Choice A is a misused detail; the narrator does refer to the other man as “big” in paragraph 5, but he is not using the word “man” to describe the other man’s size. Instead, he is using it to question his humanity. Choice B is opposite, as the narrator does not agree with the owner, answering him “indignantly.” Choice C is a distortion. Although the narrator states that “cruelty” to animals “has the effect of inclining me to fight,” his actions are not physical.

6. **H**

**Difficulty:** Low

**Category:** Detail

**Getting to the Answer:** In lines 61–62, the owner initially responded to the narrator’s words with a “sulky scowl.” In response, the narrator mentions an Act of Parliament and makes a threat. At this, the owner stops scowling, seeming “to have been affected by my threats.” The owner was worried about the narrator’s threats of prosecution, (H). Choice F is out of scope; the owner never seems worried that the dog will bite, and the dog has been behaving kindly towards the narrator since running up to him. Choice G is incorrect because the owner does not discuss his factory job until a later paragraph and never mentions being late to work. Choice J distorts the passage: the owner, not the narrator, was about to throw a stick at the dog.

7. A

**Difficulty:** High

**Category:** Inference

**Getting to the Answer:** Consider the narrator’s tone and comments directed toward the reader. Although the introduction might appear to be argumentative, the narrator includes comments to the reader in lines 2–3 and lines 22–25 that display a thoughtful attitude. He will later explain his behavior in lines 65–66: “I am naturally of a peaceable disposition.” Clearly, the narrator doesn’t want the reader to think him a brute. This tone matches (A). Choice B is opposite; the narrator is mindful of the reader, though he argues with the dog owner in the passage. Choice C is extreme; the narrator never expresses fear that anyone will disagree with his views about dogs, doggies, or animal welfare. Choice D is also extreme. The narrator seems to desire the

reader to have a favorable opinion of him, but nothing suggests that he is so concerned that he's misrepresenting the events.

8. **G**

**Difficulty:** Medium

**Category:** Inference

**Getting to the Answer:** Locate the paragraph that contains the owner's explanation about "kindness" (lines 78–94) and review his story. To prevent the dog from following him to the factory, the owner chases him home "out of pure kindness." This matches (G). Choice F is a misused detail; the owner does make this claim in lines 61–62, but this is before he's trying to explain his behavior towards the dog as kindness. Choice H is out of scope, as no mention is made of playing fetch, and the owner even admits that the throwing of "sticks an' stones" is meant to drive the dog home. Choice J is a distortion. While the owner does claim that the dog might be harmed at the factory, he does not claim that the men at the factory "have a record" of these types of actions in the past.

9. **D**

**Difficulty:** High

**Category:** Inference

**Getting to the Answer:** In lines 88–94, the owner explains his motivation for his treatment of the dog. After hearing this, the narrator

is “somewhat doubtful of the truth of this story.” The narrator had just seen the owner mistreating his dog, despite his claims, and his initial “scowl” morphs to a “deferential air” (line 75) as soon as the narrator threatens to have him arrested for his behavior. It seems that the owner is putting on an act to avoid prosecution, (D). Choice A is out of scope; the passage concludes before the purchase of the dog is discussed, so we don’t know anything about the owner’s eagerness. The narrator calls the owner “big” and “rough” (lines 50–51) but never questions his employability, B, only his treatment of animals. Choice C is a distortion; the narrator’s suspicion of the story stems from the owner’s contradictory actions and behaviors, not his assumptions about conditions at the owner’s workplace.

10. **G**

**Difficulty:** Medium

**Category:** Inference

**Getting to the Answer:** Keep in mind both the characters’ actions and motivations as well as the timing. Immediately after the owner’s story about why chasing the dog with sticks is “kindness,” the narrator doubts this explanation and has the sudden thought of buying the dog (lines 95–101). The narrator has considered everything that’s happened thus far and realizes that the win-win-win scenario for himself, the owner, and the dog is for him to buy the dog, which matches (G). Choice F is a distortion. The first paragraphs do establish that the dog is “amiable,” but the narrator is immediately motivated by his concern for the dog’s welfare. Choice H is opposite; rather, he acts

assertively towards the owner, as in lines 57–58: “as I felt confidence in my strength, my stick, and the goodness of my cause, I was bold.” Choice J is also a distortion, as the narrator believes the owner is just pretending to have concern for the dog’s welfare.

## *Passage II*

### 2. Suggested Passage Map notes:

#### Passage A

¶1: Present-day people think science is unquestionable

¶2: History shows that science is not always correct

¶3: People think science remains constant, but questioning leads to progress

#### Passage B

¶1: Historically people were skeptical about science

¶2: Scientific research should be questioned

¶3: Pharma. company studies should be scrutinized

¶4: Policy decisions should be based on balance of faith and doubt

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## **BIG PICTURE SUMMARY:**

### **Passage A**

**Main idea:** The public misunderstands scientific research as supplying unquestionable certainties rather than probabilities because science seems predictable in everyday life.

**Author's purpose:** To argue that science research is subject to uncertainties, possibilities, and limitations

### **Passage B**

**Main idea:** The current public is not critical enough of scientific research, especially as it is applied to public policy.

**Author's purpose:** To argue for better public knowledge about the background of scientific studies and a middle-of-the-road approach to applying research to public policy

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11. **B**

**Difficulty:** Low

**Category:** Detail

**Getting to the Answer:** The first mention of policy makers is in paragraph 1, line 14, where the author writes that they “treat the results of every latest study as if they were surefire truths.” In other

words, they accept the results without question, which matches (B). Choices A, C, and D are opposites.

12. **H**

**Difficulty:** Low

**Category:** Inference

**Getting to the Answer:** Because the question cites a specific part of the passage, reread the relevant text to make a prediction. In line 33, the author uses the word “probabilities” to refer to the scientific discipline that studies the comparative chances of events taking place, which matches (H). Choice F is opposite; the author believes that science is uncertain, so theories will not necessarily be proven true. Choice G is out of scope; the author does not include information about how future scientists will impact current data. Choice J is a distortion; the author does state that “an unfounded prejudice stemming from a desire for scientific constancy can actually discourage inquiry,” but that is not related to the idea that science is an implementation of probabilities.

13. **C**

**Difficulty:** Medium

**Category:** Vocab-in-Context

**Getting to the Answer:** The word *complacent* follows examples of predictable events, including a car starting and a power plant running

without problems. Since we assume these events will always be the same, we become used to them and don't question them at all. In the same way, we have a "a complacent faith in the reliability and consistency of science" and assume that study results are always correct. Choice (C), unquestioned, is a synonym for *complacent*. All other choices are incorrect definitions based on the context provided.

14. **G**

**Difficulty:** Medium

**Category:** Detail

**Getting to the Answer:** If you have not made notes about various scientific studies in your map, scan through the passage looking for each of the answer choices and eliminate those which were not accepted by the public. Choice F is questioned by "some critics," who we cannot assume are the general public. Choice H is in Passage A, not Passage B, and J isn't in the passage at all. That leaves (G) as the correct answer.

15. **B**

**Difficulty:** Medium

**Category:** Function

**Getting to the Answer:** Use your passage notes to help predict an answer for a Function question that refers to an entire paragraph. The first paragraph of Passage B outlines the way that skepticism toward

science has changed over time. Choice (B) matches the function of paragraph 1. Choice A is out of scope; no new hypothesis is introduced in this paragraph. Choice C is a misused detail; paragraph 2 introduces the issue of public policy, but this question asks specifically about paragraph 1. Choice D is a misused detail; underlying causes are discussed in the third paragraph, not the first.

16. **F**

**Difficulty:** High

**Category:** Inference

**Getting to the Answer:** Remember not to make too big a logical leap; the correct inference will not stray far from the text. The author believes that people are too ready to believe the results of scientific studies. Choice (F) fits well with the text and represents a logical, supportable inference. Choice G is out of scope; neither author supports the idea of government control and regulation. Choice H is a misused detail; this idea applies to Passage A. Choice J is out of scope; the belief that the reliability of science has decreased isn't discussed in the passage.

17. **C**

**Difficulty:** High

**Category:** Inference

**Getting to the Answer:** Keeping track of each author’s primary viewpoints or beliefs can help you to more quickly evaluate and eliminate answer choices. Passage B describes a solution in which people understand enough about science to assess its reliability for themselves, but Passage A claims that people don’t do this because they desire a world of certainties. The contrast between striving for more knowledge and clinging to easy beliefs is captured in (C). Choice A is a distortion; the actions and attitudes of policymakers don’t prevent people from becoming better educated. Choice B is a misused detail; Passage B discusses the difficulties of obtaining impartial results, but this is not relevant to the question. Choice D is out of scope; the author of Passage A discusses ethical questions, but this is not related to the solution specified in Passage B.

18. **F**

**Difficulty:** Low

**Category:** Detail

**Getting to the Answer:** Remember that the answers to Detail questions are always stated directly. By turning first to the passages, you can accurately predict the correct answer and not be misled by misused details. Passage A includes the phrase “present-day industrial societies” in the first sentence, and Passage B mentions “present-day industrial societies” in the second paragraph. Choice (F) matches your research. Choice G is a misused detail; this phrase is from paragraph 2 in Passage A. Choice H is a misused detail; this is included in paragraph

3 in Passage B. Choice J is a misused detail; this is mentioned in the first paragraph of Passage B only.

19. **B**

**Category:** Detail

**Difficulty:** Medium

**Getting to the Answer:** Prediction is key in Detail questions. Wrong answer choices will often reference other details erroneously. In paragraph 2, the passage directly states “In the late 19th century, when Italian astronomer Giovanni Schiaparelli first detected seas and continents on the planet Mars, many people balked at the idea of Earth-like topography on the Red Planet,” which shows the fallibility, or inaccuracy, of a scientific certainty. Use this as a prediction. Choice (B) matches the prediction. Choice A is a misused detail; this example is mentioned in Passage A, not Passage B. Choice C is a distortion; the author of Passage B discusses this in paragraph 4, but these are not examples of the fallibility of scientific certainties. Choice D is a misused detail; this example is mentioned in Passage A, not Passage B.

20. **F**

**Difficulty:** Medium

**Category:** Function

**Getting to the Answer:** When a question stem includes a specific line reference, you usually need to read a little before and a little after

those particular lines in order to understand the full context of the quoted portion. The word cited in the question stem comes from the third paragraphs of Passage A and Passage B. Passage A says, “technological advances engage increasingly complex moral questions within fields such as pharmaceutical developments” and Passage B states that “Some critics of company-funded studies argue that the level of misrepresentation included in such studies borders on immoral.” Choice (F) matches with the references to moral questions in both passages. Choice G is a misused detail; this is mentioned in Passage B only, in the last paragraph. Choice H is a misused detail; this is mentioned in Passage A only, in the third paragraph. Choice J is a misused detail; drug testing and analysis is discussed in paragraph 3 of Passage A but not in paragraph 3 of Passage B.

### *Passage III*

#### 3. Suggested Passage Map notes:

¶1: Walter Scott (S) born in Scotland in 1771, wrote Scottish ballads

¶2: S poetry brought fame

¶3: 1814, S started writing novels anonymously for \$

¶4: 1820 S wrote *Ivanhoe* set in England, became Baronet

¶5: wrote for \$ until his death in 1832

¶6: S (1) popularized historical novel, (2) rehabilitated Highland culture

¶7: S responsible for Scottish banks retaining right to issue own banknotes

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### **BIG PICTURE SUMMARY:**

**Main idea:** Scott faced highs and lows through his writing career, which included writing poetry and historical fiction about his native Scotland.

**Author's purpose:** To describe the career and influence of author Sir Walter Scott

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21. **B**

**Difficulty:** Medium

**Category:** Global

**Getting to the Answer:** This question focuses on the big picture. You should be predicting the purpose and main idea of every passage so you can deal with questions like this quickly. Your notes should tell you that the author is writing more about Scott's achievements than about his weaknesses. You can predict that the answer will be favorable overall. Choice A is out of scope; this choice lacks a sufficient focus on Scott. Choice (B) matches your prediction. Scott's success is stressed throughout and the last two paragraphs point out Scott's impact in

several areas. Choice C is a distortion; although you read that Scott had financial difficulties, the financial aspect is much less important than is the success of his writing. Choice D is a distortion; the passage offers no support for this claim.

22. **J**

**Difficulty:** Medium

**Category:** Detail

**Getting to the Answer:** On Detail questions, first find the appropriate section in the passage. Read the question carefully; sometimes a single word can make a major difference in selecting the correct answer. Note that the question asks about why Scott started writing novels, not poetry, so look to paragraph 3, where the author first talks about Scott’s novels. The first line tells you that financial difficulties led Scott to write a novel, which met with great success. Look for a choice that matches this idea. Choice F is out of scope; the author doesn’t list this outcome as a result of Scott’s polio. Choice G is out of scope; nothing in the passage mentions “copyright violations.” Choice H is out of scope; the author doesn’t reference whether the ballads sold well or not. Choice (J) fits the prediction.

23. **D**

**Difficulty:** Low

**Category:** Detail

**Getting to the Answer:** If your notes don't help, titles, whether italicized or capitalized, are easier to spot when skimming. In the third paragraph, you see that the author references *Waverly* to mention that Scott left his name off it because he was “mindful of his reputation as a poet.” Use this as your prediction. Choice A is a distortion; your research tells you that it was his reputation as a poet, not as a lawyer, that concerned Scott. Choice B is a misused detail; the author tells you that Scott found writing anonymously “fun” only after he believed that it would not damage his reputation as a poet. Choice C is out of scope; although the fact that Scott was “widely rumored” to be the author indicates that there was public interest in the novels’ author, there is nothing to suggest that interest spurred sales. Choice (D) matches the prediction.

24. J

**Difficulty:** Medium

**Category:** Inference

**Getting to the Answer:** Use the passage to help you understand the author’s view of this concept. First find where he refers to Scott and Scottish history, and then focus on the tone of that discussion. Consider the author’s overall attitude toward Scott, which is positive. In paragraph 4, the author mentions Scott’s popularization of the tartan and kilt and writes that he turned them into symbols of national identity. Also, in paragraph 6, you see in lines 85–87 that Scott’s novels “rehabilitated Highland culture after years in the shadows.” Choice F is opposite; the author’s tone is more admiring than this. Choice G is

opposite; to say that Scott “rehabilitated Highland culture” sounds important. Choice H is a distortion; Scott wrote novels, not “serious analyses of Scottish history.” Choice (J) matches the research above.

25. **A**

**Difficulty:** Medium

**Category:** Inference

**Getting to the Answer:** When in doubt, keep in mind the overall tone that the author takes in the passage. This question asks about Scott’s reputation after his death. Since the overall structure of the passage is chronological, it is likely that the answer will come toward the end. The last three paragraphs give evidence of Scott’s continued popularity: you read that his novels continued to sell after his death, eventually covering his debts; that Edinburgh’s central railroad station was named after his first successful novel; and that his picture is on Scottish currency today. You can predict that his reputation has only grown or is still positive. Choice (A) matches the prediction, and a quick check of the other choices shows that this is the only one with a positive description. Choice B is opposite; the passage clearly states that Scott’s novels continued to sell well after his death. Choice C is a distortion; his debts were unpaid, but this did not affect Scott’s reputation. Choice D is a distortion; the passage does mention such imitators (lines 80–82), but the author doesn’t suggest that they damaged Scott’s reputation.

26. **F**

**Difficulty:** High

**Category:** Vocab-in-Context

**Getting to the Answer:** Sir Walter Scott never put his own name to his novels, but instead attributed them to “the author of Waverley,” or to no author at all. He continued to do this even when his novels became so popular that it would not have hurt his reputation to reveal his name. Nevertheless he “maintained the façade,” meaning that he continued to hide his own authorship under the pretense that he was not the author of the novels, a match for (F). Choice G is another definition of façade, but it doesn’t make sense in the context of the passage. Choice H has a negative connotation, while the author says Scott maintained the pretense “out of a sense of fun.” Choice G also doesn’t make sense in the sentence.

27. **B**

**Difficulty:** Low

**Category:** Function

**Getting to the Answer:** To understand the function of a word in context, reading the entire sentence it appears in should be enough. Ask yourself why the placement of this statue would be fitting—the author has not referred to Wallace before this point. The author has, however, previously stressed Scott’s affinity for his native land, Scotland, for which Wallace is a great historical figure. Look for a connection with Scotland among the choices. Choice A is out of scope;

nothing in the passage suggests that Scott ever wrote a novel about Wallace. Choice (B) fits your prediction. Choice C is out of scope; this fails to address the choice of Wallace. Choice D is out of scope; the passage doesn't support this.

28. **H**

**Difficulty:** Medium

**Category:** Inference

**Getting to the Answer:** You will need to answer this question from your overall impression of the passage rather than any specific paragraph. First you need to decide whether the author's attitude is positive or negative. Look to the close of the passage; you know that the author believes Scott was responsible for two major trends. The focus on Scott's achievements indicates that the author admires Scott's work. Choice F is a distortion; nothing indicates that the author is skeptical toward Scott's achievements. Choice G is opposite; both of these adjectives are too negative. Choice (H) matches your prediction. Choice J is out of scope; the passage gives no such indication of jealousy.

29. **D**

**Difficulty:** Low

**Category:** Inference

**Getting to the Answer:** Paragraph references focus your research. Use your notes and reference the passage as needed. The author writes that Sir Walter refused to declare bankruptcy, insisting on putting his home and income into a trust that would eventually pay back his creditors completely. Predict that he was committed to paying his debts back. Choice A is opposite; the passage clearly contradicts this. Choice B is out of scope; the author never discusses the cause of Scott's debts. Choice C is out of scope; the author doesn't mention such annoyance on Scott's part. Choice (D) matches the prediction.

30. F

**Difficulty:** Low

**Category:** Inference

**Getting to the Answer:** Read the complete sentence for context. You may need to read the ones before and after as well. The prior sentence states that Scott was working as a lawyer, after which you read the first mention of Scott's writings. The subsequent sentences make clear that the emphasis has shifted to Scott's literary career. So the sentence including "dabbling" deals with Scott's first forays into writing. Look for a choice that captures that idea. Choice (F) matches the thrust of the prediction. Choice G is a misused detail; Scott's printing press is not mentioned until paragraph 3, and the author draws no connection between his "dabbling" and his financial troubles. Choice H is a distortion; he was certainly inexperienced, but there is no evidence that his work was inferior. Choice J is a distortion; "dabbling" refers to Scott's writing, not to his interest in history.

## *Passage IV*

### 4. Suggested Passage Map notes:

¶1: Lemur (L) part of suborder of primates, nocturnal; flying lemurs not primates

¶2: L found on Madagascar, larger are nocturnal, smaller are diurnal

¶3: All L species are endangered b/c deforestation and hunting

¶4: Ring-tailed lemur (RTL) most populous L in zoos

¶5: RTL physical characteristics

¶6: RTL baby v. adult characteristics

¶7: RTL live in forests or open brush, require primary forests

¶8: RTL behavior, territory

¶9: RTL communication

¶10: RTL breeding

31. C

**Difficulty:** Low

**Category:** Detail

**Getting to the Answer:** Wrong answers on Detail questions often include material relevant to other sections of the passage. Be sure you research the passage carefully to interpret the context correctly. You are looking for a factor that is responsible for the lemurs' survival. Your notes should help you find your way to paragraph 2, where the author first discusses Madagascar. The author says the lemurs "were safe from competition" on the island. That should factor into the correct choice. Choice A is a misused detail; the author does mention that lemurs have large reflective eyes, but doesn't relate this to survival. Choice B is a misused detail; scent marking is related to their social organization, not their survival. Choice (C) paraphrases the relevant sentence in paragraph 2 and is correct. Choice D is a misused detail; the author mentions "hierarchy" later, but not as an explanation for the lemurs' survival.

32. **F**

**Difficulty:** Medium

**Category:** Detail

**Getting to the Answer:** Taking good notes and marking the passage will help you on Detail questions that lack line references. From your notes, you should see that social organization is discussed in paragraph 8. The writer states that there are separate hierarchies for each gender and that "females tend to dominate the troop." Look for this among the choices. Choice (F) matches your prediction. Choice G

is a distortion; the author does reference “foraging,” but not in the context of social organization. Choice H is out of scope; the author doesn’t offer support for such a sweeping statement. Choice J is opposite; the author writes that females tend to dominate the troop.

33. **D**

**Difficulty:** Medium

**Category:** Vocab-in-Context

**Getting to the Answer:** Since *odd* is a common word, it’s important to think about it in the specific context of what the author has written. He uses the word when describing what ring-tailed lemurs usually eat—fruit, leaves, and seeds, plus an insect every now and then. Thus, *odd* refers to *occasional*, as (D) says. All other answer choices are possible definitions of *odd*, but none makes sense in the sentence.

34. **G**

**Difficulty:** Medium

**Category:** Detail

**Getting to the Answer:** The answers to Detail questions are stated directly in the passage—you can find the answer with research. This point is fairly obscure, and may not be reflected in your notes. If you have to, skim for *zoo*, which appears in paragraph 4. The author states that ring-tailed lemurs are the most populous lemurs in zoos and follows that by writing “they reproduce readily in captivity.” Use that as

your prediction. Choice F is out of scope; the author doesn't make such a contention. Choice (G) is a good paraphrase of the text referenced above. Choice H is out of scope; the author does not make this point. Choice J is a distortion; the author addresses "foraging," but not in connection with zoos.

35. **D**

**Difficulty:** Medium

**Category:** Inference

**Getting to the Answer:** When given a line reference, move quickly and read at least that entire sentence to discern context. The author indicates that lemurs need to live in primary forest to survive. The clearing will likely endanger the lemurs' continued survival. Look for a match to this idea. Choice A is out of scope; the author does not refer to this. Choice B is out of scope; the author does not refer to this. Choice C is out of scope; the author doesn't reference such predators here. Choice (D) matches the research above.

36. **H**

**Difficulty:** Low

**Category:** Detail

**Getting to the Answer:** This is an EXCEPT question. That means you need to find three choices that are mentioned in the text and one that is not. Don't confuse the two. Your notes can help you to locate

“olfactory signals”; they appear in paragraph 9. Work through the paragraph, crossing off the three choices that do appear. Choice F is opposite; this appears in line 88–89. Choice G is opposite; this appears in line 90–91. The author does not reference (H), which makes it the correct answer. Choice J is opposite; this appears in line 88.

# SCIENCE TEST

## *Passage I*

1. **C**

**Difficulty:** Medium

**Category:** Thinking Like a Scientist—Evaluating Hypotheses

**Getting to the Answer:** According to Scientist 2, the positions of electrons are “random and yet localized” as they move around the nucleus. They don’t follow fixed orbits, but they are more likely to be in some places than others. Thus, one way to describe the movement of electrons would be to say that it’s “almost random,” as in (C). Choice A is incorrect because it better describes the Bohr model. Choices B and D are incorrect because they contradict both models; both suggest that electrons move around the nucleus in some way.

2. **J**

**Difficulty:** High

**Category:** Thinking Like a Scientist—Evaluating Hypotheses

**Getting to the Answer:** Scientist 2 mentions the wave function in order to explain the way in which an electron’s possible position is given boundaries. These boundaries determine the shape of an atom, which in turn helps to define many of its properties. Choice (J) is thus correct. Choice F conflates the two models, but only the Bohr model describes orbits and only the electron cloud model deals with

probabilities. Choice G is incorrect because neither scientist suggests a dependence between charge and the color of light emitted by an atom. Choice H is incorrect because Scientist 2 only discusses the wave-particle duality with respect to electrons.

3. **A**

**Difficulty:** Low

**Category:** Thinking Like a Scientist—Evaluating Hypotheses

**Getting to the Answer:** Although the two models offer differing accounts of how electrons move around the nucleus, both agree that electrons move rather than remaining in a fixed position. Choice (A) is thus correct. Choice B is incorrect because neither view suggests that charge is based on probability; only the electron cloud model discusses probability, but there it is applied only to position, not charge. Choice C is incorrect because neither scientist discusses the composition of protons and neutrons. Choice D is incorrect because both views discuss the components of atoms, suggesting that atoms can in fact be divided into smaller parts.

4. **G**

**Difficulty:** Medium

**Category:** Thinking Like a Scientist—Evaluating Hypotheses

**Getting to the Answer:** Scientist 1 cites the fact that excited electrons emit very specific wavelengths of light when reverting to lower energy

orbits, and makes the following argument in favor of the Bohr model: “If the position of electrons is not specified, the precise wavelengths of light that are emitted cannot be explained.” This poses a direct challenge to the view of Scientist 2, so (G) is correct. Choice F is incorrect because it contradicts the views of both scientists. Choice H is incorrect because it’s cited by Scientist 2 as support for the probability cloud idea. Choice J is incorrect because it’s a fact agreed to by both scientists.

5. **A**

**Difficulty:** High

**Category:** Thinking Like a Scientist—Evaluating Hypotheses

**Getting to the Answer:** According to Scientist 2, “[t]he uncertainty of any one electron’s position and the nature of its existence as a charged particle contribute to an understanding of the wave-particle nature of matter and energy.” The findings mentioned in the question stem further support this wave-particle duality. Therefore, (A) is correct. Choice B is incorrect because traveling in distinct paths is part of the Bohr model. Choices C and D are incorrect because they suggest the observation supports the Bohr model. Choice D also wrongly supplies reasoning in favor of the electron cloud model rather than the Bohr model.

6. **H**

**Difficulty:** Medium

**Category:** Thinking Like a Scientist—Evaluating Hypotheses

**Getting to the Answer:** Scientist 2 begins by stating that “[t]he precise location of electrons cannot be detected.” This challenges the idea from the Bohr model that electrons travel in fixed paths, which would allow their locations to be identified precisely. Choice (H) is therefore correct. Choice F is incorrect because it is not inconsistent with the Bohr model (Scientist 1 would say that electrons have a 100% chance of occupying one of the fixed orbit paths, and a 0% chance of being elsewhere). Choices G and J are incorrect because they are not discussed by either scientist.

7. **C**

**Difficulty:** Medium

**Category:** Experiments—Synthesizing Data

**Getting to the Answer:** According to Scientist 1’s account of the Bohr model, “[e]lectrons move around an atom’s nucleus in precise co-planar, concentric circular orbits.” Choice (C) is the only option that reflects this. Choice A is incorrect because it shows an atom without a nucleus. Choice B shows an atom with orbiting electrons, but the electrons do not orbit in co-planar, concentric circles. Choice D would be a better representation of the electron cloud model.

## *Passage II*

8. **G**

**Difficulty:** Low

**Category:** Experiments—Design & Methodology

**Getting to the Answer:** This question simply requires you to find the answer choice that reflects differences in sampling between the two studies. The passage notes that sampling was conducted “at ground level” for Study 1 but “from the tops of two different monitoring towers” for Study 2. Choice (G) is thus correct. Choice F contradicts the passage—in both experiments, sampling was done on a daily basis. Choice H is tempting, but it switches the studies, making the statement untrue. Choice J does not work either—both pollutants mentioned were sampled in each experiment.

9. **B**

**Difficulty:** Medium

**Category:** Experiments—Design & Methodology

**Getting to the Answer:** Although several of these procedures might be worthwhile, only (B) correctly proposes studying all three variables mentioned in the question stem (carbon monoxide, sulfur dioxide, and respiratory ailments). Choice A includes a respiratory ailment (asthma), but it is incorrect because temperature was not one of the variables mentioned. Choices C and D are incorrect because they describe procedures that would not provide any information about respiratory ailments.

10. J

**Difficulty:** Medium

**Category:** Experiments—Design & Methodology

**Getting to the Answer:** To test the hypothesis from the question stem, you'd need an experiment that relates sulfur dioxide and the acidity of lakes. Only (J) connects sulfur dioxide to the acidity of lake water, so it is correct. Choice F is incorrect because it doesn't provide a link between sulfur dioxide and lake acidity. Choice G might be tempting because the passage does mention respiratory ailments, but G also fails to provide a direct link between sulfur emissions and lake acidity. Choice H is also incorrect: while the amount of coal burned might increase the amount of sulfur dioxide emitted by the plant, doing this alone won't tell you anything about the link between sulfur dioxide and the acidity of the lake.

11. A

**Difficulty:** Medium

**Category:** Experiments—Design & Methodology

**Getting to the Answer:** The first paragraph describes the motivation behind the studies: "Scientists noted an increase in acid rainfall and reports of respiratory ailments in a certain community. They suspected that both of these outcomes were due to increased levels of airborne pollutants, such as carbon monoxide and sulfur dioxide, entering the atmosphere in that community." Because Study 1 involved measuring

the levels of these pollutants near two highways, it is reasonable to conclude that the scientists were trying to determine if pollution from traffic was the source of these respiratory problems. This fits well with the hypothesis expressed in (A). Choice B is incorrect because the power plant is only a factor in Study 2, not Study 1. Choice C incorrectly states that Study 1 was concerned with measuring rainfall. Choice D is incorrect because it fails to involve respiratory ailments.

12. **F**

**Difficulty:** Medium

**Category:** Experiments—Synthesizing Data

**Getting to the Answer:** The studies in this passage indicate that emissions from highway traffic and from power plants contribute to increases in airborne pollutants. Building more highways, as in (F), would consequently increase, rather than reduce, highway traffic and subsequent pollution, making (F) the best answer. Choice G is incorrect because it would help: highway traffic is indicated as a source of pollutants, so traffic limits would help reduce pollution due to highway vehicles. Choice H would also help: burning coal is the source of the power plant’s pollutant emissions, so reducing coal burning would reduce emission levels. Choice J is incorrect for a similar reason: filters would decrease the amount of sulfur dioxide reaching the outside air, thereby reducing nearby levels of this airborne pollutant.

13. **D**

**Difficulty:** Medium

**Category:** Data—Inference & Calculation

**Getting to the Answer:** If emissions become less concentrated farther away from their sources, what would you expect to happen if you moved closer to the source? You could expect emissions measured closer to a source (the roadway, in this case) to be more concentrated. Thus, the correct answer will be larger than the data point for Highway 1 on January 7 in Table 1, which is 3.2 ppm. Choice (D) is the only option larger than 3.2 ppm, so it is correct. Choices A, B, and C are all smaller than 3.2 ppm.

14. **F**

**Difficulty:** Medium

**Category:** Data—Detail & Interpretation

**Getting to the Answer:** Look carefully at Table 2, which compiles the results of Study 2. According to the table, ozone and sulfur dioxide levels both show an increase followed by a decrease in both towers, supporting statement I. Because I is true, G can be eliminated. Carbon monoxide levels were always greater in Tower 1, not Tower 2, so statement II is false, meaning that H and J can also be eliminated. Choice (F) must therefore be correct. This can be confirmed by determining that statement III is false: Tower 2 had the highest level of emissions on January 8, not January 9.

### *Passage III*

15. **D**

**Difficulty:** Medium

**Category:** Data—Inference & Calculation

**Getting to the Answer:** Each of the tables includes rubber, which always produces an amperage of 0.0 mA. This means A can be eliminated. Study 2 and Study 3 both use 6 mm wire, but only Study 3 was conducted at 30°C, so use Table 3 to find the range. The highest value is 12.1 mA, so the range is 0.0 mA to 12.1 mA. Choice (D) matches this range. Choices B and C give the ranges for Study 1 and Study 2, respectively.

16. **G**

**Difficulty:** Low

**Category:** Experiments—Synthesizing Data

**Getting to the Answer:** Comparing the data in Tables 1 and 2 shows that for most of the materials tested in these experiments, the current carried by the wire increases as the diameter of the wire increases. The exception is rubber, which does not carry current in any of these trials, so it is the only material that does not support the hypothesis that a larger diameter results in more current carried. Choice (G) is thus correct.

17. **D**

**Difficulty:** Medium

**Category:** Experiments—Synthesizing Data

**Getting to the Answer:** Start by looking at what happens to current when the diameter of a zinc telluride (ZnTe) wire increases. Tables 1 and 2 show that when the diameter increases, the amount of current conducted increases. For temperature, comparing Tables 2 and 3 shows that when temperature decreases, current increases. Thus, to find the wire that would carry the largest current, you want the wire with the largest diameter and the lowest temperature. Choice (D) is thus correct.

18. **F**

**Difficulty:** Medium

**Category:** Data—Inference & Calculation

**Getting to the Answer:** The conditions described in the question stem differ from the setup of any of the studies conducted in the passage, but the key is to focus on the most important information. The materials of the wires are copper, rubber, and steel. According to the results of the 3 studies, rubber always yields an ammeter reading of 0.0 mA. This makes it an insulator, according to the definition provided in the introductory paragraph, that is, “a substance that prevents an electric charge from traveling between objects.” Because the rubber

wire interrupts the flow of charge in the circuit, no current will be conducted, so the ammeter will read 0.0 mA. Choice (F) is thus correct.

19. **A**

**Difficulty:** Medium

**Category:** Data—Inference & Calculation

**Getting to the Answer:** The scientist hypothesized that decreasing the temperature increases the amount of current a wire will carry, and this hypothesis was generally supported by a comparison of the results in Tables 2 and 3, with the exception of rubber, which never conducted a current. Consequently, if the temperature of a wire were instead *increased*, the amount of current carried would *decrease*, except for rubber, which would remain unchanged at 0.0 mA. Choice (A) is thus correct. Choice B is incorrect because only the current for rubber would remain unchanged. Choice C is incorrect because the current would never increase at a higher temperature; it would only decrease or remain unchanged. Choice D is incorrect because the current would decrease for most of the materials.

20. **J**

**Difficulty:** Medium

**Category:** Data—Inference & Calculation

**Getting to the Answer:** You can see by looking at the tables that rubber conducts 0.0 mA of electricity throughout all three studies.

Because it prevents the flow of current, this makes it an insulator, based on the definition provided in the passage. However, because the results of all three studies are the same for rubber, it does not appear that its capacity as an insulator is affected by changes to its diameter or temperature. Choice (J) is thus correct.

21. **D**

**Difficulty:** Low

**Category:** Experiments—Design & Methodology

**Getting to the Answer:** The question asks you to identify which effect the scientist should investigate next to learn more. Choice A, however, was revealed by comparing the results of Studies 2 and 3, while B was revealed by comparing Studies 1 and 2. Choice C was investigated in all of the studies. That leaves (D), which is correct because wire length was held constant throughout all of the studies, so it would be an appropriate choice to manipulate in a future study to determine its effect on current conducted.

### *Passage IV*

22. **J**

**Difficulty:** Low

**Category:** Data—Detail & Interpretation

**Getting to the Answer:** The question stem points you to the top two curves in Figure 1. To find the greatest difference, determine the average air temperature in August for the urban area (the solid line) and rural area (the dash-dot line) for each of the years listed in the answer choices. The respective August urban and rural temperatures were approximately 75°F and 68°F in 2007; 77°F and 70°F in 2010; 73°F and 66°F in 2012, and 74°F and 63°F in 2014. The differences in temperature between urban and rural are 7°F in 2007, 2010, and 2012, and 11°F in 2014. Therefore, the correct answer is (J). Alternatively, rather than calculate the exact differences, you could eyeball the graph and estimate; it shouldn't be too hard to see that the gap between the top two curves is wider for 2014 than for the other years.

23. **A**

**Difficulty:** Low

**Category:** Data—Detail & Interpretation

**Getting to the Answer:** Look at Figure 3 to find out which pair of months had the closest average wind velocities. According to Figure 3, the average wind velocity for the rural area was approximately 16 mph for January, 16 mph for April, 13 mph for July, 20 mph for September, and 23 mph for November. Since the average wind velocities for January and April are about the same, the correct answer is (A).

24. **H**

**Difficulty:** Medium

**Category:** Data—Inference & Calculation

**Getting to the Answer:** The question stem mentions Study 3, in which the scientists studied wind velocity and air quality. Eliminate G and J, which mention average air temperature (the focus of Study 1). The new evidence states that buildings increase frictional drag on air flowing over built-up terrain. An increase in frictional drag would lead to lower wind velocity, which means that having more buildings lowers wind velocity. According to Figure 3, the average wind velocity is lower for the urban area than for the rural area, which suggests that there are more buildings in the urban area. Thus, the conclusion in the question stem that the rural area has more buildings than the urban area would NOT be justified based on the results. The correct answer is (H). Even if you were unaware of what effect frictional drag would have on wind velocity, you could still eliminate F because it provides the reasoning that wind velocity is lower for the rural area, which is directly contradicted by Figure 3.

25. C

**Difficulty:** Medium

**Category:** Data—Inference & Calculation

**Getting to the Answer:** According to Study 1, “compared to the relative humidity of the rural area, the relative humidity of the urban area was 2% lower in the winter and 6% lower in the summer.” Figure 1 shows a similar relationship for average air temperature differences. The difference in the average summer air temperatures between the

urban and rural areas is greater than the difference in the average winter air temperatures. Thus, because they follow similar trends, you can conclude that relative humidity differences and average air temperature differences are correlated. The correct answer is (C). Choice A is not true according to the passage: the relative humidity is lower for the urban area. Choice B is true but does not answer the question, which concerns both winter and summer temperature differences. Choice D is incorrect because it mentions wind velocity, which was measured in Study 3 and not Study 1.

26. **G**

**Difficulty:** Medium

**Category:** Experiments—Synthesizing Data

**Getting to the Answer:** The hypothesis from the question stem suggests that since building materials and road surfaces increase the air temperature of urban areas, urban areas would have higher air temperature than rural areas. According to Figure 1, the summer temperatures of the urban area during August are higher than those of the rural area during August. Therefore, yes, the results do support the hypothesis. Eliminate H and J. Choice (G) correctly states summer temperatures in the urban area were higher than those in the rural area, making (G) the correct answer.

27. **B**

**Difficulty:** Medium

**Category:** Data—Inference & Calculation

**Getting to the Answer:** Make sure your response draws from the information given in the passage and question stem. According to Study 3, there are about 10 times more dust particles in the air of the urban area than of the rural area. Given that dust particles act as hygroscopic nuclei, it is likely that the urban areas will have more rain because of the higher level of dust in the air at those areas. And, indeed, Figure 2 shows that the urban area received more precipitation than the rural area. Thus, the correct answer is (B). Choices A, C, and D are not true statements. According to the passage, compared to the urban area, the rural area had higher wind velocity, fewer clouds, and higher relative humidity.

28. **F**

**Difficulty:** Medium

**Category:** Experiments—Synthesizing Data

**Getting to the Answer:** Based on Figure 1, 75°F is approximately the average air temperature for the urban area in the summer, while Figure 2 suggests that the average annual precipitation for the urban area is about 40 inches. Therefore, this third area is likely also an urban area, which could be expected to have a similar wind velocity to the urban area that was studied. According to Figure 3, the wind velocity for the urban area varied between about 8 and 12 mph. Thus, it is reasonable to expect that this third area will have an average wind velocity of somewhere between 8 and 12 mph, as in (F).

## Passage V

29. **A**

**Difficulty:** Medium

**Category:** Data—Detail & Interpretation

**Getting to the Answer:** Based on Figure 2, Mercury speeds up as it approaches perihelion and slows down as it moves away. Choice (A) is thus correct. Choice B suggests the opposite trend. Choice C suggests that orbital velocity decreases, but that happens only as the planet moves away from perihelion. Choice D suggests that orbital velocity increases, but that happens only as the planet moves toward perihelion.

30. **H**

**Difficulty:** Low

**Category:** Data—Inference & Calculation

**Getting to the Answer:** A planet with a mass in between that of Jupiter and Saturn, assuming a similar density, would have a radius that lies between the radii of Jupiter and Saturn, that is, between 58,232 and 69,911 km. Only (H) falls into this range. Choice F suggests a radius less than that of Mercury. Choice G suggests a radius between that of Earth and Venus. Choice J suggests a radius larger than that of Jupiter.

31. **B**

**Difficulty:** Low

**Category:** Data—Detail & Interpretation

**Getting to the Answer:** According to Table 1, Saturn has a mass of  $5.68 \times 10^{26}$  kg, Jupiter a mass of  $1.90 \times 10^{27}$  kg, Earth a mass of  $5.97 \times 10^{24}$  kg, and Mercury a mass of  $3.29 \times 10^{23}$  kg. Of these, Jupiter has the greatest mass, so (B) is correct.

32. **G**

**Difficulty:** Medium

**Category:** Data—Detail & Interpretation

**Getting to the Answer:** Based on Figure 2, Mercury's orbital velocity at  $75 \times 10^6$  km away from perihelion is roughly 53 m/s. The next point at which it has this orbital velocity is  $75 \times 10^6$  km as it recedes from perihelion. Choice (G) is thus correct. This can also be seen from the symmetry of Mercury's curve in Figure 2: the velocity at a particular distance while approaching is always equal to the velocity at that same distance while receding. Choice F is incorrect because it corresponds to a velocity of about 50 m/s. Choices H and J are incorrect because both correspond to a velocity of about 56 m/s.

33. **C**

**Difficulty:** Medium

**Category:** Thinking Like a Scientist—Applying Core Knowledge

**Getting to the Answer:** Acceleration is simply the change in velocity per unit of time, so a larger acceleration due to gravity will cause a falling object to reach a given velocity more quickly—in other words, it will cause the object to fall faster. Because Earth has a higher acceleration due to gravity than does Venus, objects on Earth fall faster than objects on Venus. Choice (C) is thus correct.

34. **G**

**Difficulty:** Medium

**Category:** Data—Inference & Calculation

**Getting to the Answer:** According to Table 1, Mercury has a mass of  $3.29 \times 10^{23}$  kg and a radius of 2,440 km, while Venus has a mass of  $4.87 \times 10^{24}$  kg and a radius of 6,052 km. The mass and radius of the new planet in the question stem falls in between the values for Mercury and Venus, so it is reasonable to predict that it would have a velocity at perihelion that falls in between Mercury’s velocity of about 59 m/s and Venus’s velocity of about 35 m/s. Choice (G) is correct because it is the only value that falls within this range.

## *Passage VI*

35. **A**

**Difficulty:** Medium

**Category:** Experiments—Synthesizing Data

**Getting to the Answer:** As can be seen in Figure 1, titration of a strong base into a strong acid generates a curve that starts with an acidic pH (a value considerably less than 7), followed by a sharp increase to a basic pH (a value considerably greater than 7). Titration of a strong acid into a strong base would show the reverse behavior, starting well above pH 7 and finishing well below pH 7. Choice (A) is thus correct. Choice B has an appropriate appearance, but it is incorrect because it bottoms out near a neutral pH (near 7) instead of an acidic pH. Choices C and D are incorrect because their curves do not match the general shape seen in Figure 1.

36. H

**Difficulty:** Medium

**Category:** Experiments—Synthesizing Data

**Getting to the Answer:** This question asks about the equivalence point, which is defined in the passage as “the point at which equal concentrations of an acid and base are present.” The passage also notes that the change in pH immediately after and immediately before the equivalence point will be drastic, so you should look for the point in the middle of the sharp increase for Solution A in Figure 1. Based on the figure, the equivalence point for Solution A is found at a pH of about 7 (after approximately 24 mL of NaOH have been added). According to Table 1, phenol red has a pH range of 6.8 – 8.4, making it the only indicator that includes pH 7 in its range. Choice (H) is thus

correct. Choices F and G are incorrect because they change colors at too low of a pH, while J is incorrect because it changes colors at too high of a pH.

37. **C**

**Difficulty:** Low

**Category:** Thinking Like a Scientist—Applying Core Knowledge

**Getting to the Answer:** This question is easier to answer if you remember from high school chemistry that 7 is a neutral pH. The passage describes the chemical equation as “a typical acid-base neutralization reaction.” Thus, if it goes to completion without excess reactants, the resulting solution should have a neutral pH of 7. Choice (C) is correct. Choices A and B present acidic pH values, while D presents a basic pH.

38. **G**

**Difficulty:** Medium

**Category:** Data—Detail & Interpretation

**Getting to the Answer:** Figure 2 presents the reaction rate as a percentage of the rate at the equivalence point. Thus, any percentage value greater than 100% corresponds to a reaction rate that is faster than the rate at the equivalence point. The curve in Figure 2 is above 100% between approximately 1 mL and 24 mL. Choice (G) is correct because it is the only option with a volume in this range.

39. **B**

**Difficulty:** Medium

**Category:** Thinking Like a Scientist—Applying Core Knowledge

**Getting to the Answer:** Familiarity with the names of elements and simple compounds will help to answer this question. According to the reaction presented in the passage, sodium (Na) moves from NaOH to NaCl as the reaction proceeds forward. NaCl is sodium chloride, commonly known as table salt. Choice (B) is correct. Choices A and C are incorrect because water ( $\text{H}_2\text{O}$ ) and hydrochloric acid (HCl) do not contain sodium. Choice D is incorrect because sodium hydroxide (NaOH) is where the sodium is found before the reaction, not after it.

40. **J**

**Difficulty:** Medium

**Category:** Experiments—Synthesizing Data

**Getting to the Answer:** Because the question asks about a reaction rate, look at Figure 2 first. The highest reaction rate (with a value of over 125%) is found after about 5 mL of NaOH have been added. Figure 1 shows low pH values for both solutions at 5 mL of NaOH. Choice (J) is correct because it is the only option that features a low pH. Choices F and G are incorrect because both points are found after about 24 mL of NaOH have been added, when the reaction rate is only 100%. Choice H is incorrect because a high pH in Solution A is only found after about

25 mL or more of NaOH have been added, when the reaction rate drops below 100%.

## 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.

In today’s world the truth of the matter is that a high school diploma no longer makes a job applicant competitive; a college degree is now required for most high-paying jobs which also offer advancement opportunities. Given the high cost of a college education—and even community college fees may be beyond the reach of some students—taking out a student loan is almost a given for the college student. The question is, however, how these loans should be structured. Several options are offered, but the fairest and most workable is that of no-interest government and bank loans.

Firstly, as the issue states, student loans can take years to repay, even when the former students earn good salaries and repay the loan month by month. This is simply because the cost of a college education is so high. The average cost of a four-year college ranges from almost \$10,000 per

year to over \$35,000. For all but the wealthiest of students, paying for college without a loan is prohibitive. My cousin spent years trying to pay off her student loans and, in the long run, defaulted and had to declare bankruptcy. Surely this is not the intention of either the government, other lending institutions, or colleges.

Loans are not special entitlements; they are fundamental to allow students of all economic backgrounds to attend college. As such, the government should not be making money from student loans. Interest is essentially a fee charged for borrowing money, with some sort of collateral insuring repayment. In the case of a college loan, that collateral is the student's future earning capacity. Granted, the principal must be repaid, but beyond that, taking money out of earnings cuts into the former student's ability to use that money for other purchases, including housing, which are so vital in driving the country's economy. Charging only the principal needed to pay for college insures that students can not only pay the yearly tuition, but are also more likely to be able to settle the entire loan and after graduation, contribute to the economy as a whole. In the special circumstance that some students need more time, it is then fair to add some further amount of payment as recognition that the original agreement was not fulfilled. This is the fairest solution and one that provides the greatest opportunity for students to go to college and pay off their loans.

The second option defines a college education as a commodity, which is something that can be bought and sold and also implies choice. Although it can be argued that a college education can be bought, it is not the same as oil or wheat. It is not used for the moment but for the future and it cannot

be compared to loans for items that people choose to buy, such as cars or refrigerators. Loans to support an educated populace as the backbone of our society are not the same as car loans and should not be treated as such. If we truly believe in education, we must make allowances for the loans required to fund it. As we have all learned, college is an investment in the future. It has become less and less a personal choice and more of a requirement for job consideration. When considered on a supply and demand basis, it is even more important, since studies show that jobs requiring a college degree are in more and more demand. A capitalist market requires the ability to be competitive and creative; this is exactly what a college education provides. Educated students are far more important than almost anything else a loan can support, and any accommodations, including making college loans less expensive than other loans, is for the benefit of society and the future, and should be promoted, not prohibited.

Finally, the third point of view is simply ridiculous. There is absolutely no way to determine how much money a person will earn in the future. We can make considered guesses—lawyers will earn more than waiters—but there is no guarantee that the lawyer will not be fired and the waiter will not become a restaurant owner. Basing the loan amount on future earnings can also mean that the graduate has no opportunity to change his career from a high-earning one, such as a lawyer, to one that may truly be his heart's desire, such as being an artist. Furthermore, even if one were to train to be a lawyer, it is possible that he will not find a job that pays him the same amount of money the loan projected him to earn. At one time, investment counselors were earning a lot of money, and therefore would have been low-risk borrowers, but after the investment scandal

several years ago, many investment counselors are doing other jobs, have no job, or may even be in jail. College graduates are just starting their careers; how well they do, what they earn, and whether they stay in their original jobs are unknown and cannot be used to determine a loan amount.

College loans should be as accessible and easy to repay as possible. There is nothing more important than an educated and far-sighted generation of college graduates. They are the ones who will run the government, captain business, and teach children. To deprive them of their college opportunity by making it too hard for them to either get or repay adequate loans is to deprive this country of those who will steer its future.

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?