

## SECTION III

Time—35 minutes

28 Questions

**Directions:** Each passage in this section is followed by a group of questions to be answered on the basis of what is stated or implied in the passage. For some of the questions, more than one of the choices could conceivably answer the question. However, you are to choose the best answer; that is, the response that most accurately and completely answers the question, and blacken the corresponding space on your answer sheet.

- Until recently many astronomers believed that asteroids travel about the solar system unaccompanied by satellites. These astronomers assumed this because they considered asteroid-satellite systems inherently unstable. Theoreticians could have told them otherwise: even minuscule bodies in the solar system can theoretically have satellites, as long as everything is in proper scale. If a bowling ball were orbiting about the Sun in the asteroid belt, it could have a pebble orbiting it as far away as a few hundred radii (or about 50 meters) without losing the pebble to the Sun's gravitational pull.

- Observations now suggest that asteroid satellites may exist not only in theory but also in reality. Several astronomers have noticed, while watching asteroids pass briefly in front of stars, that something besides the known asteroid sometimes blocks out the star as well. Is that something a satellite?

- The most convincing such report concerns the asteroid Herculina, which was due to pass in front of a star in 1978. Astronomers waiting for the predicted event found not just one occultation, or eclipse, of the star, but two distinct drops in brightness. One was the predicted occultation, exactly on time. The other, lasting about five seconds, preceded the predicted event by about two minutes. The presence of a secondary body near Herculina thus seemed strongly indicated. To cause the secondary occultation, an unseen satellite would have to be about 45 kilometers in diameter, a quarter of the size of Herculina, and at a distance of 990 kilometers from the asteroid at the time. These values are within theoretical bounds, and such an asteroid-satellite pair could be stable.

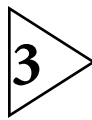
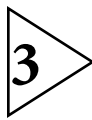
- With the Herculina event, apparent secondary occultations became “respectable”—and more commonly reported. In fact, so common did reports of secondary events become that they are now simply too numerous for all of them to be accurate. Even if every asteroid has as many satellites as can be fitted around it without an undue number of collisions, only one in every hundred primary occultations would be accompanied by a secondary event (one in every thousand if asteroidal satellite systems resembled those of the planets).

- Yet even astronomers who find the case for asteroid satellites unconvincing at present say they would change their minds if a photoelectric record were made of a well-behaved secondary event. By “well-behaved” they mean that during occultation the observed brightness must drop sharply as the star

- winks out and must rise sharply as it reappears from behind the obstructing object, but the brightness during the secondary occultation must drop to that of the asteroid, no higher and no lower. This would make it extremely unlikely that an airplane or a glitch in the instruments was masquerading as an occulting body.

1. Which one of the following best expresses the main idea of the passage?
  - (A) The observation of Herculina represented the crucial event that astronomical observers and theoreticians had been waiting for to establish a convincing case for the stability of asteroid satellite systems.
  - (B) Although astronomers long believed that observation supports the existence of stable asteroid-satellite systems, numerous recent reports have increased skepticism on this issue in astronomy.
  - (C) Theoreticians' views on the stability of asteroid satellite systems may be revised in the light of reports like those about Herculina.
  - (D) Astronomers continue to consider it respectable to doubt the stability of asteroid-satellite systems, but new theoretical developments may change their views.
  - (E) The Herculina event suggests that theoreticians' views about asteroid-satellite systems may be correct, and astronomers agree about the kind of evidence needed to clearly resolve the issue.
2. Which one of the following is mentioned in the passage as providing evidence that Herculina has a satellite?
  - (A) the diameter of a body directly observed near Herculina
  - (B) the distance between Herculina and the planet nearest to it
  - (C) the shortest possible time in which satellites of Herculina, if any, could complete a single orbit
  - (D) the occultation that occurred shortly before the predicted occultation by Herculina
  - (E) the precise extent to which observed brightness dropped during the occultation by Herculina

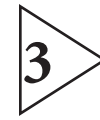
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3. According to the passage, the attitude of astronomers toward asteroid satellites since the Herculina event can best be described as
- (A) open-mindedness combined with a concern for rigorous standards of proof
  - (B) contempt for and impatience with the position held by theoreticians
  - (C) bemusement at a chaotic mix of theory, inadequate or spurious data, and calls for scientific rigor
  - (D) hardheaded skepticism, implying rejection of all data not recorded automatically by state-of-the-art instruments
  - (E) admiration for the methodical process by which science progresses from initial hypothesis to incontrovertible proof
4. The author implies that which one of the following was true prior to reports of the Herculina event?
- (A) Since no good theoretical model existed, all claims that reports of secondary occultations were common were disputed.
  - (B) Some of the reported observations of secondary occultations were actually observations of collisions of satellites with one another.
  - (C) If there were observations of phenomena exactly like the phenomena now labeled secondary occultations, astronomers were less likely then to have reported such observations.
  - (D) The prevailing standards concerning what to classify as a well-behaved secondary event were less stringent than they are now.
  - (E) Astronomers were eager to publish their observations of occultations of stars by satellites of asteroids.
5. The information presented in the passage implies which one of the following about the frequency of reports of secondary occultations after the Herculina event?
- (A) The percentage of reports of primary occultations that also included reports of secondary occultations increased tenfold compared to the time before the Herculina event.
  - (B) Primary occultations by asteroids were reported to have been accompanied by secondary occultations in about one out of every thousand cases.
  - (C) The absolute number of reports of secondary occultations increased tenfold compared to the time before the Herculina event.
  - (D) Primary occultations by asteroids were reported to have been accompanied by secondary occultations in more than one out of every hundred cases.
  - (E) In more than one out of every hundred cases, primary occultations were reported to have been accompanied by more than one secondary occultation.
6. The primary purpose of the passage is to
- (A) cast doubt on existing reports of secondary occultations of stars
  - (B) describe experimental efforts by astronomers to separate theoretically believable observations of satellites of asteroids from spurious ones
  - (C) review the development of ideas among astronomers about whether or not satellites of asteroids exist
  - (D) bring a theoretician's perspective to bear on an incomplete discussion of satellites of asteroids
  - (E) illustrate the limits of reasonable speculation concerning the occultation of stars
7. The passage suggests that which one of the following would most help to resolve the question of whether asteroids have satellites?
- (A) a review of pre-1978 reports of secondary occultations
  - (B) an improved theoretical model of stable satellite systems
  - (C) a photoelectric record of a well-behaved secondary occultation
  - (D) a more stringent definition of what constitutes a well-behaved secondary occultation
  - (E) a powerful telescope that would permit a comparison of ground-based observations with those made from airplanes

- Historians attempting to explain how scientific work was done in the laboratory of the seventeenth-century chemist and natural philosopher Robert Boyle must address a fundamental discrepancy
- (5) between how such experimentation was actually performed and the seventeenth-century rhetoric describing it. Leaders of the new Royal Society of London in the 1660s insisted that authentic science depended upon actual experiments performed,
- (10) observed, and recorded by the scientists themselves. Rejecting the traditional contempt for manual operations, these scientists, all members of the English upper class, were not to think themselves demeaned by the mucking about with chemicals,
- (15) furnaces, and pumps; rather, the willingness of each of them to become, as Boyle himself said, a mere “drudge” and “under-builder” in the search for God’s truth in nature was taken as a sign of their nobility and Christian piety.
- (20) This rhetoric has been so effective that one modern historian assures us that Boyle himself actually performed all of the thousand or more experiments he reported. In fact, due to poor eyesight, fragile health, and frequent absences from
- (25) his laboratory, Boyle turned over much of the labor of obtaining and recording experimental results to paid technicians, although published accounts of the experiments rarely, if ever, acknowledged the technicians’ contributions. Nor was Boyle unique in
- (30) relying on technicians without publicly crediting their work.
- Why were the contributions of these technicians not recognized by their employers? One reason is the historical tendency, which has persisted into the
- (35) twentieth century, to view scientific discovery as resulting from momentary flashes of individual insight rather than from extended periods of cooperative work by individuals with varying levels of knowledge and skill. Moreover, despite the clamor of
- (40) seventeenth-century scientific rhetoric commending a hands-on approach, science was still overwhelmingly an activity of the English upper class, and the traditional contempt that genteel society maintained for manual labor was pervasive and deeply rooted.
- (45) Finally, all of Boyle’s technicians were “servants,” which in seventeenth-century usage meant anyone who worked for pay. To seventeenth-century sensibilities, the wage relationship was charged with political significance. Servants, meaning wage
- (50) earners, were excluded from the franchise because they were perceived as ultimately dependent on their wages and thus controlled by the will of their employers. Technicians remained invisible in the political economy of science for the same reasons
- (55) that underlay servants’ general political exclusion. The technicians’ contributions, their observations and judgment, if acknowledged, would not have been perceived in the larger scientific community as objective because the technicians were dependent on
- (60) the wages paid to them by their employers. Servants might have made the apparatus work, but their contributions to the making of scientific knowledge were largely—and conveniently—ignored by their employers.

8. Which one of the following best summarizes the main idea of the passage?
- (A) Seventeenth-century scientific experimentation would have been impossible without the work of paid laboratory technicians.
- (B) Seventeenth-century social conventions prohibited upper-class laboratory workers from taking public credit for their work.
- (C) Seventeenth-century views of scientific discovery combined with social class distinctions to ensure that laboratory technicians’ scientific work was never publicly acknowledged.
- (D) Seventeenth-century scientists were far more dependent on their laboratory technicians than are scientists today, yet far less willing to acknowledge technicians’ scientific contributions.
- (E) Seventeenth-century scientists liberated themselves from the stigma attached to manual labor by relying heavily on the work of laboratory technicians.
9. It can be inferred from the passage that the “seventeenth-century rhetoric” mentioned in line 6 would have more accurately described the experimentation performed in Boyle’s laboratory if which one of the following were true?
- (A) Unlike many seventeenth-century scientists, Boyle recognized that most scientific discoveries resulted from the cooperative efforts of many individuals.
- (B) Unlike many seventeenth-century scientists, Boyle maintained a deeply rooted and pervasive contempt for manual labor.
- (C) Unlike many seventeenth-century scientists, Boyle was a member of the Royal Society of London.
- (D) Boyle generously acknowledged the contribution of the technicians who worked in his laboratory.
- (E) Boyle himself performed the actual labor of obtaining and recording experimental results.
10. According to the author, servants in seventeenth-century England were excluded from the franchise because of the belief that
- (A) their interests were adequately represented by their employers
- (B) their education was inadequate to make informed political decisions
- (C) the independence of their political judgment would be compromised by their economic dependence on their employers
- (D) their participation in the elections would be a polarizing influence on the political process
- (E) the manual labor that they performed did not constitute a contribution to the society that was sufficient to justify their participation in elections



11. According to the author, the Royal Society of London insisted that scientists abandon the
- (A) belief that the primary purpose of scientific discovery was to reveal the divine truth that could be found in nature
  - (B) view that scientific knowledge results largely from the insights of a few brilliant individuals rather than from the cooperative efforts of many workers
  - (C) seventeenth-century belief that servants should be denied the right to vote because they were dependent on wages paid to them by their employers
  - (D) traditional disdain for manual labor that was maintained by most members of the English upper class during the seventeenth century
  - (E) idea that the search for scientific truth was a sign of piety
12. The author implies that which one of the following beliefs was held in both the seventeenth and the twentieth centuries?
- (A) Individual insights rather than cooperative endeavors produce most scientific discoveries.
  - (B) How science is practiced is significantly influenced by the political beliefs and assumptions of scientists.
  - (C) Scientific research undertaken for pay cannot be considered objective.
  - (D) Scientific discovery can reveal divine truth in nature.
  - (E) Scientific discovery often relies on the unacknowledged contributions of laboratory technicians.
13. Which one of the following best describes the organization of the last paragraph?
- (A) Several alternative answers are presented to a question posed in the previous paragraph, and the last is adopted as the most plausible.
  - (B) A question regarding the cause of the phenomenon described in the previous paragraph is posed, two possible explanations are rejected, and evidence is provided in support of a third.
  - (C) A question regarding the phenomenon described in the previous paragraph is posed, and several incompatible views are presented.
  - (D) A question regarding the cause of the phenomenon described in the previous paragraph is posed, and several contributing factors are then discussed.
  - (E) Several possible answers to a question are evaluated in light of recent discoveries cited earlier in the passage.
14. The author's discussion of the political significance of the "wage relationship" (line 48) serves to
- (A) place the failure of seventeenth-century scientists to acknowledge the contributions of their technicians in the larger context of relations between workers and their employers in seventeenth-century England
  - (B) provide evidence in support of the author's more general thesis regarding the relationship of scientific discovery to the economic conditions of societies in which it takes place
  - (C) provide evidence in support of the author's explanation of why scientists in seventeenth-century England were reluctant to rely on their technicians for the performance of anything but the most menial tasks
  - (D) illustrate political and economic changes in the society of seventeenth-century England that had a profound impact on how scientific research was conducted
  - (E) undermine the view that scientific discovery results from individual enterprise rather than from the collective endeavor of many workers
15. It can be inferred from the passage that "the clamor of seventeenth-century scientific rhetoric" (lines 39–40) refers to
- (A) the claim that scientific discovery results largely from the insights of brilliant individuals working alone
  - (B) ridicule of scientists who were members of the English upper class and who were thought to demean themselves by engaging in the manual labor required by their experiments
  - (C) criticism of scientists who publicly acknowledged the contributions of their technicians
  - (D) assertions by members of the Royal Society of London that scientists themselves should be responsible for obtaining and recording experimental results
  - (E) the claim by Boyle and his colleagues that the primary reason for scientific research is to discover evidence of divine truth in the natural world

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One type of violation of the antitrust laws is the abuse of monopoly power. Monopoly power is the ability of a firm to raise its prices above the competitive level—that is, above the level that would

- (5) exist naturally if several firms had to compete—without driving away so many customers as to make the price increase unprofitable. In order to show that a firm has abused monopoly power, and thereby violated the antitrust laws, two essential
- (10) facts must be established. First, a firm must be shown to possess monopoly power, and second, that power must have been used to exclude competition in the monopolized market or related markets.

- The price a firm may charge for its product is
- (15) constrained by the availability of close substitutes for the product. If a firm attempts to charge a higher price—a supracompetitive price—customers will turn to other firms able to supply substitute products at competitive prices. If a firm provides a large
- (20) percentage of the products actually or potentially available, however, customers may find it difficult to buy from alternative suppliers. Consequently, a firm with a large share of the relevant market of substitutable products may be able to raise its price
- (25) without losing many customers. For this reason courts often use market share as a rough indicator of monopoly power.

- Supracompetitive prices are associated with a loss of consumers' welfare because such prices force some
- (30) consumers to buy a less attractive mix of products than they would ordinarily buy. Supracompetitive prices, however, do not themselves constitute an abuse of monopoly power. Antitrust laws do not attempt to counter the mere existence of monopoly
- (35) power, or even the use of monopoly power to extract extraordinarily high profits. For example, a firm enjoying economies of scale—that is, low unit production costs due to high volume—does not violate the antitrust laws when it obtains a large
- (40) market share by charging prices that are profitable but so low that its smaller rivals cannot survive. If the antitrust laws posed disincentives to the existence and growth of such firms, the laws could impair consumers' welfare. Even if the firm, upon acquiring
- (45) monopoly power, chose to raise prices in order to increase profits, it would not be in violation of the antitrust laws.

- The antitrust prohibitions focus instead on abuses of monopoly power that exclude competition in the
- (50) monopolized market or involve leverage—the use of power in one market to reduce competition in another. One such forbidden practice is a tying arrangement, in which a monopolist conditions the sale of a product in one market on the buyer's
- (55) purchase of another product in a different market. For example, a firm enjoying a monopoly in the communications systems market might not sell its products to a customer unless that customer also buys its computer systems, which are competing with
- (60) other firms' computer systems.

The focus on the abuse of monopoly power, rather than on monopoly itself, follows from the primary purpose of the antitrust laws: to promote consumers' welfare through assurance of the quality and quantity of products available to consumers.

- (65) and quantity of products available to consumers.
16. Which one of the following distinctions between monopoly power and the abuse of monopoly power would the author say underlies the antitrust laws discussed in the passage?
- (A) Monopoly power is assessed in terms of market share, whereas abuse of monopoly power is assessed in terms of market control.
- (B) Monopoly power is easy to demonstrate, whereas abuse of monopoly power is difficult to demonstrate.
- (C) Monopoly power involves only one market, whereas abuse of monopoly power involves at least two or more related markets.
- (D) Monopoly power is the ability to charge supracompetitive prices, whereas abuse of monopoly power is the use of that ability.
- (E) Monopoly power does not necessarily hurt consumer welfare, whereas abuse of monopoly power does.
17. Would the use of leverage meet the criteria for abuse of monopoly power outlined in the first paragraph?
- (A) No, because leverage involves a nonmonopolized market.
- (B) No, unless the leverage involves a tying arrangement.
- (C) Yes, because leverage is a characteristic of monopoly power.
- (D) Yes, unless the firm using leverage is charging competitive prices.
- (E) Yes, because leverage is used to eliminate competition in a related market.

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18. What is the main purpose of the third paragraph (lines 28–47)?
- (A) to distinguish between supracompetitive prices and supracompetitive profits
  - (B) to describe the positive uses of monopoly power
  - (C) to introduce the concept of economies of scale
  - (D) to distinguish what is not covered by the antitrust laws under discussion from what is covered
  - (E) to remind the reader of the issue of consumers' welfare
19. Given only the information in the passage, with which one of the following statements about competition would those responsible for the antitrust laws most likely agree?
- (A) Competition is essential to consumers' welfare.
  - (B) There are acceptable and unacceptable ways for firms to reduce their competition.
  - (C) The preservation of competition is the principal aim of the antitrust laws.
  - (D) Supracompetitive prices lead to reductions in competition.
  - (E) Competition is necessary to ensure high-quality products at low prices.
20. Which one of the following sentences would best complete the last paragraph of the passage?
- (A) By limiting consumers' choices, abuse of monopoly power reduces consumers' welfare, but monopoly alone can sometimes actually operate in the consumers' best interests.
  - (B) What is needed now is a set of related laws to deal with the negative impacts that monopoly itself has on consumers' ability to purchase products at reasonable cost.
  - (C) Over time, the antitrust laws have been very effective in ensuring competition and, consequently, consumers' welfare in the volatile communications and computer systems industries.
  - (D) By controlling supracompetitive prices and corresponding supracompetitive profits, the antitrust laws have, indeed, gone a long way toward meeting that objective.
  - (E) As noted above, the necessary restraints on monopoly itself have been left to the market, where competitive prices and economies of scale are rewarded through increased market share.

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Amsden has divided Navajo weaving into four distinct styles. He argues that three of them can be identified by the type of design used to form horizontal bands: colored stripes, zigzags, or

(5) diamonds. The fourth, or bordered, style he identifies by a distinct border surrounding centrally placed, dominating figures.

Amsden believes that the diamond style appeared after 1869 when, under Anglo influence and

(10) encouragement, the blanket became a rug with larger designs and bolder lines. The bordered style appeared about 1890, and, Amsden argues, it reflects the greatest number of Anglo influences on the newly emerging rug business. The Anglo desire that

(15) anything with graphic designs have a top, bottom, and border is a cultural preference that the Navajo abhorred, as evidenced, he suggests, by the fact that in early bordered specimens strips of color unexpectedly break through the enclosing pattern.

(20) Amsden argues that the bordered rug represents a radical break with previous styles. He asserts that the border changed the artistic problem facing weavers: a blank area suggests the use of isolated figures, while traditional, banded Navajo designs were

(25) continuous and did not use isolated figures. The old patterns alternated horizontal decorative zones in a regular order.

Amsden's view raises several questions. First, what is involved in altering artistic styles? Some

(30) studies suggest that artisans' motor habits and thought processes must be revised when a style changes precipitously. In the evolution of Navajo weaving, however, no radical revisions in the way articles are produced need be assumed. After all, all

(35) weaving subordinates design to the physical limitations created by the process of weaving, which includes creating an edge or border. The habits required to make decorative borders are, therefore, latent and easily brought to the surface.

(40) Second, is the relationship between the banded and bordered styles as simple as Amsden suggests? He assumes that a break in style is a break in psychology. But if style results from constant quests for invention, such stylistic breaks are inevitable.

(45) When a style has exhausted the possibilities inherent in its principles, artists cast about for new, but not necessarily alien, principles. Navajo weaving may have reached this turning point prior to 1890.

Third, is there really a significant stylistic gap?

(50) Two other styles lie between the banded styles and the bordered style. They suggest that disintegration of the bands may have altered visual and motor habits and prepared the way for a border filled with separate units. In the Chief White Antelope blanket,

(55) dated prior to 1865, ten years before the first Anglo trading post on the Navajo reservation, whole and partial diamonds interrupt the flowing design and become separate forms. Parts of diamonds arranged vertically at each side may be seen to anticipate the

(60) border.

21. The author's central thesis is that
- (A) the Navajo rejected the stylistic influences of Anglo culture
  - (B) Navajo weaving cannot be classified by Amsden's categories
  - (C) the Navajo changed their style of weaving because they sought the challenge of new artistic problems
  - (D) original motor habits and thought processes limit the extent to which a style can be revised
  - (E) the causal factors leading to the emergence of the bordered style are not as clear-cut as Amsden suggests
22. It can be inferred from the passage that Amsden views the use of "strips of color" (line 18) in the early bordered style as
- (A) a sign of resistance to a change in style
  - (B) an echo of the diamond style
  - (C) a feature derived from Anglo culture
  - (D) an attempt to disintegrate the rigid form of the banded style
  - (E) a means of differentiating the top of the weaving from the bottom
23. The author's view of Navajo weaving suggests which one of the following?
- (A) The appearance of the first trading post on the Navajo reservation coincided with the appearance of the diamond style.
  - (B) Traces of thought processes and motor habits of one culture can generally be found in the art of another culture occupying the same period and region.
  - (C) The bordered style may have developed gradually from the banded style as a result of Navajo experiments with design.
  - (D) The influence of Anglo culture was not the only non-Native American influence on Navajo weaving.
  - (E) Horizontal and vertical rows of diamond forms were transformed by the Navajos into solid lines to create the bordered style.
24. According to the passage, Navajo weavings made prior to 1890 typically were characterized by all of the following EXCEPT
- (A) repetition of forms
  - (B) overall patterns
  - (C) horizontal bands
  - (D) isolated figures
  - (E) use of color



25. The author would most probably agree with which one of the following conclusions about the stylistic development of Navajo weaving?
- (A) The styles of Navajo weaving changed in response to changes in Navajo motor habits and thought processes.
  - (B) The zigzag style was the result of stylistic influences from Anglo culture.
  - (C) Navajo weaving used isolated figures in the beginning, but combined naturalistic and abstract designs in later styles.
  - (D) Navajo weaving changed gradually from a style in which the entire surface was covered by horizontal bands to one in which central figures dominated the surface.
  - (E) The styles of Navajo weaving always contained some type of isolated figure.
26. The author suggests that Amsden's claim that borders in Navajo weaving were inspired by Anglo culture could be
- (A) conceived as a response to imagined correspondences between Anglo and Navajo art
  - (B) biased by Amsden's feelings about Anglo culture
  - (C) a result of Amsden's failing to take into account certain aspects of Navajo weaving
  - (D) based on a limited number of specimens of the styles of Navajo weaving
  - (E) based on a confusion between the stylistic features of the zigzag and diamond styles
27. The author most probably mentions the Chief White Antelope blanket in order to
- (A) establish the direct influence of Anglo culture on the bordered style
  - (B) cast doubts on the claim that the bordered style arose primarily from Anglo influence
  - (C) cite an example of a blanket with a central design and no border
  - (D) suggest that the Anglo influence produced significant changes in the two earliest styles of Navajo weaving
  - (E) illustrate how the Navajo had exhausted the stylistic possibilities of the diamond style
28. The passage is primarily concerned with
- (A) comparing and contrasting different styles
  - (B) questioning a view of how a style came into being
  - (C) proposing alternate methods of investigating the evolution of styles
  - (D) discussing the influence of one culture on another
  - (E) analyzing the effect of the interaction between two different cultures

## S T O P

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY.  
DO NOT WORK ON ANY OTHER SECTION IN THE TEST.