

## READING TEST

35 Minutes—40 Questions

**DIRECTIONS:** There are several passages in this test. Each passage is accompanied by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

## Passage I

**LITERARY NARRATIVE:** This passage is adapted from the memoir "My Glove" by Katherine A. Powers (©2008 by the Creative Nonfiction Foundation).

My oldest personal possession is my baseball glove, which I bought for eight dollars at Woolworth's in St. Cloud, Minnesota, in 1960, when I was almost thirteen. It was a "modern" glove in that it had shape, 5 unlike the ancient specimens I came across in my grandfather's house that looked as if they'd been fashioned for trolls and exhumed from a bog. My glove had—has, I should say—a good deal of rawhide lacing. Its metal eyelets number twenty-five. The strap's black 10 nylon label boasts a "W," which might stand for "Wilson," except it doesn't. The glove's inside surface sports another beguiling "W," as well as "Style 2681" and "[illegible] Set Pocket." I can't remember what sort of "Set Pocket" it was. Deep, I'd say. The inscription 15 has been flattened out of existence by almost fifty years of service.

I bought this wonderful thing secretly, because my father had met the few remarks I'd made about "thinking of getting a glove" with his rote response: "You 20 don't want that." (Other things I "didn't want" were blue jeans, a bicycle, a penknife, a fishing pole, a permanent wave, and a pet of any sort.) A baseball glove? What would I do with it? Who would I play with? Boys at school? I was a girl. And what *was* I going to play 25 with? Not a hardball: we were not having anything to do with hardballs. That's how people got their teeth knocked out and the next thing you knew there'd be a broken window and "I'll be out there doing my act with the putty knife."

For a week or so I fraternized with my new glove 30 on the sly. Behind the closed door of the room I shared with my younger sister, I cradled my glove and pushed my face in it, inhaling the deep, fertile leather smell it pumped out. I kneaded it, shaped it, and slammed a 35 ball—a brand-new baseball—in it. Outside the house, around the corner, out of sight, I found a clandestine battery mate, the wall of a brick college dormitory that had no windows on the lowest story. The glove activated all the baseball boilerplate I had amassed from 40 incessant baseball-book reading. Confronting the wall, I flicked off the sign, looked in for another, slapped the glove against my thigh, wound up, and poured one in. Sometimes (if the wall was hitting) I cupped my knee

with my glove, waiting for the batter to try to punch 45 one through. I snagged the ball, pounced on it, speared it, whipped it home.

I walked around (out of sight of the house) with the glove tucked under my arm, wishing I could shove it in my back pocket like boys did in books, but of 50 course my pants, when I was allowed to wear pants, had no pockets because my mother had made them. I wished I knew where to get neat's-foot oil, not available at Woolworth's, but no one I could confide in knew anything about that. Another thing I could not do, 55 I might as well confess, was spit in my glove. I could direct the occasional spitting noise at the pocket, yes. But shoot a gob of spit right in there and work it in like you read about? No, I couldn't.

I brought the glove to school, placing it beside me 60 on the old-fashioned bench seat, on top of my books—just like the boys did. In that distant day, or perhaps only in that parochial school, the boys and the girls were not allowed to play sports together at recess, and none of the girls had gloves. But we did play softball 65 and my glove had no problem at all handling the larger sphere. It could handle anything.

Soon enough, unable to keep my love object to myself, I came clean with my parents. Fairly clean, at least: I kept the hardball under wraps, nestling a tennis 70 ball into the glove's pocket in a prissily responsible manner. I told my father I thought I better tell him I'd gotten a baseball glove. It was a really good one. He massaged it with his thumbs, sort of churning them around in the glove. The leather seemed okay, he 75 allowed, but he said he didn't see why the glove had to look the way it did. He whapped his fist in it a few times and then took it with both hands and bent it back and forth as if to reprimand it for the affectation of its deep pocket. He entered briefly into the subject, familiar 80 to all baseball-book readers, of infielders sitting on their gloves to keep them flat so they could turn the ball over fast. I said I knew about that.

He said, "Is this the best you can do for a ball?" I told him that actually I had bought a baseball, but that I 85 only used it against the side of the brick dormitory—you know the wall that doesn't have any windows low down you could accidentally hit. He said that's how you ruin a good ball, leather gets all nicked. I said that was true.

1. It can most reasonably be inferred from the passage that compared to what the narrator thought her father's reaction would be to her purchase of a baseball glove, his actual reaction is:
  - A. more angry and regretful.
  - B. less harsh and dismissive.
  - C. more blameful and stern.
  - D. less lighthearted and prideful.
2. In the final two paragraphs (lines 67–89), the predominant approach of the narrator as she responds to her father's pointers and anecdotes about baseball could best be described as:
  - F. honest and direct; she tells her father when he explains something that she already knows.
  - G. manipulative and self-serving; she pretends to be interested in her father's pointers so he'll be more likely to give her permission to play baseball.
  - H. helpful and instructive; she gently corrects her father's misconceptions about playing baseball.
  - J. defensive and bitter; she's offended when her father speaks as if he knows more about baseball than she does.
3. The narrator claims that the baseball glove she bought in 1960 was "modern" in that it had:
  - A. a fertile leather smell.
  - B. a black nylon label.
  - C. metal eyelets.
  - D. shape.
4. The passage most strongly supports that the narrator generally responded to her father's comment "You don't want that" (lines 19–20) with:
  - F. little, if any, surprise.
  - G. deep and vocal anger.
  - H. a feeling of pity for her father.
  - J. appreciation for her father's insight.
5. Based on the passage, which of the following statements represents one of the narrator's typical experiences with playing baseball or softball at school?
  - A. The narrator and a few girls who had their own gloves would play baseball on their own.
  - B. Sometimes the narrator would play baseball with the boys, but usually she would play softball with the girls, without her glove.
  - C. The narrator would play baseball with the boys, since any girl who had her own glove was allowed to play baseball with them.
  - D. The narrator would play softball with the girls, and she would be the only one to play with a glove of her own.
6. Which of the following statements, if spoken by the narrator, would best capture the sentiment of the narrator's comments in lines 76–79?
  - F. I could tell that my father wished that he had kept one of his baseball gloves.
  - G. It was as if my father were scolding my glove for its design.
  - H. My father bent my glove too forcefully, just to make me mad.
  - J. My father didn't want to try out my glove, considering that he had seen much better ones.
7. Details in the passage suggest that the narrator's father considered a tennis ball to be:
  - A. the best choice for the narrator to use for practicing baseball, considering she was a girl.
  - B. a better choice than a hardball for first learning how to catch and quickly turn over a ball.
  - C. a less-than-ideal choice for practicing baseball, even for the narrator.
  - D. a less durable choice than a hardball for practicing pitches against a brick wall.
8. In the passage, the narrator describes a brick wall of a college dormitory as:
  - F. fraternizing with her glove.
  - G. flicking off the sign.
  - H. using baseball boilerplate.
  - J. being a clandestine battery mate.
9. The narrator explains that she didn't carry her baseball glove around in her back pocket for which of the following reasons?
  - A. She felt the action was crass, much like spitting in her glove.
  - B. Her homemade pants didn't have pockets.
  - C. She needed to hide her glove, since she hadn't told her parents about it yet.
  - D. Her glove didn't fit in her small back pocket.
10. The narrator characterizes herself as coming only "fairly clean" (line 68) with her parents because she:
  - F. didn't tell them right away about her glove.
  - G. had been using her sister's tennis balls to practice baseball.
  - H. didn't tell them at first that she owned a hardball.
  - J. had been practicing throwing a tennis ball against a dormitory wall.

## Passage II

**SOCIAL SCIENCE:** This passage is adapted from the article "Model Behaviour" by *The Economist* (©2009 by The Economist Newspaper Limited).

The warmongering orcs depicted in the *Lord of the Rings* trilogy are evil, unpleasant creatures that leave death and destruction in their wake. But if you find yourself in a burning building a few years from now, they might just save your life. That is because the technology used to make hordes of these menacing, computer-generated monsters move convincingly on screen turns out to be just what is needed to predict how crowds of humans move around inside buildings.

The simulation of the behaviour of crowds of people and swarms of animals (not just mythological ones) is being applied to many unusual situations.

When the first film in the *Lord of the Rings* trilogy was released in 2001, much was made of its heavy reliance on computer-generated imagery. But what was perhaps most impressive were the epic battle scenes, which broke new ground in special effects by showing huge numbers of characters with an unprecedented degree of detail and realism. For this the trilogy's director, Peter Jackson, largely has Stephen Regelous to thank. Regelous is the founder of Massive Software, based in Auckland, New Zealand. His firm's software made it possible to generate as many as half a million virtual actors in a single shot, each behaving in an independent and plausible manner.

That is because every character was, in effect, given a brain, says Diane Holland, Massive's chief executive. Each one was modeled as a software "agent" with its own desires, needs and goals, and the ability to perceive the environment and respond to the immediate surroundings in a believable way. Any given orc, for example, could work out which other fighters on the battlefield were in its line of sight, and hence whether it should flee or attack. This produced far more realistic results than orchestrating the motions of the digital extras in a scripted, choreographed way.

Taking a similar approach is Dr. Demetri Terzopoulos, a computer scientist at the University of California in Los Angeles. He is using agents to simulate the behaviour of commuters passing through Pennsylvania Station in New York. His agents have memory, but they also have a sense of time and the ability to plan ahead. An agent entering the station will typically seek out the ticket office, stand in line to buy a ticket, and then perhaps kill some time watching a street performer if he has a few minutes before his train arrives, says Terzopoulos. If he is running late, by contrast, he may try to push his way to the front of the ticket line before sprinting for the platform.

Terzopoulos's research has shown that agents can simulate complex behaviours with great realism. Working with Qinxin Yu, a graduate student, Terzopoulos has modeled how people behave in public when some-

one collapses. People crowd around to help, and some agents will even remember if they recently saw a police officer nearby, and run to get help, he says. Such realism is useful in the development of automated closed-circuit television security systems. Using real cameras for such research would raise privacy concerns, so he is making agent simulations available instead to researchers who are training cameras to detect unusual behaviour. Another intriguing application is to help archaeologists study ancient ruins. Using a model of the Great Temple of Petra in Jordan, Terzopoulos has evaluated how it would have been used by the people who built it. He has concluded that the temple's capacity had previously been greatly overestimated.

Agents need not even represent humans. Massive has been working with BMT Asia Pacific, a marine consultancy, to model the behaviour of the thousands of ships operating in Hong Kong harbour. This involves simulating the behaviour of the ships themselves, each of which may be under the control of several people, says Richard Colwill of BMT. And rather than assuming that everyone will adhere to the maritime traffic code, which determines who has right of way, it can incorporate acts of bravado and incompetence. "We get about 150 collisions each year in Hong Kong," says Colwill. His firm plans to use the software to determine which traffic-management strategies will be least disruptive during the construction of an immersed road tunnel that will need to be lowered into the harbour.

As agent software becomes better able to capture complex real-world behaviour, other uses for it are sure to emerge. Indeed, this could soon become a crowded field.

11. The main idea of the passage is that:
- A. using computer-generated simulations in movies has both advantages and disadvantages.
  - B. the *Lord of the Rings* trilogy made cinematic history with its computer-generated simulations.
  - C. computer-generated simulations can be applied to predict behavior in a number of situations.
  - D. Terzopoulos has expanded the field of computer-generated simulation beyond its uses in film.
12. In the passage, the author's attitude toward computer-generated simulations can best be described as:
- F. fearful of their negative consequences.
  - G. optimistic about their potential uses.
  - H. boastful about their success.
  - J. skeptical of their accuracy.

13. Which of the following statements best describes the organization of the passage?
- A. A problem with computer-generated simulations is identified, and several solutions are proposed.
  - B. An example of computer-generated simulation is followed by a generalization and more examples.
  - C. Summaries of the work of various computer researchers are presented in chronological order.
  - D. A claim about the efficacy of computer-generated simulations is followed by attempts to refute it.
14. Which of the following questions is directly answered in the passage?
- F. What behaviors can't be modeled by computer-generated simulations?
  - G. What is the intended use for the software being developed by Massive Software and BMT Asia Pacific?
  - H. How do researchers give a brain to a computerized character?
  - J. How do programmers decide which characteristics and actions to include in their software?
15. The main purpose of the seventh paragraph (lines 68–82) is to:
- A. illustrate the dangers of predicting crowd behavior through computer simulation.
  - B. summarize Hong Kong's lengthy history of using computer simulations of crowd behavior to direct harbor traffic.
  - C. contrast BMT Asia Pacific's computer simulation of crowd behavior with actual crowd behavior.
  - D. extend the discussion of using computer simulations to predict crowd behavior to situations involving inanimate objects.
16. According to the passage, the director of the *Lord of the Rings* trilogy owes thanks to which of the following people?
- F. Demetri Terzopoulos
  - G. Diane Holland
  - H. Stephen Regelous
  - J. Richard Colwill
17. The passage indicates that, in relation to Terzopoulos's work in computer-generated simulations, Massive Software's work is:
- A. more experimental in nature.
  - B. less often used in films.
  - C. more realistic in films.
  - D. similar in approach.
18. The passage indicates that Terzopoulos accounted for which of the following situations in his study of commuter behavior at Pennsylvania Station?
- F. A train arriving behind schedule
  - G. A train being full
  - H. A commuter getting lost
  - J. A commuter running late
19. According to the passage, using computer simulations instead of cameras to study public behavior is preferable due to concerns about:
- A. privacy.
  - B. cost.
  - C. labor.
  - D. safety.
20. In lines 85–86, the phrase *a crowded field* most nearly refers to:
- F. the research and development of agent software to simulate real-world situations.
  - G. a harbor in need of traffic-management strategies.
  - H. an open area where real-world crowd behavior is studied.
  - J. a filming location for the *Lord of the Rings* trilogy.

## Passage III

**HUMANITIES:** Passage A is adapted from the article “America, America: Two Plays about the Country’s Complexities” by Hilton Als (©2010 by Condé Nast). Passage B is adapted from the article “O.K. Chorale: An English Take on Rodgers and Hammerstein” by John Lahr (©2002 by Condé Nast).

## Passage A by Hilton Als

Molly Smith, the artistic director of Arena Stage in Washington, D.C., directed the company’s current revival of Richard Rodgers and Oscar Hammerstein II’s first musical collaboration, *Oklahoma!* Smith’s production is extraordinary in thought and execution and utterly satisfying on so many levels. Smith’s conceit is entirely original: instead of taking this nearly perfect show at face value, she has dug back into the history of Oklahoma itself. Sold to the United States as part of the 1803 Louisiana Purchase, Oklahoma was opened for settlement in 1889. By the time it became a state, eighteen years later, the Territory, as it was known, was populated by white settlers from other parts of the country, as well as a number of emancipated slaves and forcibly resettled Native Americans, who braved drought, harsh economic times, and often brutal and complicated racial interactions to make the Territory their home.

Smith doesn’t explain any of this in her production—who would rewrite Rodgers and Hammerstein?—but it shows in her casting. As in the original Broadway production, which opened in 1943, there are no stars onstage. Smith raises the roof not so much with “color-blind” casting as by paying attention to how the characters might have looked if they were actual Oklahomans of the period. The wonderful Aunt Eller (E. Faye Butler) and her niece, Laurey (the buoyant and complex Eleasha Gamble), are black, while Laurey’s suitor, Curly (the outstanding Nicholas Rodriguez), could be taken for Native American. This deviation from standard casting brings a new force to the musical—which itself changed musicals forever by introducing plot and narrative development into what had previously been considered a frivolous genre. Altogether, the actors seem relieved to be not segregated in black or white shows but together in an utterly American one.

The afternoon I saw *Oklahoma!*, it was clear that the members of the audience didn’t feel overwhelmed by a “classic”; instead, they were as moved as I was by the humility and hope that Smith and her company brought to the show.

## Passage B by John Lahr

Because of *Oklahoma!*’s enormous subsequent influence, its novelties—no opening ensemble number, chorus girls in long dresses, dancers who don’t appear until late in the first act, the integrated score—have lost some of their original lustre. In the Royal National Theatre’s three-hour revival (now at New York’s Gershwin Theatre), directed by Trevor Nunn, the show’s heady mixture of wonder and ambition is best

50 captured in its production values. Anthony Ward’s picturesque set immediately submerges us in a gorgeous world of folk innocence.

In the making of musicals, Nunn is a four-star general. His stage pictures spill over with meticulous, articulate energy. But technique, which can make the show work, is not enough to make it wonderful. Here, I think, the issue of cultural chemistry comes into play. American optimism has its root in abundance and in the vastness of the land that *Oklahoma!* celebrates. Britain, on the other hand, is an island the size of Utah. Its culture is one of scarcity; its preferred idiom is irony—a language of limits. In the retranslation of an award-winning English version of an American classic to its natural Broadway habitat, an emotional lopsidedness has become evident, particularly in the casting.

The linchpins of the show are Aunt Eller, played by the gritty, droll comedienne Andrea Martin, who is American and nails it, and the feisty lovelorn Laurey, played by the fine-voiced, demure Josefina Gabrielle, who is English and doesn’t. It’s not talent that’s at issue here—Gabrielle is the first Laurey to dance her own Dream Ballet—but national character. The show is about Western women, and Gabrielle’s Laurey lacks that very American sense of gumption, a combination of buoyancy and backbone.

In his memoir, “Musical Stages,” Richard Rodgers averred that the show’s opening scene—a cowboy strolling onto the stage where a single woman is churning butter—announced to the audience, “Watch out! This is a different kind of musical.” He went on to say, “Everything in the production was made to conform to the simple open-air spirit of the story; this was essential, and certainly a rarity in the musical theatre.” Trevor Nunn’s version of *Oklahoma!* preserves the crowd-pleasing commercial zest of the original; but on the evening I saw the show only a handful of audience members stood to applaud the hardworking cast, confirming my suspicion that the open-air spirit of the evening had been slowly leached away.

Questions 21–23 ask about Passage A.

21. The information in lines 9–18 serves primarily to:
- explain events in the order they are narrated in *Oklahoma!*
  - note an aspect of the original production of *Oklahoma!* that is missing from Smith’s.
  - suggest that the creators of *Oklahoma!* failed to grasp the magnitude of their subject matter.
  - summarize the history that Smith has likely considered in staging *Oklahoma!*

22. Based on the passage, the statement “there are no stars onstage” (lines 22–23) most likely means the:
- F. acting is mediocre.
  - G. power of the production does not rely on the celebrity status of the cast members.
  - H. actors in the scenes have small roles.
  - J. script is a poor match for the talents of the actors.
23. The author of Passage A’s overall response to the performance of *Oklahoma!* that is the subject of his review is one of:
- A. mild disappointment.
  - B. profound respect.
  - C. tentative approval.
  - D. confusion.

Questions 24–27 ask about Passage B.

24. The information between the dashes in lines 43–45 serves as examples of:
- F. shortcomings in the British production of *Oklahoma!*
  - G. differences between two productions of *Oklahoma!*
  - H. the passage author’s favorite elements of *Oklahoma!*
  - J. elements of the original production of *Oklahoma!*
25. The author of Passage B would most likely agree with which of the following statements about Nunn?
- A. His reputation as a mediocre director will be changed by his production of *Oklahoma!*
  - B. His production of *Oklahoma!* is typical of his work in the way it celebrates the simple life.
  - C. He is a major figure in the world of musicals, and his production of *Oklahoma!* is flawed.
  - D. He is a genius at finding new talent for roles that have traditionally been held by stars.
26. The reference to Utah in the discussion of the English version of a uniquely American play primarily serves to:
- F. conjure up a state with a history of settlement similar to *Oklahoma!*’s.
  - G. suggest how small Britain is compared to the United States.
  - H. conjure up a wide-open landscape.
  - J. suggest that the story told in *Oklahoma!* pertains to other states.

27. To the author of Passage B, the actor who plays Laurey represents:
- A. why a British production can’t capture the essence of a musical concerned with the national character of the United States.
  - B. the universal appeal of *Oklahoma!* as a musical that celebrates a diversity of national identities.
  - C. the idea that *Oklahoma!* lends itself to endless reinvention.
  - D. the contrasts within an individual character that reflect the larger societal contrasts explored in *Oklahoma!*

Questions 28–30 ask about both passages.

28. A shared element of these two reviews of *Oklahoma!* is the:
- F. assertion that casting can play a crucial role in determining the show’s success.
  - G. focus on how a theater professional from overseas interprets a classic of American culture.
  - H. eagerness to point out that the show succeeded in spite of minor disappointments.
  - J. opinion that set design can mask some shortcomings of the show.
29. It is most reasonable to infer that the authors of Passage A and Passage B would agree that for a director to reinterpret *Oklahoma!* for today’s audiences is an act of:
- A. courage, because the musical is both familiar and dated in ways that limit opportunities for making a significant positive impression on audiences.
  - B. foolishness, because the original is so powerful that attempts to improve upon it amount to meddling with something that isn’t broken.
  - C. arrogance, because it suggests that audiences aren’t able on their own to relate a piece from an earlier era to their own lives.
  - D. respect, because doing so acknowledges that the play deserves a richer treatment than its original cast members were able to accomplish.
30. Unlike the last paragraph of Passage B, the last paragraph of Passage A:
- F. focuses on the audience’s reaction to the production.
  - G. bluntly expresses the author’s disappointment in the production.
  - H. minimizes the director’s role in the production’s outcome.
  - J. conveys appreciation for the director and cast of the production.

## Passage IV

**NATURAL SCIENCE:** This passage is adapted from the article "Not Dead Yet: A Dying Star Is Caught Flaring Briefly Back to Life" by Charles Liu (©2005 by Natural History Magazine, Inc.).

About a billion years before a sunlike star "dies," or stops generating energy via nuclear fusion, it becomes a red giant, growing dramatically to a hundred times its original diameter. Then, as the red-giant phase ends, the star blows off its outer layers, giving rise to an expanding gas cloud called a planetary nebula. The planetary nebula, in turn, swells in size and drops in density for at most another 100,000 years, exposing the remaining stellar core at its center. That core becomes a white dwarf—the most common celestial cadaver visible in the sky. The white dwarf usually radiates its leftover heat into space for billions of years, and it slowly fades to black.

Some soon-to-be white dwarfs, however, seem to heed the counsel of poet Dylan Thomas: "Do not go gentle into that good night." According to the theory of stellar evolution, the temperature in the stellar core can fluctuate wildly, and sometimes spikes as high as tens of millions of degrees. For a little while at least, the core may even flicker back into stellar life as a giant star, generating new energy with new flares of nuclear fusion.

Alas, such a giant can't last long, because the core is, in essence, running on fumes. Without a substantial fuel source to sustain fusion, a nuclear re-ignition of this kind runs out of gas within a few centuries, and the star heads back toward white dwarfhood. But during its brief return to fusion-powered life, its interaction with the surrounding cloud of gas creates a fascinating astronomical laboratory for the study of stellar and interstellar processes.

The star FG Sagittae, a highly variable star in the constellation Sagitta, seems to be a case in point. FG Sagittae lies at the heart of a planetary nebula called He 1-5. In the past thirty years the star's temperature has dropped from more than 30,000 degrees Fahrenheit to less than 10,000 degrees, though its brightness has changed erratically from year to year. As with an old, grease-choked diesel engine struggling to start back up, the star's efforts to restart nuclear fusion create puffs of thick smoke—carbon atoms coughed up from the fading stellar core. The smoke absorbs the star's radiating heat and periodically obscures the visible light it emits. To see through the haze and examine the goings-on near the star's surface, astronomers must look at its radiation in less obscured wavelengths, such as infrared light.

A research team led by Robert A. Gehrz of the University of Minnesota in Minneapolis has now done just that. Recently the team published the results of twenty years of monitoring the infrared properties of FG Sagittae with three telescopes equipped with infrared photometers—in effect, photon counters. One instrument is in Minnesota, one in Arizona, and one in

Wyoming. Gehrz and his colleagues discovered that, though the star's overall brightness and temperature have changed dramatically through the years, carbon dust from the surface of FG Sagittae has been shining more or less steadily at a temperature of about 1,200 degrees F (650 degrees Celsius). That's roughly hot enough to melt aluminum, but substantially cooler than the core of any star undergoing active nuclear fusion. Gehrz and his colleagues conclude that, besides giving rise to clouds of obscuring gas, FG Sagittae is powering a strong stellar wind peppered with this carbon dust. They think this dust has been glowing continuously for the past decade. On the basis of the measured amount of emitted infrared radiation, Gehrz's team estimates that the wind is carrying between 1.5 and 7.5 quadrillion ( $1.5$  to  $7.5 \times 10^{15}$ ) tons of stellar material away from FG Sagittae each second—or about eight to forty Earth masses each year.

Sooner rather than later the current burst of new nuclear fusion will cease, and the dusty stellar wind will cease. The stellar core, no longer obscured by a thick, dusty blanket, will turn once more into a hot white dwarf. If, as theoretical models predict, the stellar renaissance of FG Sagittae lasts a few hundred years, the wind will deposit thousands of Earth-masses' worth of carbon-rich matter into the star's surroundings. The carbon atoms, as they cool down, could become seeds for the buildup of interstellar dust grains—which, in turn, could seed the formation of asteroids, moons, planets, and perhaps eventually even life as we know it. Maybe the astronomers of the twenty-fourth or twenty-fifth century will look toward FG Sagittae and see, in its surroundings, the potential makings of a new and distant earth.

31. The passage indicates that one difference between a sunlike star and a dying star is that a sunlike star:
- has more fuel for nuclear fusion.
  - has a larger planetary nebula.
  - is more often studied with a photometer.
  - has more dramatic fluctuations in brightness.
32. The main purpose of the first paragraph is to:
- describe how some stars flicker back to stellar life before becoming white dwarfs.
  - use FG Sagittae as an example of a star currently heading toward the white dwarf phase.
  - explain the dying process of stars from the red giant phase through the white dwarf phase.
  - contrast the longevity of a red giant with that of a white dwarf.

33. The author quotes a Dylan Thomas poem in lines 15–16 mainly to introduce the passage's point that:
- A. astronomers often feel nostalgic about the stars they have studied.
  - B. a dying star is sometimes a danger to the stellar matter around it.
  - C. scientists often refer to white dwarfs as being in a gentle stage of a star's life.
  - D. some stars flare back into life before fading to black.
34. According to the passage, one reason the brightness of FG Sagittae has appeared to change erratically from year to year is that:
- F. the star's light is periodically blocked by another stellar body.
  - G. smoke sometimes obscures the star's light.
  - H. wind is distorting the planetary nebula.
  - J. white dwarfs don't produce visible light.
35. According to the passage, compared to the temperature of the core of a star undergoing nuclear fusion, the temperature of the carbon dust from the surface of FG Sagittae is:
- A. about the same.
  - B. slightly cooler.
  - C. much cooler.
  - D. much hotter.
36. The passage states that when studying the wind powered by FG Sagittae, Gehr's team used the measured amount of emitted infrared radiation to estimate the:
- F. likelihood of stellar material produced by FG Sagittae affecting Earth's mass.
  - G. probability of FG Sagittae becoming a red giant by the twenty-fifth century.
  - H. reason for the decrease in the amount of dust generated by FG Sagittae.
  - J. amount of stellar material carried away from FG Sagittae per second.
37. Based on the passage, FG Sagittae's efforts to restart nuclear fusion would best be characterized as:
- A. smooth.
  - B. labored.
  - C. sudden.
  - D. impossible.
38. According to the passage, Gehr's research team used infrared light to study FG Sagittae because infrared light allowed the team to:
- F. identify the individual gases that compose the planetary nebula.
  - G. calculate the exact number of years the star will spend in the white dwarf phase.
  - H. view the activity close to the surface of FG Sagittae.
  - J. determine the precise location of FG Sagittae in He 1-5.
39. At the end of the passage, the author muses that the current regeneration of FG Sagittae may eventually result in:
- A. the formation of new life in the universe.
  - B. FG Sagittae's return to the beginning of its life cycle.
  - C. the death of a distant star.
  - D. the onset of the red giant phase in a neighboring star.
40. According to the passage, if theoretical models are accurate, the stellar renaissance of FG Sagittae will last for a period of time best described as:
- F. a few hundred years.
  - G. between 10,000 and 30,000 years.
  - H. approximately 100,000 years.
  - J. billions of years.

**END OF TEST 3**

**STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.**

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