

## SECTION I

Time—35 minutes

27 Questions

**Directions:** Each set of questions in this section is based on a single passage or a pair of passages. The questions are to be answered on the basis of what is stated or implied in the passage or pair of passages. 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.

To study centuries-old earthquakes and the geologic faults that caused them, seismologists usually dig trenches along visible fault lines, looking for sediments that show evidence of having shifted. Using radiocarbon dating, they measure the quantity of the radioactive isotope carbon 14 present in wood or other organic material trapped in the sediments when they shifted. Since carbon 14 occurs naturally in organic materials and decays at a constant rate, the age of organic materials can be reconstructed from the amount of the isotope remaining in them. These data can show the location and frequency of past earthquakes and provide hints about the likelihood and location of future earthquakes.

Geologists William Bull and Mark Brandon have recently developed a new method, called lichenometry, for detecting and dating past earthquakes. Bull and Brandon developed the method based on the fact that large earthquakes generate numerous simultaneous rockfalls in mountain ranges that are sensitive to seismic shaking. Instead of dating fault-line sediments, lichenometry involves measuring the size of lichens growing on the rocks exposed by these rockfalls. Lichens—symbiotic organisms consisting of a fungus and an alga—quickly colonize newly exposed rock surfaces in the wake of rockfalls, and once established they grow radially, flat against the rocks, at a slow but constant rate for as long as 1,000 years if left undisturbed. One species of North American lichen, for example, spreads outward by about 9.5 millimeters each century. Hence, the diameter of the largest lichen on a boulder provides direct evidence of when the boulder was dislodged and repositioned. If many rockfalls over a large geographic area occurred simultaneously, that pattern would imply that there had been a strong earthquake. The location of the earthquake's epicenter can then be determined by mapping these rockfalls, since they decrease in abundance as the distance from the epicenter increases.

Lichenometry has distinct advantages over radiocarbon dating. Radiocarbon dating is accurate only to within plus or minus 40 years, because the amount of the carbon 14 isotope varies naturally in the environment depending on the intensity of the radiation striking Earth's upper atmosphere. Additionally, this intensity has fluctuated greatly during the past 300 years, causing many radiocarbon datings of events during this period to be of little value. Lichenometry, Bull and Brandon claim, can accurately date an earthquake to within ten years. They note, however, that using lichenometry requires careful site selection

and accurate calibration of lichen growth rates, adding that the method is best used for earthquakes that occurred within the last 500 years. Sites must be selected to minimize the influence of snow avalanches and other disturbances that would affect normal lichen growth, and conditions like shade and wind that promote faster lichen growth must be factored in.

1. Which one of the following most accurately expresses the main idea of the passage?
  - (A) Lichenometry is a new method for dating past earthquakes that has advantages over radiocarbon dating.
  - (B) Despite its limitations, lichenometry has been proven to be more accurate than any other method of discerning the dates of past earthquakes.
  - (C) Most seismologists today have rejected radiocarbon dating and are embracing lichenometry as the most reliable method for studying past earthquakes.
  - (D) Two geologists have revolutionized the study of past earthquakes by developing lichenometry, an easily applied method of earthquake detection and dating.
  - (E) Radiocarbon dating, an unreliable test used in dating past earthquakes, can finally be abandoned now that lichenometry has been developed.
2. The passage provides information that most helps to answer which one of the following questions?
  - (A) How do scientists measure lichen growth rates under the varying conditions that lichens may encounter?
  - (B) How do scientists determine the intensity of the radiation striking Earth's upper atmosphere?
  - (C) What are some of the conditions that encourage lichens to grow at a more rapid rate than usual?
  - (D) What is the approximate date of the earliest earthquake that lichenometry has been used to identify?
  - (E) What are some applications of the techniques involved in radiocarbon dating other than their use in studying past earthquakes?

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3. What is the author's primary purpose in referring to the rate of growth of a North American lichen species (lines 29–30)?
- (A) to emphasize the rapidity with which lichen colonies can establish themselves on newly exposed rock surfaces
  - (B) to offer an example of a lichen species with one of the slowest known rates of growth
  - (C) to present additional evidence supporting the claim that environmental conditions can alter lichens' rate of growth
  - (D) to explain why lichenometry works best for dating earthquakes that occurred in the last 500 years
  - (E) to provide a sense of the sort of timescale on which lichen growth occurs
4. Which one of the following statements is most strongly supported by the passage?
- (A) Lichenometry is less accurate than radiocarbon dating in predicting the likelihood and location of future earthquakes.
  - (B) Radiocarbon dating is unlikely to be helpful in dating past earthquakes that have no identifiable fault lines associated with them.
  - (C) Radiocarbon dating and lichenometry are currently the only viable methods of detecting and dating past earthquakes.
  - (D) Radiocarbon dating is more accurate than lichenometry in dating earthquakes that occurred approximately 400 years ago.
  - (E) The usefulness of lichenometry for dating earthquakes is limited to geographic regions where factors that disturb or accelerate lichen growth generally do not occur.
5. The primary purpose of the first paragraph in relation to the rest of the passage is to describe
- (A) a well-known procedure that will then be examined on a step-by-step basis
  - (B) an established procedure to which a new procedure will then be compared
  - (C) an outdated procedure that will then be shown to be nonetheless useful in some situations
  - (D) a traditional procedure that will then be contrasted with other traditional procedures
  - (E) a popular procedure that will then be shown to have resulted in erroneous conclusions about a phenomenon
6. It can be inferred that the statements made by Bull and Brandon and reported in lines 50–58 rely on which one of the following assumptions?
- (A) While lichenometry is less accurate when it is used to date earthquakes that occurred more than 500 years ago, it is still more accurate than other methods for dating such earthquakes.
  - (B) There is no reliable method for determining the intensity of the radiation now hitting Earth's upper atmosphere.
  - (C) Lichens are able to grow only on the types of rocks that are common in mountainous regions.
  - (D) The mountain ranges that produce the kinds of rockfalls studied in lichenometry are also subject to more frequent snowfalls and avalanches than other mountain ranges are.
  - (E) The extent to which conditions like shade and wind have affected the growth of existing lichen colonies can be determined.
7. The passage indicates that using radiocarbon dating to date past earthquakes may be unreliable due to
- (A) the multiplicity of the types of organic matter that require analysis
  - (B) the variable amount of organic materials caught in shifted sediments
  - (C) the fact that fault lines related to past earthquakes are not always visible
  - (D) the fluctuations in the amount of the carbon 14 isotope in the environment over time
  - (E) the possibility that radiation has not always struck the upper atmosphere
8. Given the information in the passage, to which one of the following would lichenometry likely be most applicable?
- (A) identifying the number of times a particular river has flooded in the past 1,000 years
  - (B) identifying the age of a fossilized skeleton of a mammal that lived many thousands of years ago
  - (C) identifying the age of an ancient beach now underwater approximately 30 kilometers off the present shore
  - (D) identifying the rate, in kilometers per century, at which a glacier has been receding up a mountain valley
  - (E) identifying local trends in annual rainfall rates in a particular valley over the past five centuries

- While courts have long allowed custom-made medical illustrations depicting personal injury to be presented as evidence in legal cases, the issue of whether they have a legitimate place in the courtroom is surrounded by ongoing debate and misinformation. Some opponents of their general use argue that while illustrations are sometimes invaluable in presenting the physical details of a personal injury, in all cases except those involving the most unusual injuries, illustrations from medical textbooks can be adequate. Most injuries, such as fractures and whiplash, they say, are rather generic in nature—certain commonly encountered forces act on particular areas of the body in standard ways—so they can be represented by generic illustrations.

- Another line of complaint stems from the belief that custom-made illustrations often misrepresent the facts in order to comply with the partisan interests of litigants. Even some lawyers appear to share a version of this view, believing that such illustrations can be used to bolster a weak case. Illustrators are sometimes approached by lawyers who, unable to find medical experts to support their clients' claims, think that they can replace expert testimony with such deceptive professional illustrations. But this is mistaken. Even if an unscrupulous illustrator could be found, such illustrations would be inadmissible as evidence in the courtroom unless a medical expert were present to testify to their accuracy.

- It has also been maintained that custom-made illustrations may subtly distort the issues through the use of emphasis, coloration, and other means, even if they are technically accurate. But professional medical illustrators strive for objective accuracy and avoid devices that have inflammatory potential, sometimes even eschewing the use of color. Unlike illustrations in medical textbooks, which are designed to include the extensive detail required by medical students, custom-made medical illustrations are designed to include only the information that is relevant for those deciding a case. The end user is typically a jury or a judge, for whose benefit the depiction is reduced to the details that are crucial to determining the legally relevant facts. The more complex details often found in textbooks can be deleted so as not to confuse the issue. For example, illustrations of such things as veins and arteries would only get in the way when an illustration is supposed to be used to explain the nature of a bone fracture.

- Custom-made medical illustrations, which are based on a plaintiff's X rays, computerized tomography scans, and medical records and reports, are especially valuable in that they provide visual representations of data whose verbal description would be very complex. Expert testimony by medical professionals often relies heavily on the use of technical terminology, which those who are not

- specially trained in the field find difficult to translate mentally into visual imagery. Since, for most people, adequate understanding of physical data depends on thinking at least partly in visual terms, the clearly presented visual stimulation provided by custom-made illustrations can be quite instructive.
9. Which one of the following is most analogous to the role that, according to the author, custom-made medical illustrations play in personal injury cases?
- (A) schematic drawings accompanying an engineer's oral presentation
  - (B) road maps used by people unfamiliar with an area so that they will not have to get verbal instructions from strangers
  - (C) children's drawings that psychologists use to detect wishes and anxieties not apparent in the children's behavior
  - (D) a reproduction of a famous painting in an art history textbook
  - (E) an artist's preliminary sketches for a painting
10. Based on the passage, which one of the following is the author most likely to believe about illustrations in medical textbooks?
- (A) They tend to rely less on the use of color than do custom-made medical illustrations.
  - (B) They are inadmissible in a courtroom unless a medical expert is present to testify to their accuracy.
  - (C) They are in many cases drawn by the same individuals who draw custom-made medical illustrations for courtroom use.
  - (D) They are believed by most lawyers to be less prone than custom-made medical illustrations to misrepresent the nature of a personal injury.
  - (E) In many cases they are more apt to confuse jurors than are custom-made medical illustrations.
11. The passage states that a role of medical experts in relation to custom-made medical illustrations in the courtroom is to
- (A) decide which custom-made medical illustrations should be admissible
  - (B) temper the impact of the illustrations on judges and jurors who are not medical professionals
  - (C) make medical illustrations understandable to judges and jurors
  - (D) provide opinions to attorneys as to which illustrations, if any, would be useful
  - (E) provide their opinions as to the accuracy of the illustrations

12. According to the passage, one of the ways that medical textbook illustrations differ from custom-made medical illustrations is that
- (A) custom-made medical illustrations accurately represent human anatomy, whereas medical textbook illustrations do not
  - (B) medical textbook illustrations employ color freely, whereas custom-made medical illustrations must avoid color
  - (C) medical textbook illustrations are objective, while custom-made medical illustrations are subjective
  - (D) medical textbook illustrations are very detailed, whereas custom-made medical illustrations include only details that are relevant to the case
  - (E) medical textbook illustrations are readily comprehended by nonmedical audiences, whereas custom-made medical illustrations are not
13. The author's attitude toward the testimony of medical experts in personal injury cases is most accurately described as
- (A) appreciation of the difficulty involved in explaining medical data to judges and jurors together with skepticism concerning the effectiveness of such testimony
  - (B) admiration for the experts' technical knowledge coupled with disdain for the communications skills of medical professionals
  - (C) acceptance of the accuracy of such testimony accompanied with awareness of the limitations of a presentation that is entirely verbal
  - (D) respect for the medical profession tempered by apprehension concerning the tendency of medical professionals to try to overwhelm judges and jurors with technical details
  - (E) respect for expert witnesses combined with intolerance of the use of technical terminology
14. The author's primary purpose in the third paragraph is to
- (A) argue for a greater use of custom-made medical illustrations in court cases involving personal injury
  - (B) reply to a variant of the objection to custom-made medical illustrations raised in the second paragraph
  - (C) argue against the position that illustrations from medical textbooks are well suited for use in the courtroom
  - (D) discuss in greater detail why custom-made medical illustrations are controversial
  - (E) describe the differences between custom-made medical illustrations and illustrations from medical textbooks

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**Passage A**

Because dental caries (decay) is strongly linked to consumption of the sticky, carbohydrate-rich staples of agricultural diets, prehistoric human teeth can provide clues about when a population made the transition

- (5) from a hunter-gatherer diet to an agricultural one. Caries formation is influenced by several factors, including tooth structure, bacteria in the mouth, and diet. In particular, caries formation is affected by carbohydrates' texture and composition, since
- (10) carbohydrates more readily stick to teeth.
- Many researchers have demonstrated the link between carbohydrate consumption and caries. In North America, Leigh studied caries in archaeologically derived teeth, noting that caries rates differed between
- (15) indigenous populations that primarily consumed meat (a Sioux sample showed almost no caries) and those heavily dependent on cultivated maize (a Zuni sample had 75 percent carious teeth). Leigh's findings have been frequently confirmed by other researchers, who
- (20) have shown that, in general, the greater a population's dependence on agriculture is, the higher its rate of caries formation will be.

Under some circumstances, however, nonagricultural populations may exhibit relatively

(25) high caries rates. For example, early nonagricultural populations in western North America who consumed large amounts of highly processed stone-ground flour made from gathered acorns show relatively high caries frequencies. And wild plants collected by the Hopi

(30) included several species with high cariogenic potential, notably pinyon nuts and wild tubers.

**Passage B**

Archaeologists recovered human skeletal remains interred over a 2,000-year period in prehistoric Ban Chiang, Thailand. The site's early inhabitants

(35) appear to have had a hunter-gatherer-cultivator economy. Evidence indicates that, over time, the population became increasingly dependent on agriculture.

- Research suggests that agricultural intensification
- (40) results in declining human health, including dental health. Studies show that dental caries is uncommon in pre-agricultural populations. Increased caries frequency may result from increased consumption of starchy-sticky foodstuffs or from alterations in tooth wear. The
- (45) wearing down of tooth crown surfaces reduces caries formation by removing fissures that can trap food particles. A reduction of fiber or grit in a diet may diminish tooth wear, thus increasing caries frequency. However, severe wear that exposes a tooth's pulp
- (50) cavity may also result in caries.

The diet of Ban Chiang's inhabitants included some cultivated rice and yams from the beginning of the period represented by the recovered remains. These were part of a varied diet that also included

(55) wild plant and animal foods. Since both rice and yams are carbohydrates, increased reliance on either or both should theoretically result in increased caries frequency.

Yet comparisons of caries frequency in the Early and Late Ban Chiang Groups indicate that overall

- (60) caries frequency is slightly greater in the Early Group. Tooth wear patterns do not indicate tooth wear changes between Early and Late Groups that would explain this unexpected finding. It is more likely that, although dependence on agriculture increased, the diet
- (65) in the Late period remained varied enough that no single food dominated. Furthermore, there may have been a shift from sweeter carbohydrates (yams) toward rice, a less cariogenic carbohydrate.

15. Both passages are primarily concerned with examining which one of the following topics?
- (A) evidence of the development of agriculture in the archaeological record
- (B) the impact of agriculture on the overall health of human populations
- (C) the effects of carbohydrate-rich foods on caries formation in strictly agricultural societies
- (D) the archaeological evidence regarding when the first agricultural society arose
- (E) the extent to which pre-agricultural populations were able to obtain carbohydrate-rich foods
16. Which one of the following distinguishes the Ban Chiang populations discussed in passage B from the populations discussed in the last paragraph of passage A?
- (A) While the Ban Chiang populations consumed several highly cariogenic foods, the populations discussed in the last paragraph of passage A did not.
- (B) While the Ban Chiang populations ate cultivated foods, the populations discussed in the last paragraph of passage A did not.
- (C) While the Ban Chiang populations consumed a diet consisting primarily of carbohydrates, the populations discussed in the last paragraph of passage A did not.
- (D) While the Ban Chiang populations exhibited very high levels of tooth wear, the populations discussed in the last paragraph of passage A did not.
- (E) While the Ban Chiang populations ate certain highly processed foods, the populations discussed in the last paragraph of passage A did not.

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17. Passage B most strongly supports which one of the following statements about fiber and grit in a diet?
- (A) They can either limit or promote caries formation, depending on their prevalence in the diet.
  - (B) They are typically consumed in greater quantities as a population adopts agriculture.
  - (C) They have a negative effect on overall health since they have no nutritional value.
  - (D) They contribute to the formation of fissures in tooth surfaces.
  - (E) They increase the stickiness of carbohydrate-rich foods.
18. Which one of the following is mentioned in both passages as evidence tending to support the prevailing view regarding the relationship between dental caries and carbohydrate consumption?
- (A) the effect of consuming highly processed foods on caries formation
  - (B) the relatively low incidence of caries among nonagricultural people
  - (C) the effect of fiber and grit in the diet on caries formation
  - (D) the effect of the consumption of wild foods on tooth wear
  - (E) the effect of agricultural intensification on overall human health
19. It is most likely that both authors would agree with which one of the following statements about dental caries?
- (A) The incidence of dental caries increases predictably in populations over time.
  - (B) Dental caries is often difficult to detect in teeth recovered from archaeological sites.
  - (C) Dental caries tends to be more prevalent in populations with a hunter-gatherer diet than in populations with an agricultural diet.
  - (D) The frequency of dental caries in a population does not necessarily correspond directly to the population's degree of dependence on agriculture.
  - (E) The formation of dental caries tends to be more strongly linked to tooth wear than to the consumption of a particular kind of food.
20. Each passage suggests which one of the following about carbohydrate-rich foods?
- (A) Varieties that are cultivated have a greater tendency to cause caries than varieties that grow wild.
  - (B) Those that require substantial processing do not play a role in hunter-gatherer diets.
  - (C) Some of them naturally have a greater tendency than others to cause caries.
  - (D) Some of them reduce caries formation because their relatively high fiber content increases tooth wear.
  - (E) The cariogenic potential of a given variety increases if it is cultivated rather than gathered in the wild.
21. The evidence from Ban Chiang discussed in passage B relates to the generalization reported in the second paragraph of passage A (lines 20–22) in which one of the following ways?
- (A) The evidence confirms the generalization.
  - (B) The evidence tends to support the generalization.
  - (C) The evidence is irrelevant to the generalization.
  - (D) The evidence does not conform to the generalization.
  - (E) The evidence disproves the generalization.

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- Recent criticism has sought to align Sarah Orne Jewett, a notable writer of regional fiction in the nineteenth-century United States, with the domestic novelists of the previous generation. Her work does
- (5) resemble the domestic novels of the 1850s in its focus on women, their domestic occupations, and their social interactions, with men relegated to the periphery. But it also differs markedly from these antecedents. The world depicted in the latter revolves around children.
- (10) Young children play prominent roles in the domestic novels and the work of child rearing—the struggle to instill a mother’s values in a child’s character—is their chief source of drama. By contrast, children and child rearing are almost entirely absent from the world of
- (15) Jewett’s fiction. Even more strikingly, while the literary world of the earlier domestic novelists is insistently religious, grounded in the structures of Protestant religious belief, to turn from these writers to Jewett is to encounter an almost wholly secular world.
- (20) To the extent that these differences do not merely reflect the personal preferences of the authors, we might attribute them to such historical transformations as the migration of the rural young to cities or the increasing secularization of society. But while such
- (25) factors may help to explain the differences, it can be argued that these differences ultimately reflect different conceptions of the nature and purpose of fiction. The domestic novel of the mid-nineteenth century is based on a conception of fiction as part of
- (30) a continuum that also included writings devoted to piety and domestic instruction, bound together by a common goal of promoting domestic morality and religious belief. It was not uncommon for the same
- (35) multipurpose book to be indistinguishably a novel, a child-rearing manual, and a tract on Christian duty. The more didactic aims are absent from Jewett’s writing, which rather embodies the late nineteenth-century “high-cultural” conception of fiction as an autonomous sphere with value in and of itself.
- (40) This high-cultural aesthetic was one among several conceptions of fiction operative in the United States in the 1850s and 1860s, but it became the dominant one later in the nineteenth century and remained so for most of the twentieth. On this
- (45) conception, fiction came to be seen as pure art: a work was to be viewed in isolation and valued for the formal arrangement of its elements rather than for its larger social connections or the promotion of extraliterary goods. Thus, unlike the domestic novelists, Jewett
- (50) intended her works not as a means to an end but as an end in themselves. This fundamental difference should be given more weight in assessing their affinities than any superficial similarity in subject matter.

22. The passage most helps to answer which one of the following questions?
- (A) Did any men write domestic novels in the 1850s?
- (B) Were any widely read domestic novels written after the 1860s?
- (C) How did migration to urban areas affect the development of domestic fiction in the 1850s?
- (D) What is an effect that Jewett’s conception of literary art had on her fiction?
- (E) With what region of the United States were at least some of Jewett’s writings concerned?
23. It can be inferred from the passage that the author would be most likely to view the “recent criticism” mentioned in line 1 as
- (A) advocating a position that is essentially correct even though some powerful arguments can be made against it
- (B) making a true claim about Jewett, but for the wrong reasons
- (C) making a claim that is based on some reasonable evidence and is initially plausible but ultimately mistaken
- (D) questionable, because it relies on a currently dominant literary aesthetic that takes too narrow a view of the proper goals of fiction
- (E) based on speculation for which there is no reasonable support, and therefore worthy of dismissal
24. In saying that domestic fiction was based on a conception of fiction as part of a “continuum” (line 30), the author most likely means which one of the following?
- (A) Domestic fiction was part of an ongoing tradition stretching back into the past.
- (B) Fiction was not treated as clearly distinct from other categories of writing.
- (C) Domestic fiction was often published in serial form.
- (D) Fiction is constantly evolving.
- (E) Domestic fiction promoted the cohesiveness and hence the continuity of society.

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25. Which one of the following most accurately states the primary function of the passage?
- (A) It proposes and defends a radical redefinition of several historical categories of literary style.
  - (B) It proposes an evaluation of a particular style of writing, of which one writer's work is cited as a paradigmatic case.
  - (C) It argues for a reappraisal of a set of long-held assumptions about the historical connections among a group of writers.
  - (D) It weighs the merits of two opposing conceptions of the nature of fiction.
  - (E) It rejects a way of classifying a particular writer's work and defends an alternative view.
26. Which one of the following most accurately represents the structure of the second paragraph?
- (A) The author considers and rejects a number of possible explanations for a phenomenon, concluding that any attempt at explanation does violence to the unity of the phenomenon.
  - (B) The author shows that two explanatory hypotheses are incompatible with each other and gives reasons for preferring one of them.
  - (C) The author describes several explanatory hypotheses and argues that they are not really distinct from one another.
  - (D) The author proposes two versions of a classificatory hypothesis, indicates the need for some such hypothesis, and then sets out a counterargument in preparation for rejecting that counterargument in the following paragraph.
  - (E) The author mentions a number of explanatory hypotheses, gives a mildly favorable comment on them, and then advocates and elaborates another explanation that the author considers to be more fundamental.
27. The differing conceptions of fiction held by Jewett and the domestic novelists can most reasonably be taken as providing an answer to which one of the following questions?
- (A) Why was Jewett unwilling to feature children and religious themes as prominently in her works as the domestic novelists featured them in theirs?
  - (B) Why did both Jewett and the domestic novelists focus primarily on rural as opposed to urban concerns?
  - (C) Why was Jewett not constrained to feature children and religion as prominently in her works as domestic novelists were?
  - (D) Why did both Jewett and the domestic novelists focus predominantly on women and their concerns?
  - (E) Why was Jewett unable to feature children or religion as prominently in her works as the domestic novelists featured them in theirs?

## 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.