

Reading Test

60 MINUTES, 47 QUESTIONS

Turn to Section 1 of your answer sheet to answer the questions in this section.

DIRECTIONS

Each passage or pair of passages below is followed by a number of questions. After reading each passage or pair, choose the best answer to each question based on what is stated or implied in the passage or passages and in any accompanying graphics (such as a table or graph).

Questions 1-9 are based on the following passage.

This passage is adapted from Ruth Ozeki, *A Tale for the Time Being*. ©2013 by Ruth Ozeki Lounsbury. This passage is set in British Columbia. Ruth has discovered a bag containing a book on a beach.

“In search of lost time,” Ruth said, translating the tarnished gilt title, embossed on the book’s red cloth spine. “I’ve never read it.”

Line “I haven’t, either,” said Oliver. “I don’t think I’ll
5 be trying it in French, though.”

“Mm,” she said, agreeing, but then she opened the cover, anyway, curious to see if she could understand just the first few lines. She was expecting to see an age-stained folio, printed in an antique font, so she
10 was entirely unprepared for the adolescent purple handwriting that sprawled across the page. It felt like a desecration, and it shocked her so much she almost dropped the book.

Print is predictable and impersonal, conveying
15 information in a mechanical transaction with the reader’s eye.

Handwriting, by contrast, resists the eye, reveals its meaning slowly, and is as intimate as skin.

Ruth stared at the page. The purple words were
20 mostly in English, with some Japanese characters scattered here and there, but her eye wasn’t really taking in their meaning as much as a *felt* sense, murky and emotional, of the writer’s presence. The fingers that had gripped the purple gel ink pen must
25 have belonged to a girl, a teenager. Her handwriting, these loopy purple marks impressed onto the page,

retained her moods and anxieties, and the moment Ruth laid eyes on the page, she knew without a doubt that the girl’s fingertips were moist and soft, and that
30 she had bitten her nails down to the quick.

Ruth looked more closely at the letters. They were round and a little bit sloppy (as she now imagined the girl must be, too), but they stood more or less upright and marched gamely across the page at a
35 good clip, not in a hurry, but not dawdling, either. Sometimes at the end of a line, they crowded each other a little, like people jostling to get onto an elevator or into a subway car, just as the doors were closing. Ruth’s curiosity was piqued. It was clearly a
40 diary of some kind. She examined the cover again. Should she read it? Deliberately now, she turned to the first page, feeling vaguely prurient, like an eavesdropper. Novelists spend a lot of time poking their noses into other people’s business. Ruth was not
45 unfamiliar with this feeling.

Hi!, she read. *My name is Nao, and I am a time being. Do you know what a time being is? . . .*

“Flotsam,” Oliver said. He was examining the barnacles that had grown onto the surface of the
50 outer plastic bag. “I can’t believe it.”

Ruth glanced up from the page. “Of course it’s flotsam,” she said. “Or jetsam.” The book felt warm in her hands, and she wanted to continue reading but heard herself asking, instead, “What’s the difference,
55 anyway?”

“Flotsam is accidental, stuff found floating at sea. Jetsam’s been jettisoned. It’s a matter of intent. So you’re right, maybe this is jetsam.” He laid the bag back down onto the table. “I think it’s starting.”

60 “What’s starting?”

“Drifters,” he said. “Escaping the orbit of the Pacific Gyre . . .”

His eyes were sparkling and she could tell he was excited. She rested the book in her lap. “What’s a
65 gyre?”

“There are eleven great planetary gyres,” he said.

“Two of them flow directly toward us from Japan and diverge just off the British Columbia coastline. The smaller one, the Aleut Gyre, goes north toward
70 the Aleutian Islands. The larger one goes south. It’s sometimes called the Turtle Gyre, because the sea turtles ride it when they migrate from Japan to Baja.”

He held up his hands to describe a big circle.

“Imagine the Pacific,” Oliver said. “The Turtle Gyre
75 goes clockwise, and the Aleut Gyre goes counterclockwise.” His hands moved in the great arcs and spirals of the ocean’s flow.

1

Which choice best supports the conclusion that Ruth first believes the diary is very old?

- A) Lines 8-11 (“She was . . . page”)
- B) Lines 14-16 (“Print . . . eye”)
- C) Lines 39-40 (“It was . . . kind”)
- D) Lines 48-50 (“He was . . . bag”)

2

As used in line 14, “conveying” most nearly means

- A) bearing.
- B) communicating.
- C) projecting.
- D) conducting.

3

The narrator distinguishes between print and handwriting (lines 14-18) primarily to illustrate

- A) how writers reveal specific mannerisms through text.
- B) how readers interact with different types of text.
- C) why readers find it difficult to decipher handwritten text.
- D) why readers classify printed text as more durable than handwritten text.

4

The phrase in parentheses in lines 32-33 primarily serves to suggest Ruth is

- A) deciding whether to read Nao’s diary.
- B) adapting to Nao’s shifting moods.
- C) criticizing Nao’s messy handwriting.
- D) forming an idea of Nao’s characteristics.

5

Which choice best describes how Ruth approaches the idea of reading the diary?

- A) She feels entitled to study Nao’s writing but is worried about translating it.
- B) She fails to contemplate whether Nao’s diary should be viewed only by its owner.
- C) Her hesitation to read the diary is overcome by a desire to pry into Nao’s affairs.
- D) Her consideration for Nao’s privacy is based on her own experience as a novelist.

6

As used in line 26, “impressed” most nearly means

- A) designed.
- B) emphasized.
- C) forced.
- D) inscribed.

7

It can reasonably be inferred that Nao would react to her diary being read with

- A) embarrassment, because she reflects on personal matters.
- B) approval, because she addresses an imagined reader in her writing.
- C) alarm, because she describes her moods and anxieties.
- D) surprise, because she is unaware that readers are inquisitive.

8

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 27-30 (“and the . . . quick”)
- B) Lines 31-32 (“Ruth . . . sloppy”)
- C) Lines 43-44 (“Novelists . . . business”)
- D) Lines 46-47 (“*Hi! . . . is*”)

9

In the passage, Oliver indicates that the two Pacific gyres

- A) rotate in opposite directions.
- B) are named for their points of origin.
- C) are used by turtles to migrate to Baja.
- D) end near the British Columbia coastline.

Questions 10-19 are based on the following passage and supplementary material.

This passage is adapted from Daniel H. Pink, *To Sell Is Human: The Surprising Truth about Moving Others*. ©2012 by Daniel H. Pink.

The notion that extraverts—people who are very outgoing and talkative—are the finest salespeople is so obvious that we’ve overlooked one teensy flaw.

Line There’s almost no evidence that it’s actually true.

5 When social scientists have investigated the relationship between extraversion and sales success, they’ve found the link, at best, flimsy. For instance, while supervisors often give extraverts high *ratings*, several researchers have found that extraversion has
10 “no statistically significant relationship . . . with sales *performance*” and that “extraversion is not related to sales *volume*.” One of the most comprehensive investigations—a set of three meta-analyses of thirty-five separate studies involving
15 3,806 salespeople—found that the correlation between extraversion and sales was essentially nonexistent. (Positive correlations are measured on a scale that goes from 0 to 1, with higher numbers—say, 0.62—indicating close correlations and 0 no
20 correlation at all. Across the thirty-five studies, the correlation between extraversion and sales performance was a minuscule 0.07.)

Does this mean that introverts—those soft-spoken souls more at home in a study carrel than at a
25 party—are better at moving others? Not at all. In fact, the evidence, which is emerging in new research, reveals something far more intriguing.

Adam Grant is a management professor at the University of Pennsylvania’s Wharton School and
30 one of America’s top young social psychologists. Some of his previous research had examined extraversion and he’d become curious that a trait so widely associated with sales didn’t have much connection to success in that realm. So he decided to
35 find out why.

Grant collected data from a software company that operates call centers to sell its products. He began by asking more than three hundred sales representatives to complete several personality
40 assessments, including one that social scientists use to measure where people fall on the introversion-extraversion spectrum. This particular assessment lists statements such as “I am the life of the party” and “I am quiet around strangers” and asks

45 participants to rate themselves on a 1-to-7 scale, with their answers resulting in a numerical measure of extraversion. Then Grant tracked the sales representatives’ revenues over the next three months.

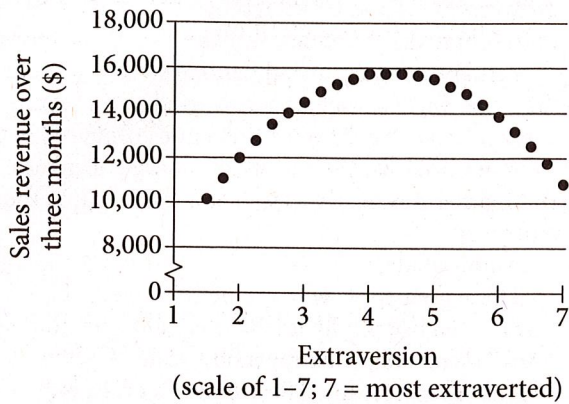
Perhaps not surprisingly, introverted sales reps
50 didn’t perform as well as extraverted ones, earning an average of \$120 per hour in revenue compared with \$125 per hour for their more outgoing colleagues. But neither did nearly as well as a third group: the ambiverts.

55 Ambi-whats?

These are people who are neither overly extraverted nor wildly introverted. Go back to that 1-to-7 introversion-extraversion scale. Ambiverts sit roughly in the center. They’re not 1s or 2s, but
60 they’re not 6s or 7s. In Grant’s study, these Goldilocks personalities—not too hot, not too cold—earned an average of nearly \$155 per hour, easily besting their counterparts. In fact, the salespeople who had the highest average
65 revenue—\$208 per hour—had extraversion scores between 4.0 and 4.5, smack at the midpoint.

“These findings call into question the longstanding belief that the most productive salespeople are extraverted,” Grant writes.
70 According to a large study of European and American customers, the “most destructive” behavior of salespeople wasn’t being ill-informed. It was an excess of assertiveness and zeal that led to contacting customers too frequently. Extraverts, in
75 other words, often stumble over themselves. They can talk too much and listen too little, which dulls their understanding of others’ perspectives. They can fail to strike the proper balance between asserting and holding back, which can be read as
80 pushy and drive people away.

Sales Revenue over Three-Month Period by Degree of Extraversion



Adapted from Adam M. Grant, "Rethinking the Extraverted Sales Ideal: The Ambivert Advantage." ©2013 by Adam M. Grant.

10

The primary purpose of the passage is to

- A) propose a theory that accounts for a recent trend in a profession.
- B) present several hypotheses about the existence of a new personality type.
- C) describe research that undermines a popular belief about a profession.
- D) summarize findings that challenge a controversial study about a personality type.

11

As used in line 2, "finest" most nearly means

- A) purest.
- B) subtlest.
- C) ablest.
- D) fanciest.

12

The parenthetical statements in lines 17-22 ("Positive . . . minuscule 0.07") mainly serve to

- A) provide quantitative information to emphasize a finding presented earlier.
- B) clarify why experts found a small positive correlation between sales performance and personality type.
- C) distinguish between the scale used for the three meta-analyses discussed earlier and the scale used in Grant's study discussed later.
- D) explain how researchers compiled the data to calculate statistical values reported in the study.

13

As used in line 25, "moving" most nearly means

- A) persuading.
- B) advancing.
- C) transporting.
- D) vacating.

14

The perspective adopted by the author in line 55 is best characterized as that of a

- A) researcher who questions the validity of a finding.
- B) general reader who is presented with an unfamiliar term.
- C) social historian who investigates the origin of a technical term.
- D) scientist who formulates a hypothesis about a phenomenon.

15

Which choice best supports Grant's claim in lines 67-69 ("These . . . writes")?

- A) Lines 49-52 ("Perhaps . . . colleagues")
- B) Lines 57-59 ("Go back . . . center")
- C) Lines 59-60 ("They're . . . or 7s")
- D) Lines 60-63 ("In Grant's . . . counterparts")

16

Based on the passage, which choice best describes the relationship between Grant's study and the study of European and American customers presented in the last paragraph?

- A) The study of customers offers a more detailed analysis of the scale used in Grant's study.
- B) The study of customers shows research on personality types excluded by Grant's study.
- C) The study of customers challenges the method used to assess extraversion in Grant's study.
- D) The study of customers helps to account for the findings in Grant's study.

17

The passage best supports which statement about salespeople such as those who generated average revenue of approximately \$15,000 or more over three months, as shown in the graph?

- A) Many social scientists mistakenly regard such salespeople as less persuasive than those who are ambiverts.
- B) Many customers mistakenly regard such salespeople as less knowledgeable than those who are more introverted.
- C) Many supervisors mistakenly regard such salespeople as less effective than those who are very outgoing.
- D) Many salespeople mistakenly regard such colleagues as less diligent than those who are more extraverted.

18

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 5-7 ("When . . . flimsy")
- B) Lines 7-12 ("For instance . . . *volume*")
- C) Lines 23-25 ("Does . . . all")
- D) Lines 70-72 ("According . . . ill-informed")

19

According to the graph, the amount of revenue generated by a salesperson with an extraversion rating of 7 was within which interval?

- A) \$8,000-\$10,000
- B) \$10,000-\$12,000
- C) \$12,000-\$14,000
- D) \$14,000-\$16,000

Questions 20-29 are based on the following passage.

This passage is adapted from Dennis Normile, "Close Look at Young Star Finds a Chemical Surprise." ©2014 by American Association for the Advancement of Science.

The basics of star formation are easy. Find an unusually dense region within a molecular cloud filled with dust and gas in interstellar space and let gravity do the rest. The gas and dust will eventually coalesce into a doughnut-shaped envelope that encircles an inner rotating disk. As material accumulates over hundreds of thousands of years, the central region collapses into a star while the disk solidifies into planets.

10 Astronomers have understood this overall scenario for decades, but the details are fuzzy because telescopes haven't been good enough to check theorists' computer models. That changed in 2011 with the partial completion of the Atacama Large

15 Millimeter/submillimeter Array (ALMA). The telescope, a collection of radio antennas, is being erected on the Chajnantor Plain, 5000 meters above sea level in the Chilean Andes, where the dry, sparse air causes minimal distortion of the faint waves from

20 the far reaches of the universe. Using 24 of the antennas—the final array will have 66—an international group led by astrophysicists at the University of Tokyo has taken the most detailed look yet at the heart of a star-forming region and found a

25 chemical surprise.

The researchers trained ALMA on a very young star still forming in the constellation Taurus, about 450 light-years from Earth. As is typical at such an early stage, the star is encircled by an envelope and

30 disk of gas and dust. The new telescope's power enabled the team to identify the chemical composition of the gases at different locations throughout this star- and planet-forming system. Previously, astronomers thought that the envelope

35 and disk must be made up of the same gaseous molecules of hydrogen found throughout interstellar space plus dust particles made up of other elements. To the surprise of the University of Tokyo group, ALMA detected something different—sulfur

40 monoxide gas—in a narrow band where the envelope meets the disk. Collisions between particles in the envelope and those in the rapidly spinning disk generate heat that thaws frozen sulfur monoxide molecules stuck to dust grains, explains Nami Sakai,

45 an astrophysicist at the University of Tokyo. Sulfur

monoxide can't be detected when it is frozen to dust grains. But ALMA can spot it in its gaseous state. Knowing just what gases are swirling around young stars should lead to a better understanding of where

50 and how elements found in planets, comets, and asteroids are formed. Sakai and colleagues report their findings online at *Nature*.

"These are beautiful data and very interesting results," says Ewine van Dishoeck, an astrophysicist

55 at the Leiden Observatory in the Netherlands. "This work shows that ALMA will provide ample observational evidence" that will challenge theoretical models, adds astrophysicist Stéphane Guilloteau of University of Bordeaux in France.

60 "This paper is a beautiful example of the new discovery [capabilities] offered by ALMA."

20

A central idea of the passage is that the ALMA telescope

- A) has provided new details about the composition of gases around young stars.
- B) is limited to observing stars that are less than 450 light-years from Earth.
- C) has found that there are too few hydrogen molecules in interstellar space.
- D) allows astrophysicists to determine the density of stars as they form.

21

The image of a “doughnut-shaped envelope” in line 5 mainly serves to

- A) help readers visualize an unfamiliar situation.
- B) describe a tool used in a field of research.
- C) introduce humor into what is otherwise a serious scientific discussion.
- D) characterize the limits of current scientific knowledge.

22

As used in line 12, “check” most nearly means

- A) maintain.
- B) adopt.
- C) obstruct.
- D) verify.

23

As used in line 29, “stage” most nearly means

- A) phase.
- B) platform.
- C) portion.
- D) place.

24

Based on the passage, in which region surrounding other young stars should astronomers search if they wish to confirm the discovery around the young star in Taurus?

- A) The rapidly spinning inner disk
- B) The central section of the envelope
- C) The area of contact between the disk and the envelope
- D) The boundary where the envelope meets interstellar space

25

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 4-6 (“The gas . . . disk”)
- B) Lines 30-33 (“The new . . . system”)
- C) Lines 38-41 (“To the surprise . . . disk”)
- D) Lines 48-51 (“Knowing . . . formed”)

26

According to the passage, what is an advantage of placing ALMA at a location high above sea level?

- A) There are few distractions from work at the remote observation site.
- B) There are fewer disturbing effects caused by Earth's atmosphere.
- C) Reflection of sunlight off the ocean is minimized at that altitude.
- D) Distances to star-forming regions are slightly reduced.

27

The main purpose of the third paragraph (lines 26-52) is to

- A) describe how dense molecular clouds acquire dust and particles from interstellar space.
- B) inform readers that scientists find gaseous hydrogen in all regions of interstellar space.
- C) introduce the techniques used to build telescopes such as ALMA.
- D) describe what ALMA enabled scientists to discover near a newly formed star.

28

Based on the passage, what can reasonably be inferred about how astrophysicists view ALMA?

- A) They believe that using it may yield a great deal of surprising data.
- B) They do not think that they will be able to improve the technology on which it relies.
- C) They worry that it is not powerful enough to determine the composition of dust particles.
- D) They think that it will be quickly replaced by a more sophisticated array.

29

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 20-25 ("Using . . . surprise")
- B) Lines 26-28 ("The researchers . . . Earth")
- C) Lines 53-55 ("These . . . Netherlands")
- D) Lines 60-61 ("This paper . . . ALMA")

Questions 30-38 are based on the following passages.

Passage 1 is adapted from 'A' [Anonymous], "Letter to Horace Greeley at the *New-York Daily Tribune* on the National Woman's Rights Convention in Worcester, Massachusetts." Originally published in 1850. Passage 2 is adapted from Horace Greeley, "Remarks to 'A.'" Originally published in 1850.

Passage 1

It is clear that, if we are going to live, or have any private comforts, there must be dinners cooked, children's faces must be washed, and there must be a home—a home to which the mind of the weary
 5 husband will turn to bear him up and urge him on in his toils for the inmates of that sanctuary—a home where he can for a time forget, in his wife's and children's society, the toils and troubles of this weary world—a home which he can never leave without
 10 carrying with him a new grace, a new strength, drawn from Woman's influence, to enable him victoriously and manfully to withstand the trials and temptations of the world. Now, if Women are given the right to vote, to electioneer, to become
 15 stateswomen, why it is an incontrovertible fact (that is, if they attend properly to politics) that the dinners must go *uncooked*, the children's faces *unwashed*, and home be forgotten—unless, indeed, the men exchange duties with them, as was proposed at the
 20 Convention, and stay at home and help their wives cook and wash the dishes.

So far from thinking Women "slaves," I do not see how it can appear in such a light to any thinking mind, any true-hearted woman. There is something
 25 so superior about Woman that would make one shrink as from profanation at the idea of her mingling in public with "the sterner and *worser* sex"—a spiritualization that raises her far above the intrigues of politicians and the vulgarity of
 30 rowdies—a superiority which, if not acknowledged in words, is confessed in actions, even by men who, however degraded they may be, refrain from the slightest word or action that could be comment[ed] upon, in the presence of a woman.

35 The Women of the Worcester Convention seem to have entirely overlooked the immense power given to women in the form of Home Influence. What power can be greater than a mother's holy and elevated example[?]. . .

40 We must also remember, that if women gained these absurd "rights," they would be obliged to maintain them; and this they have not the strength to do; for which of the women at the Worcester Convention could knock a man down if he chose to
 45 stand up? and what man would come forward to protect a woman as long as she claimed to herself the right of self-protection?

Passage 2

That the full and equal enjoyment of Political Franchises would improve the lot of Woman, may be
 50 doubtful; but we are willing to give the Democratic theory a full and fair trial. Whenever so many Women shall petition for the Right of Suffrage as to indicate that a majority of the sex virtually concur in the demand, then we shall insist that the Franchise
 55 shall be extended to them. Being a disciple of the faith which holds that 'all just government is founded on the *consent* of the *governed*,' we could do not less, even though we knew that the Women would make a bad use of the power thus accorded them. Right first;
 60 Expediency afterward.

As to our correspondent's fear that buttered toast will run short, and children's faces get crusted over, in case the Political Rights of Women are recognized as equal to and identical with those of Men, we do
 65 not share it. We know people who supposed that, when Slavery was abolished, there could be no more boots blacked, no wood chopped, bacon fried, et cetera. But we see that all needful operations go on, though Slavery *is* abolished throughout this region.
 70 We see not why it may not be so in case the slavery of Woman should in like manner be abolished. . . .

Political franchises are but means to an end, which end is the securing of social and personal rights. Other classes have found the Elective
 75 Franchise serviceable toward the attainment of these rights, and we see not why it would lose its efficacy in the hands of Women. And as to the exposure of Women to insult and outrage in the Town or Ward Meeting, or at the Election, we trust the effect would
 80 be just opposite to that anticipated—namely, that men would be constrained by the presence of ladies to keep sober and behave themselves. The presence of Woman has this effect ever in those public assemblages honored by her presence; and we trust
 85 its virtue is far from having been exhausted.

As to Woman having to fight and knock down to maintain their Rights if once conceded, we don't believe a word of it. Knock down whom? Certainly

not those who cheerfully concede them all they ask;
 90 and if there are any of the other sort, such brutes as
 choose to commence the game of knocking down,
 [they] would be very sure to get enough of it before
 coming to the Women.

30

As used in line 1, “clear” most nearly means

- A) untroubled.
- B) innocent.
- C) smooth.
- D) obvious.

31

What main effect do the words “weary,” “toils,” and
 “troubles,” used in lines 4-8, have on the tone of the
 first paragraph of Passage 1?

- A) They create a somber tone that reinforces the importance of the home as a retreat from the outside world.
- B) They create a sinister tone that suggests the danger of privileging the needs of children over those of adults.
- C) They create an aggravated tone that conveys irritation with the stresses of marriage.
- D) They create a discontented tone that underscores the hopelessness of domestic life.

32

One of the main ideas of Passage 1 is that

- A) children will suffer unduly if their mothers work outside the home.
- B) women in fact possess greater political power than men.
- C) home life would be harmed if women were allowed to exercise political authority.
- D) involvement in politics is equally challenging for men and women.

33

In Passage 2, Greeley indicates that women must be given the right to vote when the majority of women demand it because

- A) women have been granted that right by the courts.
- B) granting that right is consistent with the idea of a government based on democratic principles.
- C) men have done a poor job of electing able officials without women’s participation.
- D) the United States is out of step with other great nations in which women can vote.

34

Which statement can reasonably be inferred from Passage 2 about Greeley’s position on women’s right to vote?

- A) Although Greeley suspects he will be ostracized for supporting women’s suffrage, he is willing to incur the risk.
- B) Although Greeley assumes that women, once granted the vote, will lose interest in politics, he considers it unfair to treat them as second-class citizens.
- C) Although Greeley has reservations about women properly exercising their right to vote, he feels that women are entitled to that right.
- D) Although Greeley is personally opposed to women’s involvement in activities outside the home, he is sympathetic to women’s desire to engage in politics.

35

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 55-59 (“Being . . . them”)
- B) Lines 59-60 (“Right . . . afterward”)
- C) Lines 61-65 (“As to . . . share it”)
- D) Lines 70-71 (“We see . . . abolished”)

36

Based on Passage 2, Greeley would most likely view the concerns about women’s neglect of household duties expressed in Passage 1 as

- A) amusing, because they suggest an inability to conceive of men undertaking such duties.
- B) pervasive, because many people have publicly expressed such concerns.
- C) troubling, because they hint at larger fears that are not so easily overcome.
- D) exaggerated, because past concerns of a similar nature have proved to be overblown.

37

The author of Passage 1 would most likely concede that Greeley’s claim regarding women’s potential exposure to insult and outrage is

- A) somewhat plausible, since men rarely consider the needs of anyone but themselves.
- B) mostly correct, since men’s pride usually ensures chivalrous behavior.
- C) generally true, since men’s behavior would be tempered by women’s virtuousness.
- D) largely accurate, since most men would be likely to ignore the threat of public censure.

38

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 22-24 (“So far . . . true-hearted woman”)
- B) Lines 24-34 (“There . . . a woman”)
- C) Lines 40-43 (“We must . . . to do”)
- D) Lines 43-47 (“for which . . . self-protection”)

Questions 39-47 are based on the following passage and supplementary material.

This passage is adapted from Rachel Nuwer, "Wereplant Releases Its Pollen by the Light of the Full Moon." ©2015 by The Smithsonian Institution. *Ephedra foeminea* is a Mediterranean shrub.

Ephedra's relatives, which first arose about 130 million years ago in the Early Cretaceous, likely served as dinosaur food. Like others of their kind, *Ephedra* plants don't have flowers and instead secrete droplets of pollen-laden liquid from their cones. Some species let the wind ferry drops between cones, but the liquid is also high in sugar, which attracts insects.

Catarina Rydin, a botanist at the University of Stockholm, suspects that *Ephedra* might have saved itself from extinction by shifting from a predominantly insect-pollinated system to one dependent on wind, based on observations she has made in the fossil record. "Historically, climate change has occurred repeatedly, not least in the aftermath of the meteorite impact 65 million years ago, and wind-pollination may have been a safer method to ensure reproduction during such times," she says. "It is thus possible that insect-pollinated species of *Ephedra* had a greater risk of becoming extinct."

To better understand the plants and their evolution, Rydin and her doctoral student, Kristina Bolinder, headed down to Greece, where they scrambled over rocks to count insects and keep an eye out for pollen droplets. They had already determined that *E. distachya*, one of *E. foeminea*'s close relatives, sent its pollen riding on the wind—a finding that matches most other *Ephedra* species researchers have taken the time to study. But *E. foeminea*'s pollination methods remained more elusive. Even after its cones appeared, they refused to open, and the usual suspects among insect pollinators seemed uninterested.

One night over a Greek dinner, the two began musing about something they'd recently read about nocturnal insects using the moon to navigate. Suddenly an idea struck: Could *E. foeminea*'s pollination somehow be connected to the lunar cycle? "It started as a joke that evening, I should say," Rydin says.

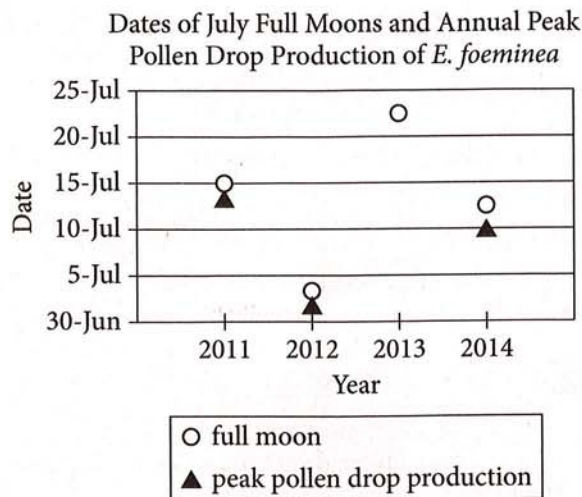
Still, the joke seemed plausible enough that she and Bolinder decided to investigate. They eagerly bided their time in the field, reading up about

nocturnal pollination and counting down the nights until the July full moon. On that long-awaited evening, the researchers strategically positioned themselves in an open field of *E. foeminea* and waited. As the moon rose in the cloudless sky, its soft glow revealed droplets of pollen, which shimmered and sparkled on the brightly colored cones. "We may be biased," Rydin says, "but we found it ever so beautiful."

Whereas most nocturnally blooming plants have white flowers to help pollinators find them in the dark, *E. foeminea*'s cones are red and yellow, and they emit no discernable scent. "It became clear to us that the glittering probably is the means of nocturnal attraction that we had searched for but not found before," Rydin says. That display likely acts as a homing beacon for insects, including the flies and moths that the researchers observed alighting on *E. foeminea* that evening.

Although the light of the half moon would likely be sufficient to illuminate the pollen, the full moon alone remains up throughout the entire night, so the researchers think that *E. foeminea* maximizes the effect for efficiency. "Only at full moon do the insects have a moon to navigate by during the entire night," Rydin says.

So far, the researchers only have that one spectacular display, backed up by a scattering of historical data that seems to support the pattern. While some pollen drops did appear during the full moons of August and September, there were significantly fewer cones, suggesting that *E. foeminea*, like its relatives, peaks in summer. As such, many mysteries remain.



Note: Pollen drop production data not available for 2013.

Adapted from Catarina Rydin and Kristina Bolinder, "Moonlight Pollination in the Gymnosperm *Ephedra* (Gnetales)." ©2015 by The Royal Society.

39

Based on the passage, what led Rydin and Bolinder initially to hypothesize that *E. foeminea* pollination is in some way connected to the moon?

- A) Fellow scientists recommended that hypothesis as a possibility.
- B) They noticed a decrease in daytime insect activity during a full moon.
- C) Other researchers had linked nocturnal insect behavior to the moon.
- D) They observed a reflective quality in the pollen.

40

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 32-34 ("Even . . . uninterested")
- B) Lines 35-37 ("One . . . navigate")
- C) Lines 49-52 ("As the . . . cones")
- D) Lines 60-63 ("That . . . evening")

41

The passage suggests that Rydin and Bolinder might have had a "biased" perspective (lines 52-53) during their full moon observation because they

- A) were happy because it seemed that their hunch was about to be confirmed.
- B) regretted their inability to find a pollination source.
- C) appreciated the way the light from the pollen droplets helped them to identify the insects.
- D) were anxious to share their discovery of a new pollination method.

42

Based on the passage, what is the most likely reason *E. foeminea*'s pollen display does not occur during the half moon?

- A) The half moon is not bright enough to aid the insects in navigation.
- B) The half moon interferes with the insects' daily cycle of activity.
- C) The half moon is visible for fewer hours of the night than the full moon is.
- D) The half moon does not have the gravitational pull of the full moon.

43

The main effect of using the phrase "shimmered and sparkled" (line 51) and the word "glittering" (line 58) to describe *E. foeminea*'s pollen droplets is to

- A) explain why the droplets were functional in spite of an unpleasant odor.
- B) pinpoint a result of evolutionary change since the Early Cretaceous period.
- C) hint at why scientists were driven to discover *Ephedra*'s pollination process.
- D) provide a vivid description of the qualities that attracted insects to the droplets.

44

As used in line 72, “backed up” most nearly means

- A) reversed.
- B) reinforced.
- C) blocked.
- D) substituted.

45

Which finding shown in the graph supports the passage’s assertion that *E. foeminea* shares characteristics with some other *Ephedra* species?

- A) *E. foeminea*’s peak pollen drop production coincides with full moons.
- B) *E. foeminea*’s peak pollen drop production occurs in July.
- C) The timing of *E. foeminea*’s peak pollen drop production varies from year to year.
- D) The association of *E. foeminea*’s peak pollen drop production with the full moon has become weaker over time.

46

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 3-5 (“Like . . . cones”)
- B) Lines 26-30 (“They had . . . study”)
- C) Lines 43-46 (“They eagerly . . . moon”)
- D) Lines 74-77 (“While . . . summer”)

47

Which statement most accurately describes *E. foeminea*’s pollen drop production as depicted in the graph?

- A) It peaks shortly before the full moon.
- B) It peaks shortly after the full moon.
- C) It peaks at exactly the same time each year.
- D) It peaks at different times among various populations.

STOP

**If you finish before time is called, you may check your work on this section only.
Do not turn to any other section.**