

GRE Model Question Paper 4

Time Allowed : 1 Hour 58 Minutes	Maximum Marks : 340
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General Instructions

Read the following instructions very carefully and strictly follow them:

1. There is no penalty for incorrect answers on the Verbal Reasoning and Quantitative Reasoning sections. This means you should always answer every question, even if you have to guess.
2. Within any section of the test, you can mark questions you want to review and change your answers as long as the time for that section has not expired.
3. The Analytical Writing section is always presented first. The Verbal Reasoning and Quantitative Reasoning sections may appear in any order after the essay.
4. The test is taken on a computer, and test-takers are provided with scratch paper or a small whiteboard for notes.
5. The Quantitative Reasoning section includes an on-screen calculator.
6. There are no breaks during the test. Leaving your seat at any point will not stop the timer for the current section.

SECTION 1

Time: 30 Minutes

38 Questions

Directions (Questions 1-5):

Five participants at an international conference are planning to take a car trip together. Two persons, the driver and one passenger, will sit in the front seat of the car, and three persons will sit in the back seat. The names of the five participants and all of the languages that each of them speaks are as follows:

- **Mohsen:** Farsi and Hebrew
- **Orlando:** Italian and Russian
- **Shelly:** Hebrew and Russian
- **Theo:** German and Italian
- **Ursula:** Farsi, German, and Hebrew

The participants must be seated in the car according to the following restrictions:

- The driver must be Orlando or else Shelly.

- Two persons can be seated side by side only if at least one of the languages they speak is the same.
-

1. Which of the following is an acceptable seating arrangement, with the driver listed first under "Front Seat" and the passengers in the back seat listed from one side to the other side?

- (A) Front Seat: Mohsen, Ursula Back Seat: Theo, Orlando, Shelly
(B) Front Seat: Orlando, Mohsen Back Seat: Shelly, Theo, Ursula
(C) Front Seat: Orlando, Shelly Back Seat: Mohsen, Ursula, Theo
(D) Front Seat: Shelly, Mohsen Back Seat: Ursula, Orlando, Theo
(E) Front Seat: Shelly, Orlando Back Seat: Theo, Mohsen, Ursula
-

2. If Mohsen sits in the front seat, which of the following can be true?

- (A) Orlando will be the driver.
(B) Orlando will sit next to Ursula.
(C) Shelly will sit in the middle position in the back.
(D) Shelly will be the driver.
(E) Ursula will sit in the middle position in the back seat.
-

3. If Theo sits in the front seat, which of the following must be true?

- (A) Mohsen and Shelly will sit side by side.
(B) Mohsen and Ursula will sit side by side.
(C) Orlando and Theo will sit side by side.
(D) Orlando and Ursula will sit side by side.
(E) Shelly and Ursula will sit side by side.
-

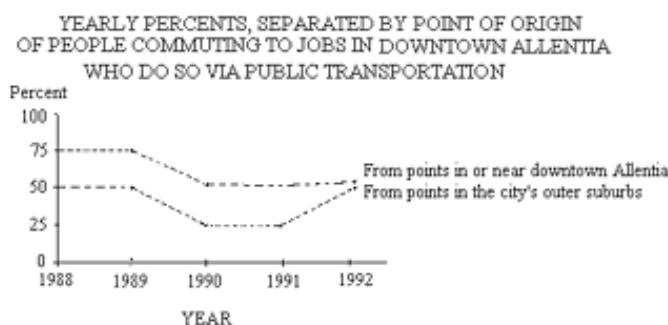
4. If both persons sitting in the front seat speak Hebrew, then it must be true that

- (A) exactly one person sitting in the back seat speaks Russian
(B) neither speaker of Farsi is sitting in the front seat
(C) no one sitting in the front seat speaks Russian
(D) no one sitting in the back seat speaks Hebrew
(E) a speaker of Russian is sitting in the middle position in the back seat
-

5. Which of the following must be true if Orlando is the driver?

- (A) If Shelly sits in the front seat, Ursula will sit in the middle position in the back seat.
- (B) If Shelly sits in the back seat, she will sit next to Ursula.
- (C) If Theo sits in the front seat, Ursula will sit in the middle position in the back seat.
- (D) If Theo sits in the back seat, he will sit between Mohsen and Ursula.
- (E) If Ursula sits in the back seat, she will sit in the middle position in the back seat.seat.

Directions (Questions 6-7):



6. Which of the following, if true about early 1990, would most help to explain the decrease, in 1990, of the percent of people commuting to jobs in downtown Allentia who do so via public transportation?

- (A) The termination of a governmental subsidy to the public transportation system that serves both the city and its suburbs caused a substantial increase in fares.
- (B) Many new trains and buses were put into service in the public transportation system both within the city and between the city and its suburbs.
- (C) Security was improved in the passenger waiting areas and on the public trains and buses used within the city as well as on those used between the city and its suburbs.
- (D) Legislation was passed that increased the frequency of public transportation service within the city as well as between the city and its suburbs.
- (E) The number of points served by the public transportation system both within the city and between the city and its suburbs was increased substantially by adding new routes.

7. Which of the following, if true about early 1992, could most contribute to an explanation of the change, between 1991 and 1992, in the percent of those who commute via public transportation from the outer suburbs of Allentia, as compared to the change for the other group of commuters?

- (A) The price per gallon for gasoline declined by five percent.
- (B) The cost of using public transportation, per mile traveled, increased.

- (C) The number of people who commuted to work via public transportation from points in or near downtown Allentia increased.
- (D) The frequency of public transportation service between the city and its suburbs decreased.
- (E) The cost per mile of getting to and from work by car tripled.

8. A new and more aggressive form of the fungus that caused the Irish potato famine of the nineteenth century has recently arisen. However, since this new form of the fungus can be killed by increased application of currently used fungicides, it is unlikely that the fungus will cause widespread food shortages in countries that currently rely on potatoes for sustenance.

Which of the following, if true, most calls into question the conclusion in the argument above?

- (A) Though potatoes are an important staple crop in many parts of the world, people in most countries rely primarily on wheat or rice for sustenance.
- (B) Potato farmers in many countries to which the new form of the fungus has spread cannot afford to increase their spending on fungicides.
- (C) The new form of the fungus first began to spread when contaminated potato seeds were inadvertently exported from a major potato-exporting country.
- (D) Potato farmers in most countries use several insecticides on their crops in addition to fungicides of the sort that kill the new form of the fungus.
- (E) Most governments have funds set aside that can be used to alleviate the effects of large-scale disasters such as severe food shortages and floods.

Directions (Questions 9-16):

The organizers of a music festival are scheduling exactly six master classes, one class per day for six consecutive days. Three of the classes will be given by violinists and three by pianists. The only musicians who can teach the classes are the violinists F, G, H, and J, and the pianists R, S, T, W, and Z. The festival's organizers must observe the following constraints:

- No musician will teach more than one class.
- F will not teach unless the first three classes are taught by violinists.
- If J teaches a class, it will be the sixth.
- R will teach only if T teaches the first class.
- No pianist will teach on a day that immediately precedes or immediately follows a day on which W teaches.

9. Which of the following can be the musicians scheduled to teach the master classes, in the order in which they will teach, from first to sixth?

- (A) F, J, G, T, Z, S
 - (B) F, W, H, T, G, Z
 - (C) G, F, H, T, S, Z
 - (D) S, G, W, H, R, J
 - (E) T, G, W, H, R, S
-

10. If R is scheduled to teach the second class, which of the following could be scheduled to teach the third class?

- (A) F
 - (B) G
 - (C) J
 - (D) T
 - (E) W
-

11. Which of the following must be true about the schedule of master classes?

- (A) J is not scheduled to teach if R is scheduled to teach.
 - (B) J is not scheduled to teach if T is scheduled to teach.
 - (C) J is not scheduled to teach if W is scheduled to teach.
 - (D) W is not scheduled to teach if F is scheduled to teach.
 - (E) Z is not scheduled to teach if W is scheduled to teach.
-

12. If pianists are scheduled to teach the fourth, fifth, and sixth classes, which of the following must be true?

- (A) F is scheduled to teach the first class.
 - (B) G is scheduled to teach the first class.
 - (C) H is scheduled to teach an earlier class than the class Z is scheduled to teach.
 - (D) R is scheduled to teach an earlier class than the class T is scheduled to teach.
 - (E) S is scheduled to teach an earlier class than the class T is scheduled to teach.
-

13. Which of the following must be true about the schedule of the master classes?

- (A) If F is scheduled to teach a class, then H is also scheduled to teach a class.
- (B) If J is scheduled to teach a class, then R is also scheduled to teach a class.
- (C) If J is scheduled to teach a class, then S is also scheduled to teach a class.
- (D) If T is scheduled to teach a class, then R is also scheduled to teach a class.

(E) If W is scheduled to teach a class, then Z is also scheduled to teach a class.

14. If classes are scheduled so that the classes taught by pianists and the classes taught by violinists alternate with one another, which of the following can be true?

- (A) F is scheduled to teach the fourth class.
 - (B) G is scheduled to teach the first class.
 - (C) H is scheduled to teach the third class.
 - (D) R is scheduled to teach the fifth class.
 - (E) W is scheduled to teach the second class.
-

15. If a violinist is scheduled to teach the first class and another violinist is scheduled to teach the sixth class, which of the following can be true?

- (A) F is scheduled to teach the second class.
 - (B) H is scheduled to teach the sixth class.
 - (C) R is scheduled to teach the fourth class.
 - (D) T is scheduled to teach the second class.
 - (E) W is scheduled to teach the third class.
-

16. Which of the following CANNOT be true about the schedule of the master classes?

- (A) F is scheduled to teach the third class.
 - (B) G is scheduled to teach the first class.
 - (C) T is scheduled to teach the sixth class.
 - (D) W is scheduled to teach the sixth class.
 - (E) Z is scheduled to teach the fifth class.
-

Directions (Questions 17-22):

In a small office suite, six offices are arranged in a straight line, one after another, and are consecutively numbered 1 through 6. Exactly six people – P, Q, R, S, T and U – are to be assigned to these six offices, exactly one person to an office, according to the following conditions:

- P must be assigned to an office immediately adjacent to the office to which T is assigned.
- Q cannot be assigned to an office immediately adjacent to the office to which S is assigned.

- R must be assigned either to office 1 or to office 6.
 - S must be assigned to a lower-numbered office than the office to which U is assigned.
-

17. Which of the following can be the list of the six people in the order of their offices, from office 1 through office 6?

- (A) Q, U, S, T, P, R
 - (B) R, P, T, S, U, Q
 - (C) R, S, Q, U, P, T
 - (D) S, T, Q, P, U, R
 - (E) T, P, S, R, Q, U
-

18. If T is assigned to office 6, then U must be assigned to office

- (A) 1
 - (B) 2
 - (C) 3
 - (D) 4
 - (E) 5
-

19. If Q is assigned to office 2, then the person assigned to office 6 must be

- (A) P
 - (B) R
 - (C) S
 - (D) T
 - (E) U
-

20. If Q is assigned to office 1, which of the following CANNOT be true?

- (A) P is assigned to office 3.
 - (B) P is assigned to office 4.
 - (C) S is assigned to office 4.
 - (D) T is assigned to office 2.
 - (E) T is assigned to office 3.
-

21. If U is assigned to office 3, then Q must be assigned to office

- (A) 1 or 2
 - (B) 1 or 6
 - (C) 2 or 5
 - (D) 4 or 5
 - (E) 4 or 6
-

22. If S is assigned to office 2, which of the following can be true?

- (A) P is assigned to office 1.
 - (B) Q is assigned to office 3.
 - (C) R is assigned to office 6.
 - (D) T is assigned to office 5.
 - (E) U is assigned to office 4.
-

23. As government agencies, faced with budget difficulties, reduce their funding for scientific research, a greater amount of such research is being funded by private foundations. This shift means that research projects likely to produce controversial results will almost certainly comprise a smaller proportion of all funded research projects, since private foundations, concerned about their public image, tend to avoid controversy.

Which of the following is an assumption on which the argument depends?

- (A) Only research that is conducted without concern for the possibility of generating controversy is likely to produce scientifically valid results.
 - (B) Private foundations that fund scientific research projects usually recognize that controversial results from those projects cannot always be avoided.
 - (C) Scientists who conduct research projects funded by private foundations are unlikely to allow the concerns of the funding organizations to influence the manner in which they conduct the research.
 - (D) Many government agencies are more concerned about their public image than are most private foundations.
 - (E) Government agencies are more willing than are private foundations to fund research projects that are likely to produce controversial results.
-

24. Juries in criminal trials do not base verdicts on uncorroborated testimony given by any one witness. Rightly so, because it is usually prudent to be highly skeptical of unsubstantiated claims made by any one person. But then, to be consistent, juries should end an all-too-common practice: convicting defendants on the basis

of an uncorroborated full confession.

Which of the following, if true, most strengthens the argument above?

- (A) Juries often acquit in cases in which a defendant retracts a full confession made before trial.
- (B) The process of jury selection is designed to screen out people who have a firm opinion about the defendant's guilt in advance of the trial.
- (C) Defendants sometimes make full confessions when they did in fact do what they are accused of doing and have come to believe that the prosecutor has compelling proof of this.
- (D) Highly suggestible people who are accused of wrongdoing sometimes become so unsure of their own recollection of the past that they can come to accept the accusations made against them.
- (E) Many people believe that juries should not convict defendants who have not made a full confession.

25. Although spinach is rich in calcium, it also contains large amounts of oxalic acid, a substance that greatly impedes calcium absorption by the body. Therefore, other calcium-containing foods must be eaten either instead of or in addition to spinach if a person is to be sure of getting enough calcium.

Which of the following, if true, most seriously weakens the argument above?

- (A) Rice, which does not contain calcium, counteracts the effects of oxalic acid on calcium absorption.
- (B) Dairy products, which contain even more calcium than spinach does, are often eaten by people who eat spinach on a regular basis.
- (C) Neither the calcium nor the oxalic acid in spinach is destroyed when spinach is cooked.
- (D) Many leafy green vegetables other than spinach that are rich in calcium also contain high concentrations of oxalic acid.
- (E) Oxalic acid has little effect on the body's ability to absorb nutrients other than calcium.

SECTION 2

Time: 30 Minutes

38 Questions

Directions (Questions 1-15): This section consists of a series of questions with two quantities, one in Column A and one in Column B. You are to compare the two quantities and decide whether

- (A) the quantity in Column A is greater;
- (B) the quantity in Column B is greater;
- (C) the two quantities are equal;

(D) the relationship cannot be determined from the information given.

A symbol that appears in both columns represents the same thing in Column A as it does in Column B. Common information, such as figures or notes, centered above the two columns applies to both columns.

	<u>Column A</u>	<u>Column B</u>
1.	$\frac{1}{4} - \frac{1}{5}$	$\frac{1}{20}$

	$x - y - 3 = 0$	<u>Column B</u>
2.	<u>Column A</u>	
	x	y

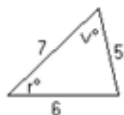
	The average (arithmetic mean) of 3 numbers is 37.5.	<u>Column B</u>
3.	<u>Column A</u>	
	The sum of the 3 numbers	100

	$x > 0$	<u>Column B</u>
4.	<u>Column A</u>	
	$\frac{1}{x} + 1$	$\frac{1}{x + 1}$

	<u>Column A</u>	<u>Column B</u>
5.	The perimeter of a square with sides of length 5	The perimeter of a rectangle with length 10 and width 2

x is a positive number and y is 30 percent of x .

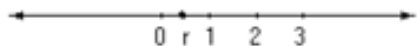
6. Column A Column B
 25 percent of y 55 percent of x
-



7. Column A Column B
 r v
-

$$x < 0$$

8. Column A Column B
 $|x|$ x
-



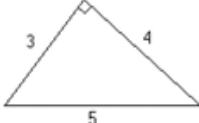
9. Column A Column B
 r $\frac{1}{r}$
-

m and n are positive integers.

10. Column A Column B
 $m + n$ mn
-

11. A bicycle registration costs \$2.25 in City X and \$3.00 in City Y. At these rates, the cost of 4 registrations in City X is k percent of the cost of 3 registrations in City Y. Column A k
-

- | | <u>Column A</u> | <u>Column B</u> |
|-----|------------------------------|-----------------|
| 12. | $\left(\frac{1}{x}\right)^2$ | x^2 |
-

- | | | |
|-----|---|-----------------|
| 13. |  | |
| | <u>Column A</u> | <u>Column B</u> |
| | | 6 |

The area of the triangular region

- | | | |
|--|--|-----------------|
| 14. An identification code read from left to right consists of 2 digits, a dash, 3 digits, a dash, and then 4 digits. Each digit can be any number from 0 through 9. | | |
| <u>Column A</u> | | <u>Column B</u> |
| | | 10^9 |
| The number of different identification codes possible | | |
-

- | | | |
|---|--|-----------------|
| 15. In a rectangular coordinate system, line k has x -intercept 4 and slope -2. | | |
| <u>Column A</u> | | <u>Column B</u> |
| | | 2 |
| The y -intercept of k | | |
-

16. Of the following, which is the closest approximation to $\frac{(1.5)(19.9)(4.012)}{3.02}$?
- (A) 400
 (B) 120
 (C) 100
 (D) 40
 (E) 10
-

17. If $(x - 1)^2 = (x - 2)^2$, then $x =$

- (A) $-\frac{5}{8}$
- (B) $\frac{2}{3}$
- (C) $\frac{1}{2}$
- (D) $\frac{3}{4}$
- (E) $\frac{5}{2}$

18. In the figure above, the areas of square regions X and Y are 1 and 4, respectively. What is the area of the triangular region?

- (A) 2
- (B) 1
- (C) $\frac{3}{4}$
- (D) $\frac{1}{2}$
- (E) $\frac{1}{4}$

19. If erasers cost \$0.25 each, at most how many erasers can be purchased for n dollars, where n is an integer?

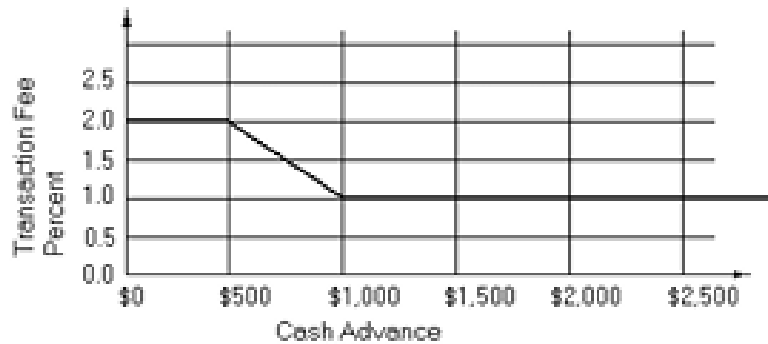
- (A) $\frac{n}{25}$
- (B) $\frac{n}{4}$
- (C) 4n
- (D) 25n
- (E) $\frac{25n}{4}$

20. Three salespeople are paid commissions in proportion to the amount of their sales, which total \$25,000, \$40,000, and \$60,000, respectively. If a total of \$20,000 is allocated for these three commissions, what is the amount of the largest commission paid?

- (A) \$8,000
- (B) \$8,400
- (C) \$9,600
- (D) \$10,000
- (E) \$12,000

Directions (Questions 21-23):

For a cash advance, a certain credit card company charges a transaction fee equal to a percent of the total amount of the cash advance, according to the graph below.



21. When compared with the transaction fee for a \$1,000 cash advance, the transaction fee for a \$500 cash advance is

- (A) \$5 more
- (B) \$10 more
- (C) the same
- (D) \$5 less
- (E) \$10 less

22. For which of the following cash advance amounts is the transaction fee approximately \$4?

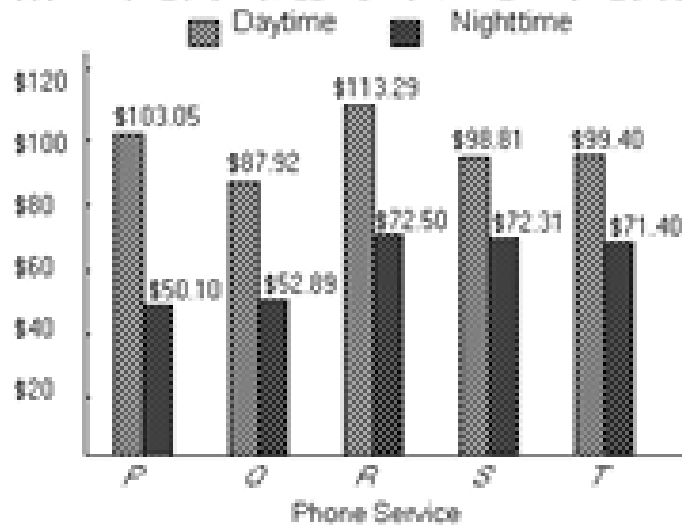
- (A) \$190
- (B) \$420
- (C) \$750
- (D) \$1,200
- (E) \$1,580

23. For a total of \$1,500 that is advanced in separate cash amounts, for which of the following is the total of the transaction fees the LEAST?

- (A) Two cash advances of \$750
- (B) Three cash advances of \$500
- (C) Six cash advances of \$250
- (D) Two cash advances, one of \$1,100 and one of \$400
- (E) Two cash advances, one of \$1,250 and one of \$250

Directions (Questions 24-25):

DAYTIME AND NIGHTTIME CHARGES FOR
360 MINUTES OF CALLING FOR FIVE PHONES SERVICE



24. What is the median nighttime charge for 360 minutes of calling?

- (A) \$63.84
- (B) \$71.40
- (C) \$72.50
- (D) \$87.92
- (E) \$113.29

25. The daytime charge for 360 minutes of calling for phone service T is approximately what percent more than the nighttime charge?

- (A) 7%
- (B) 14%
- (C) 28%
- (D) 33%
- (E) 40%

26. A square dart board has four dark circular regions of radius 3 inches as shown in the design above. Each point on the dart board is equally likely to be hit by a dart that hits the board. What is the probability that a dart that hits the board will hit one of the circular regions?

- (A) $\frac{\pi}{16}$

- (B) $\frac{\pi}{48}$
- (C) $\frac{\pi}{64}$
- (D) $\frac{1}{3}$
- (E) $\frac{1}{4}$

27. If x increased by 50 percent is equal to 20, then $x =$

- (A) $\frac{40}{3}$
- (B) 10
- (C) $\frac{20}{3}$
- (D) 5
- (E) $\frac{3}{4}$

28. In the rectangular coordinate plane, point A has coordinates $(-4, 0)$, point B has coordinates $(0, 4)$, point C has coordinates $(4, 0)$, and point D has coordinates $(0, -4)$. What is the area of quadrilateral ABCD?

- (A) 8
- (B) 16
- (C) 24
- (D) 32
- (E) 64

29. An experiment has three possible outcomes, I, J, and K. The probabilities of the outcomes are 0.25, 0.35, and 0.40, respectively. If the experiment is to be performed twice and the successive outcomes are independent, what is the probability that K will not be an outcome either time?

- (A) 0.36
- (B) 0.40
- (C) 0.60
- (D) 0.64
- (E) 0.80

30. If the inside diameter of a cylindrical garden hose is 1 inch, what is the length, in inches, of a straight hose that can hold a maximum of 1 gallon of water? (1 gallon = 231 cubic inches)

- (A) 231π
 - (B) $\frac{231}{\pi}$
 - (C) 924
 - (D) 924π
 - (E) $\frac{924}{\pi}$
-

SECTION 3

Time: 30 Minutes

25 Questions

1. It is assumed that scientists will avoid making — claims about the results of their experiments because of the likelihood that they will be exposed when other researchers cannot — their findings.

- (A) hypothetical.. evaluate
 - (B) fraudulent.. duplicate
 - (C) verifiable.. contradict
 - (D) radical.. contest
 - (E) extravagant.. dispute
-

2. As long as the nuclear family is — a larger kinship group through contiguous residence on undivided land, the pressure to — and thus to get along with relatives is strong.

- (A) nurtured among.. abstain
 - (B) excluded from.. compromise
 - (C) embedded in.. share
 - (D) scattered throughout.. reject
 - (E) accepted by.. lead
-

3. In contrast to the substantial muscular activity required for inhalation, exhalation is usually a — process.

- (A) slow
- (B) passive
- (C) precise
- (D) complex
- (E) conscious

4. The documentary film about high school life was so realistic and — that feelings of nostalgia flooded over the college-age audience.

- (A) logical
- (B) pitiful
- (C) evocative
- (D) critical
- (E) clinical

5. Although Georgia O’Keeffe is best known for her affinity with the desert landscape, her paintings of urban subjects — her longtime residency in New York City.

- (A) condemn
- (B) obfuscate
- (C) attest to
- (D) conflict with
- (E) contend with

6. Even though the survey was designated as an interdisciplinary course, it involved no real — of subject matter.

- (A) encapsulation
- (B) organization
- (C) synthesis
- (D) discussion
- (E) verification

7. The failure of many psychotherapists to — the results of pioneering research could be due in part to the specialized nature of such findings: even — findings may not be useful.

- (A) understand.. baffling
 - (B) envision.. accessible
 - (C) utilize.. momentous
 - (D) reproduce.. duplicated
 - (E) affirm.. controversial
-

8. EARPLUG: NOISE::

- (A) saw: wood
 - (B) detonation: explosion
 - (C) clothes: covering
 - (D) liquid: flask
 - (E) shield: impact
-

9. REVISE: MANUSCRIPT::

- (A) retouch: picture
 - (B) replicate: experiment
 - (C) repair: hammer
 - (D) replace: book
 - (E) restore: masterpiece
-

10. DAREDEVIL: AUDACITY::

- (A) malcontent: dissatisfaction
 - (B) perfectionist: patience
 - (C) cynic: indiscretion
 - (D) melancholic: bitterness
 - (E) hedonist: ambition
-

11. CALCIUM: MINERAL::

- (A) sugar: carbohydrate
 - (B) salt: solution
 - (C) enzyme: food
 - (D) milk: cheese
 - (E) calorie: diet
-

12. DIRGE: GRIEF::

- (A) diatribe: uneasiness
- (B) parody: cruelty
- (C) paean: praise
- (D) testimonial: veracity

(E) anthem: seriousness

13. ABANDON: INHIBITION::

- (A) ascendancy: effort
 - (B) prickliness: sensation
 - (C) surrender: resignation
 - (D) reversal: instigation
 - (E) tranquillity: agitation
-

14. INAUGURATION: OFFICIAL::

- (A) instruction: lecturer
 - (B) election: politician
 - (C) pilgrimage: devotee
 - (D) dispute: arbitrator
 - (E) matriculation: student
-

15. SCORN: REJECT::

- (A) adulate: flatter
 - (B) conjecture: forecast
 - (C) pledge: renege
 - (D) allege: declare
 - (E) disparage: ignore
-

16. PROFLIGATE: SOLVENT::

- (A) mercurial: committed
 - (B) caustic: rational
 - (C) indecisive: confused
 - (D) cautious: uncertain
 - (E) practical: seemly
-

Directions (Questions 17-19): The following questions are based on the reading passage below.

As people age, their cells become less efficient and less able to replace damaged components. At the same time their tissues stiffen. For example, the lungs and the heart muscle expand less successfully, the blood vessels become increasingly rigid, and the ligaments and tendons tighten.

Few investigators would attribute such diverse effects to a single cause. Nevertheless, researchers have discovered that a process long known to discolor and toughen foods may also contribute to age-related impairment of both cells and tissues. That process is nonenzymatic glycosylation, whereby glucose becomes attached to proteins without the aid of enzymes. When enzymes attach glucose to proteins (enzymatic glycosylation), they do so at a specific site on a specific protein molecule for a specific purpose. In contrast, the nonenzymatic process adds glucose haphazardly to any of several sites along any available peptide chain within a protein molecule.

This nonenzymatic glycosylation of certain proteins has been understood by food chemists for decades, although few biologists recognized until recently that the same steps could take place in the body. Nonenzymatic glycosylation begins when an aldehyde group (CHO) of glucose and an amino group (NH) of a protein are attracted to each other. The molecules combine, forming what is called a Schiff base within the protein. This combination is unstable and quickly rearranges itself into a stabler, but still reversible, substance known as an Amadori product.

If a given protein persists in the body for months or years, some of its Amadori products slowly dehydrate and rearrange themselves yet again, into new glucose-derived structures. These can combine with various kinds of molecules to form irreversible structures named advanced glycosylation end products (AGE's). Most AGE's are yellowish brown and fluorescent and have specific spectrographic properties. More important for the body, many are also able to cross-link adjacent proteins, particularly ones that give structure to tissues and organs. Although no one has yet satisfactorily described the origin of all such bridges between proteins, many investigators agree that extensive cross-linking of proteins probably contributes to the stiffening and loss of elasticity characteristic of aging tissues.

In an attempt to link this process with the development of cataracts (the browning and clouding of the lens of the eye as people age), researchers studied the effect of glucose on solutions of purified crystallin, the major protein in the lens of the eye. Glucose-free solutions remained clear, but solutions with glucose caused the proteins to form clusters, suggesting that the molecules had become cross-linked. The clusters diffracted light, making the solution opaque. The researchers also discovered that the pigmented cross-links in human cataracts have the brownish color and fluorescence characteristic of AGE's. These data suggest that nonenzymatic glycosylation of lens crystallins may contribute to cataract formation.

17. With which of the following statements concerning the stiffening of aging tissues would the author most likely agree?

- (A) It is caused to a large degree by an increased rate of cell multiplication.
- (B) It paradoxically both helps and hinders the longevity of proteins in the human body.
- (C) It can be counteracted in part by increased ingestion of glucose-free foods.
- (D) It is exacerbated by increased enzymatic glycosylation.
- (E) It probably involves the nonenzymatic glycosylation of proteins.

18. According to the passage, which of the following statements is true of the process that discolors and toughens foods?

- (A) It takes place more slowly than glycosylation in the human body.
- (B) It requires a higher ratio of glucose to protein than glycosylation requires in the human body.
- (C) It does not require the aid of enzymes to attach glucose to protein.
- (D) It proceeds more quickly when the food proteins have a molecular structure similar to that of crystallin proteins.
- (E) Its effectiveness depends heavily on the amount of environmental moisture.

19. According to the passage, which of the following is characteristic of enzymatic glycosylation of proteins?

- (A) AGE's are formed after a period of months or years.
- (B) Proteins affected by the process are made unstable.
- (C) Glucose attachment impairs and stiffens tissues.
- (D) Glucose is attached to proteins for specific purposes.
- (E) Amino groups combine with aldehyde groups to form Schiff bases.

20. According to the passage, which of the following statements is true of Amadori products in proteins?

- (A) They are more plentiful in a dehydrated environment.
- (B) They are created through enzymatic glycosylation.
- (C) They are composed entirely of glucose molecules.
- (D) They are derived from Schiff bases.
- (E) They are derived from AGE's.

21. Which of the following best describes the function of the third paragraph of the passage (lines 19-29)?

- (A) It offers evidence that contradicts the findings described in the first two paragraphs.
- (B) It presents a specific example of the process discussed in the first two paragraphs.
- (C) It explains a problem that the researchers mentioned in the second paragraph have yet to solve.
- (D) It evaluates the research discoveries described in the previous paragraph.

(E) It begins a detailed description of the process introduced in the previous two paragraphs.

22. The passage suggests that which of the following would be LEAST important in determining whether nonenzymatic glycosylation is likely to have taken place in the proteins of a particular tissue?

- (A) The likelihood that the tissue has been exposed to free glucose
 - (B) The color and spectrographic properties of structures within the tissue.
 - (C) The amount of time that the proteins in the tissue have persisted in the body
 - (D) The number of amino groups within the proteins in the tissue
 - (E) The degree of elasticity that the tissue exhibits
-

23. If the hypothesis stated in lines 56-58 is true, it can be inferred that the crystallin proteins in the lenses of people with cataracts

- (A) have increased elasticity
 - (B) do not respond to enzymatic glycosylation
 - (C) are more susceptible to stiffening than are other proteins
 - (D) are at least several months old
 - (E) respond more acutely than other proteins to changes in moisture levels
-

Writing of the Iroquois nation, Smith has argued that through the chiefs' council, tribal chiefs traditionally maintained complete control over the political affairs of both the Iroquois tribal league and the individual tribes belonging to the league, whereas the sole jurisdiction over religious affairs resided with the shamans. According to Smith, this division was maintained until the late nineteenth century, when the dissolution of the chiefs' council and the consequent diminishment of the chiefs' political power fostered their increasing involvement in religious affairs.

However, Smith fails to recognize that this division of power between the tribal chiefs and shamans was not actually rooted in Iroquois tradition; rather, it resulted from the Iroquois' resettlement on reservations early in the nineteenth century. Prior to resettlement, the chiefs' council controlled only the broad policy of the tribal league; individual tribes had institutions—most important, the longhouse—to govern their own affairs. In the longhouse, the tribe's chief influenced both political and religious affairs.

24. The primary purpose of the passage is to

- (A) question the published conclusions of a scholar concerning the history of the Iroquois nation
 - (B) establish the relationship between an earlier scholar's work and new anthropological research
 - (C) summarize scholarly controversy concerning an incident from Iroquois history
 - (D) trace two generations of scholarly opinion concerning Iroquois social institutions
 - (E) differentiate between Iroquois political practices and Iroquois religious practices
-

25. It can be inferred that the author of the passage regards Smith's argument as

- (A) provocative and potentially useful, but flawed by poor organization
 - (B) eloquently presented, but needlessly inflammatory
 - (C) accurate in some of its particulars, but inaccurate with regard to an important point.
 - (D) historically sound, but overly detailed and redundant
 - (E) persuasive in its time, but now largely outdated
-

26. The author of the passage implies that which of the following occurred after the Iroquois were resettled on reservations early in the nineteenth century?

- (A) Chiefs became more involved in their tribes' religious affairs.
 - (B) The authority of the chiefs' council over the affairs of individual tribes increased.
 - (C) The political influence of the Iroquois shamans was diminished.
 - (D) Individual tribes coalesced into the Iroquois tribal league.
 - (E) The longhouse became a political rather than a religious institution.
-

27. Which of the following best expresses an opinion presented by the author of the passage?

- (A) Smith has overstated the importance of the political role played by Iroquois tribal chiefs in the nineteenth century.
 - (B) Smith has overlooked the fact that the Iroquois rarely allowed their shamans to exercise political authority.
 - (C) Smith has failed to explain why the chiefs' council was dissolved late in the nineteenth century.
 - (D) Smith has failed to acknowledge the role prior to the nineteenth century of the Iroquois tribal chiefs in religious affairs.
 - (E) Smith has failed to recognize that the very structure of Iroquois social institutions reflects religious beliefs.
-

28. DRONE:

- (A) behave bestially
 - (B) decide deliberately
 - (C) err intentionally
 - (D) speak animatedly
 - (E) plan inefficiently
-

29. CERTAINTY:

- (A) obstinacy
 - (B) impetuosity
 - (C) recklessness
 - (D) indecision
 - (E) indifference
-

30. MORIBUND:

- (A) fully extended
 - (B) automatically controlled
 - (C) loosely connected
 - (D) completely dispersed
 - (E) increasingly vital
-

31. PROFANE:

- (A) approach expectantly
 - (B) punish mildly
 - (C) appease fully
 - (D) treat reverently
 - (E) admonish sternly
-

32. PERSONABLE:

- (A) unrefined
- (B) unselfish
- (C) unattractive
- (D) uncommitted

(E) undistinguished

33. MIRE:

- (A) straighten
 - (B) fracture
 - (C) extricate
 - (D) elevate
 - (E) augment
-

34. CONCEPTUAL:

- (A) proven
 - (B) effective
 - (C) manageable
 - (D) concrete
 - (E) punctilious
-

35. SURFEIT:

- (A) precise length
 - (B) delayed increment
 - (C) obtainable quantity
 - (D) unascertained limit
 - (E) insufficient supply
-

36. TENACITY:

- (A) vacillation
 - (B) servility
 - (C) temerity
 - (D) perversity
 - (E) diversity
-

37. APPOSITE:

- (A) irrelevant
- (B) nameless
- (C) tentative
- (D) disfavored
- (E) lavish

38. STYMIE:

- (A) ponder
- (B) predict
- (C) divulge
- (D) abet
- (E) explain

SECTION 4

Time: 30 Minutes

30 Questions

Directions (Questions 1-8): This section consists of a series of questions with two quantities, one in Column A and one in Column B. You are to compare the two quantities and decide whether

- (A) the quantity in Column A is greater;
- (B) the quantity in Column B is greater;
- (C) the two quantities are equal;
- (D) the relationship cannot be determined from the information given.

1.



Column A

xy

Column B

xz

x, y , and z are coordinates of

three points on the number line above.

Column A

xy

Column B

xz

2. 10 inches of snowfall is equivalent to 1 inch of rainfall. (1 foot = 12 inches)

Column A

The number of inches of rain-
fall equivalent to 1 foot of
snowfall

Column B

1

3. Column A
 $a - b$

Column B
 $b - a$

$$b > 0$$

4. The geometric mean of any two positive numbers x and y is \sqrt{xy} .

Column A

The geometric mean of 4
and 8

Column B

The average (arithmetic
mean) of 4 and 8

5. Column A
 $\frac{16}{35}$

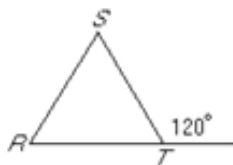
Column B
 $\frac{4}{9}$

6. Column A
 $x + 4$

Column B
 y

$$1 < x < y$$

7.



Column A
The length of ST

Column B
The length of RS

8. Column A
 x

Column B
 y

$$x + 5 = 3$$

$$y = 2x$$

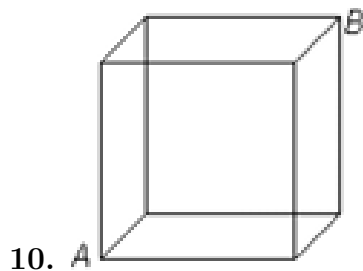
-
9. 1 gallon = 8 pints
1 quart = 2 pints

Column A

The least number of half-pint bottles needed to hold x quarts of milk

Column B

The least number of one-quart bottles needed to hold x gallons of milk



The figure shows a cube with edge of length e .

Column A

The length of diagonal AB

Column B

$$\sqrt{2}e$$

11. $y = 3x - 1$

Column A

$$x$$

Column B

$$\frac{y}{3} + 3$$

12. Column A

$$37 \times \frac{37}{36}$$

Column B

$$37 + \frac{37}{36}$$

13. Column A

0.01% of 1,000

Column B

$$1$$

x and y are positive integers and $x > y$.

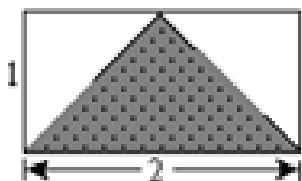
Column B

Column A

14.

$$\frac{x^2}{y^3}$$

$$\frac{y^3}{x^2}$$



15.

Column B

Column A

$$2\sqrt{2} + 2$$

The perimeter of the shaded region in the rectangle

16. $-\left(-\frac{6}{2}\right) =$

- (A) -4
- (B) -3
- (C) 3
- (D) 4
- (E) 8

17. A rectangular parking lot $2x$ feet long and x feet wide is to be enlarged so that the lot will be 2 times as long and 3 times as wide as it is now. The area of the enlarged rectangular lot will be how many times the area of the present lot?

- (A) 6
- (B) 5
- (C) 4
- (D) 3
- (E) 2

18. If $2x = 5$ and $3y = 8$, then $\frac{4x}{9y} =$

- (A) $\frac{5}{18}$
- (B) $\frac{5}{16}$
- (C) $\frac{5}{12}$
- (D) $\frac{5}{8}$
- (E) $\frac{3}{4}$

19. A certain jar contains 100 jelly beans: 50 white, 30 green, 10 yellow, 5 red, 4 purple, and 1 black. If a jelly bean is to be chosen at random, what is the probability that the jelly bean will be neither purple nor red?

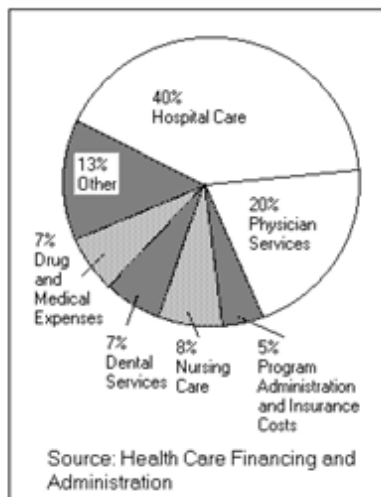
- (A) 0.09
- (B) 0.11
- (C) 0.55
- (D) 0.91
- (E) 0.96

20. The average (arithmetic mean) of $|x|$ and x equals

- (A) x if $x \geq 0$, and equals 0 if $x = 0$
- (B) $-x$ if $x \leq 0$, and equals 0 if $x = 0$
- (C) 0, regardless of the value of x
- (D) x , regardless of the value of x
- (E) $|x|$, regardless of the value of x

Directions (Questions 21-22): The following questions refer to the pie chart below.

1989 HEALTH CARE EXPENDITURES
(to the nearest whole percent)
Total \$550 billion



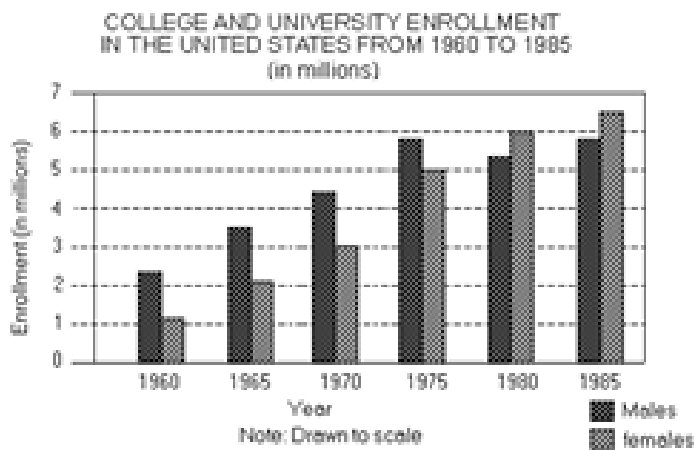
21. Expenditures for physician services in 1989 were approximately how many billion dollars more than expenditures for nursing care?

- (A) 38.5
- (B) 66.0
- (C) 82.5
- (D) 110.0
- (E) 154.0

22. If health care expenditures accounted for 11 percent of the gross domestic product in 1989, then the gross domestic product was approximately how many billion dollars?

- (A) 605
- (B) 5,000
- (C) 5,500
- (D) 6,050
- (E) 6,500

Directions (Questions 23-25): The following questions refer to the bar graph below.



23. The total enrollment in 1985 was approximately how much greater than the total enrollment in 1960?

- (A) 4 million
- (B) 5 million
- (C) 7 million
- (D) 9 million
- (E) 11 million

24. For which of the years shown was the ratio of male to female enrollment greatest?

- (A) 1980
- (B) 1975
- (C) 1970
- (D) 1965
- (E) 1960

25. For which of the following periods was the percent increase in female enrollment the greatest?

- (A) 1960 to 1965
- (B) 1965 to 1970
- (C) 1970 to 1975
- (D) 1975 to 1980
- (E) 1980 to 1985

26. If a certain town has 90 doctors and the ratio of male doctors to female doctors is 3 to 2, then the number of female doctors in this town is

- (A) 18
- (B) 30
- (C) 36
- (D) 45
- (E) 54

27. Which of the following points (x, y) is NOT on the graph of $y < 2x$?

- (A) $(-3, -7)$
- (B) $(3, 3)$
- (C) $(2, -9)$
- (D) $(2, 2)$
- (E) $(2, 5)$

28. If apples sell for \$0.68 per pound and Juanita bought 36 apples for \$8.16, then the average (arithmetic mean) number of apples per pound was

- (A) $\frac{1}{3}$
- (B) $\frac{1}{2}$
- (C) 1
- (D) 2
- (E) 3

29. The sum of the first 50 positive integers is 1,275. What is the sum of the integers from 51 to 100?

- (A) 2,525
- (B) 2,550
- (C) 3,250
- (D) 3,775
- (E) 5,050

30. The figure above shows a semicircle with center O and a quarter circle with center R. If $OQ = 4$ and $QR = 6$, what is the ratio of the area of the shaded region

to the area of the semicircular region?

- (A) 2:3
- (B) 4:3
- (C) 8:9
- (D) 9:4
- (E) 9:8

SECTION 5

Time: 30 Minutes

30 Questions

1. Joyce: Three years ago the traffic commission modified our town's busiest intersection for better visibility, a commendable effort to cut down on traffic accidents there.

Gary: Over the past three years there have been more, not fewer, traffic accidents per week at that intersection, so the modification has increased the likelihood of accidents there

The answer to which of the following questions would be most useful in evaluating Gary's argument?

- (A) What proportion of the town's drivers involved in accidents that occurred prior to the modification suffered personal injury in their accidents?
- (B) How long, on average, had the members of the traffic commission held their offices when the modification was implemented?
- (C) Do a majority of the town's residents approve of the traffic commission's overall performance?
- (D) What measures have nearby towns taken within the last three years in order to improve visibility at dangerous intersections?
- (E) How has the volume of traffic at the town's busiest intersection changed over the last three years?

2. Women make up the majority of the population in the country, and many of the prescriptions written by doctors for tranquilizers are for women patients. The testing of these drugs for efficacy and the calibration of recommended doses, however, was done only on men. Not even the animals used to test toxicity were female.

The statements above, if true, best support which of the following as a conclusion?

- (A) Some tranquilizers are more appropriately prescribed for women than for men.
- (B) There have been no reports of negative side effects from prescribed tranquilizers in women.
- (C) Tranquilizers are prescribed for patients in some instances when doctors do

not feel confident of their diagnoses. (This option is from the next page of the test)
(D) The toxicity of drugs to women is less than the toxicity of the same drugs to men. (This option is from the next page of the test)
(E) Whether the recommended dosages of tranquilizers are optimal for women is not known. (This option is from the next page of the test)

Directions (Questions 3-7): The following questions are based on the setup below.

A landscape designer has available two trees each of eight different species—linden, maple, pine, quince, redbud, spruce, tupelo, and walnut—from which a selection must be made for planting at two different locations. For planting at each location, the designer will select exactly four trees, representing four different tree species, according to the following conditions:

- If quince is planted at location 1, spruce cannot be planted at location 2.
 - If linden and quince are planted at location 1, pine must be planted at location 2.
 - If pine is planted at location 2, quince and tupelo must be planted at location 1.
 - Spruce cannot be planted at location 1 unless linden and pine are planted at location 2.
-

3. Which of the following is an acceptable selection of species to be planted at the two locations?

- (A) Location 1: Linden, maple, pine, quince Location 2: Maple, pine, tupelo, walnut
(B) Location 1: Linden, pine, quince, walnut Location 2: Linden, maple, tupelo, walnut
(C) Location 1: Maple, quince, spruce, tupelo Location 2: Maple, pine, tupelo, walnut
(D) Location 1: Quince, spruce, tupelo, walnut Location 2: Linden, maple, pine, tupelo
(E) Location 1: Quince, spruce, tupelo, walnut Location 2: Linden, pine, quince, spruce
-

4. If maple, spruce, and tupelo are planted at location 1, then which of the following must be the other species planted at location 1?

- (A) Quince
(B) Redbud

- (C) Spruce
 - (D) Tupelo
 - (E) Walnut
-

5. If maple, redbud, and walnut are planted at location 1, then any of the following species can be planted at location 2 EXCEPT

- (A) linden
 - (B) pine
 - (C) quince
 - (D) tupelo
 - (E) walnut
-

6. If linden and quince are planted at location 1, then which of the following must be true?

- (A) Quince is planted at location 2.
 - (B) Spruce is planted at location 2.
 - (C) Pine is not planted at location 1.
 - (D) Spruce is not planted at location 1.
 - (E) Tupelo is planted at location 1.
-

7. If each of the eight species is selected for planting and spruce is planted at location 2, then which of the following must also be planted at location 2?

- (A) Linden
 - (B) Pine
 - (C) Quince
 - (D) Tupelo
 - (E) Walnut
-

8. If each of the eight species must be selected for planting and quince and tupelo are planted at location 1, then which of the following can be the other two species planted at location 1?

- (A) Maple and spruce
- (B) Maple and walnut
- (C) Pine and redbud

- (D) Pine and spruce
 - (E) Redbud and walnut
-

9. Gray wolves have been absent from a large national park for decades. Park officials wish to reestablish the wolves without jeopardizing any existing species of wildlife there. Since the park contains adequate prey for the wolves and since the wolves avoid close contact with people, reintroducing them would serve the officials' purpose without seriously jeopardizing visitors' safety.

Each of the following, if true, strengthens the argument above EXCEPT:

- (A) The park is so large that wolves will not need to venture into areas frequented by people.
 - (B) Rabies is very rare in wolves, and there have been no verified cases of serious human injuries from nonrabid wild wolves since records have been kept.
 - (C) Ranchers in the region near the park have expressed concern that gray wolves, if reintroduced, would sometimes prey on their livestock.
 - (D) Predation by gray wolves on elk in the park is likely to improve the health and viability of the park's elk population as a whole by reducing malnutrition among the elk.
 - (E) Wolves do not prey on animals of any endangered species that currently inhabit the park.
-

10. Osteoporosis is a disease that reduces bone mass, leading to fragile bones that break easily. Current treatments for osteoporosis such as estrogen or calcitonin help prevent further loss of bone but do not increase bone mass. Since fluoride is known to increase bone mass, administering fluoride to osteoporosis patients would therefore help make their bones less susceptible to breaking.

Which of the following, if true, most seriously weakens the argument above?

- (A) Most people who suffer from osteoporosis are not aware that administration of fluoride can increase bone mass.
 - (B) Fluoride is added to drinking water in many locations in order to strengthen the teeth of people who drink the water.
 - (C) The risk of contracting osteoporosis and other degenerative bone diseases is lessened by exercise and an adequate intake of calcium.
 - (D) Unlike administration of fluoride, administration of estrogen or calcitonin is known to cause undesirable side effects for many people.
 - (E) The new bone mass that is added by the administration of fluoride is more brittle and less elastic than normal bone tissue.
-

11. The closest distance from which an asteroid has been photographed using ground-based radar is 2.2 million miles, the distance from which the asteroid Toutatis was recently photographed. The closest photograph of an asteroid is of Gaspra, which was photographed from a distance of only 10,000 miles. Which of the following can be properly concluded from the statements above?

- (A) Toutatis is more likely to collide with the Earth than Gaspra is.
 - (B) Toutatis, unlike Gaspra, has only recently been discovered.
 - (C) Asteroids can be photographed only by using ground-based radar.
 - (D) Ground-based radar photography cannot take photographs of objects much beyond 2.2 million miles from Earth.
 - (E) The photograph of Gaspra was not taken using ground-based radar.
-

12. Which of the following most logically completes the argument below?

Alone among living species, human beings experience adolescence, a period of accelerated physical growth prior to full maturity. Whether other hominid species, which are now all extinct and are known only through the fossil record, went through adolescence cannot be known, since

- (A) the minimum acceleration in physical growth that would indicate adolescence might differ according to species
 - (B) the fossil record, though steadily expanding, will always remain incomplete
 - (C) detecting the adolescent growth spurt requires measurements on the same individual at different ages
 - (D) complete skeletons of extinct hominids are extremely rare
 - (E) human beings might be the first species to benefit from the survival advantages, if any, conferred by adolescence
-

Directions (Questions 13-17): The following questions are based on the setup below.

A circus magician has a "magic box" that has exactly six chambers designed to hold at least two animals each. There are five trained animals—a frog, a hen, a mouse, a parakeet, and a rabbit. On the front of the box, chambers 1, 2, and 3 are arranged in a straight line so that chamber 1 is directly adjacent to chamber 2, and chamber 2 is directly adjacent to chamber 3. On the back of the box, the chambers are also arranged in a straight line with chamber 4 directly adjacent to chamber 5, and chamber 5 directly adjacent to chamber 6. No chamber in the front of the box is directly adjacent to a chamber in the back.

When working with the animals, the magician must obey the following restrictions:

- None of the chambers can contain more than two animals at the same time.
- The mouse cannot be in the same chamber as any other animal, and any chamber directly adjacent to the chamber that the mouse occupies must remain

empty.

- Neither the hen nor the frog can be in the same chamber as the parakeet.

13. If the mouse is in chamber 2, and the other four animals are all in chambers, which of the following is a pair of chambers that must be empty?

- (A) 1 and 3
- (B) 1 and 4
- (C) 2 and 4
- (D) 3 and 5
- (E) 3 and 6

14. If the mouse in chamber 2, the parakeet is in chamber 4, and all the other animals are in chambers, then the hen can be in chamber.

- (A) 1
- (B) 2
- (C) 3
- (D) 4
- (E) 5

15. If no chamber contains more than one animal and each of the five animals is in a chamber, then there is a total of how many different chambers any one of which could be the chamber that contains the mouse?

- (A) One
- (B) Two
- (C) Three
- (D) Four
- (E) Five

16. If all five animals are in the chambers, the mouse is in chamber 2, and the frog's chamber is different from and not directly adjacent to the hen's chamber, then the parakeet must be in chamber

- (A) 1
- (B) 3
- (C) 4
- (D) 5

(E) 6

17. If the hen is in chamber 1 with another animal, one animal is in chamber 5, and two animals are in chamber 3, which of the following pairs of animals must be in chamber 3?

- (A) The frog and the mouse
- (B) The frog and the parakeet
- (C) The frog and the rabbit
- (D) The mouse and the rabbit
- (E) The parakeet and the rabbit

Directions (Questions 18-22): The following questions are based on the setup below.

Seven science students—John, Kate, Luz, Mark, Nelson, Olga, and Pat—are to be divided into three groups. One group will consist of three students, and the other groups will consist of two students each. The following conditions apply to the assignment of students to groups:

- John cannot be assigned to the group to which Luz is assigned.
- Nelson must be assigned to the group to which Pat is assigned.
- Olga must be assigned to the group consisting of three students.

18. Which of the following is an acceptable assignment of students to groups?

- (A) John, Kate, and Mark; Luz, Nelson, and Olga; Pat
- (B) John, Mark, and Olga; Kate and Luz; Nelson and Pat
- (C) Kate, Luz, and Olga; John and Nelson; Mark and Pat
- (D) Mark, Nelson, and Pat; John and Kate; Luz and Olga
- (E) Nelson, Olga, and Pat; John and Luz; Kate and Mark

19. If one of the groups of two consists of Luz and Mark, which of the following must be true?

- (A) John is assigned to the group to which Kate is assigned.
- (B) John is assigned to the group to which Nelson is assigned.
- (C) Kate is assigned to the group to which Pat is assigned.
- (D) Kate is assigned to a group consisting of two students.

(E) Nelson is assigned to the group consisting of three students.

20. If Nelson is assigned to the group to which Olga is assigned, which of the following can be true?

- (A) Kate is assigned to the group to which John is assigned.
 - (B) Kate is assigned to the group to which Mark is assigned.
 - (C) Luz is assigned to the group to which Olga is assigned.
 - (D) John is assigned to the group consisting of three students.
 - (E) Pat is assigned to a group consisting of two students.
-

21. If Mark is assigned to a group to which neither John nor Pat is assigned, which of the following must be true?

- (A) John is assigned to the group to which Kate is assigned.
 - (B) John is assigned to the group to which Nelson is assigned.
 - (C) Kate is assigned to the group to which Luz is assigned.
 - (D) Kate is assigned to the group to which Nelson is assigned.
 - (E) Kate is assigned to the group to which Olga is assigned.
-

22. If John and Olga are assigned to different groups from each other, which of the following CANNOT be true?

- (A) John is assigned to the group to which Mark is assigned.
 - (B) Luz is assigned to the group to which Kate is assigned.
 - (C) Nelson is assigned to the group to which Olga is assigned.
 - (D) John is assigned to the group consisting of three members.
 - (E) John and Kate are assigned to different groups from each other.
-

23. GRAND CITY CENSUS REPORTS (1950-1980)

Year	Population	Housing Units
1950	500,000	214,000
1960	476,000	218,000
1970	453,000	226,000
1980	425,000	237,000

Which of the following, if true, most helps to reconcile the increase in housing units with the decline in population shown in the table above?

- (A) The percentage of families that included adult children living at home increased during the 1970's.
 - (B) The number of people moving to Grand City from other cities gradually decreased during the three decades.
 - (C) The number of housing units that were vacant in Grand City fell steadily between 1950 and 1980.
 - (D) The number of adults who lived alone in Grand City housing units increased dramatically between 1950 and 1980.
 - (E) Many housing units that were occupied by only one family in 1950 were occupied by two or more families in 1980.
-

24. Fossils of the coral *Acrocora palmata* that date from the last period when glaciers grew and consequently spread from the polar regions are found at ocean depths far greater than those at which *A. palmata* can now survive. Therefore, although the fossilized *A. palmata* appears indistinguishable from *A. palmata* now living, it must have differed in important respects to have been able to live in deep water.

The argument depends on the assumption that

- (A) no fossils of the coral *A. palmata* have been found that date from periods when glaciers were not spreading from the polar regions
 - (B) geological disturbances since the last period during which glaciers spread have caused no major downward shift in the location of *A. palmata* fossils
 - (C) *A. palmata* now live in shallow waters in most of the same geographical regions as those in which deep-lying *A. palmata* fossils have been found
 - (D) *A. palmata* fossils have been found that date from each of the periods during which glaciers are known to have spread from the polar region
 - (E) *A. palmata* can live at greater depths where the ocean temperature is colder than they can where the ocean temperature is warmer
-

25. Conservationists have believed that by concentrating their preservation efforts on habitats rich in an easily surveyed group of species, such as birds, they would thereby be preserving areas rich in overall species diversity. This belief rests on a view that a geographical area rich in one group of species will also be rich in the other groups characteristic of the entire regional climate zone.

Which of the following findings about widely scattered tracts 10 kilometers by 10 kilometers in a temperate climate zone would most seriously challenge the conservationists' assumptions?

- (A) The tracts show little damage from human intrusion and from pollution by human activities.
- (B) Where a certain group of species, such as birds, is abundant, there is also an abundance of the species, such as insects, on which that group of species feeds...
- (C) The area of one of the tracts is generally large enough to contain a representative sample of the organisms in the region.
- (D) There is little overlap between the list of tracts that are rich in species of butterflies and the list of those that are rich in species of birds.
- (E) The highest concentration of individuals of rare species is found where the general diversity of species is greatest.
-

SECTION 6

Time: 30 Minutes

38 Questions

1. In the nineteenth century, novelists and unsympathetic travelers portrayed the American West as a land of —- adversity, whereas promoters and idealists created a —- image of a land of infinite promise.

- (A) lurid.. a mundane
- (B) incredible.. an underplayed
- (C) dispiriting.. an identical
- (D) intriguing.. a luxuriant
- (E) unremitting.. a compelling
-

2. Honeybees tend to be more —- than earth bees: the former, unlike the latter, search for food together and signal their individual findings to one another.

- (A) insular
- (B) aggressive
- (C) differentiated
- (D) mobile
- (E) social
-

3. Joe spoke of superfluous and —- matters with exactly the same degree of intensity, as though for him serious issues mattered neither more nor less than did —-.

- (A) vital.. trivialities
- (B) redundant.. superficialities
- (C) important.. necessities

- (D) impractical.. outcomes
 - (E) humdrum.. essentials
-

4. The value of Davis' sociological research is compromised by his unscrupulous tendency to use materials — in order to substantiate his own claims, while — information that points to other possible conclusions.

- (A) haphazardly.. deploying
 - (B) selectively.. disregarding
 - (C) cleverly.. weighing
 - (D) modestly.. refuting
 - (E) arbitrarily.. emphasizing
-

5. Once Renaissance painters discovered how to — volume and depth, they were able to replace the medieval convention of symbolic, two-dimensional space with the more — illusion of actual space.

- (A) reverse.. conventional
 - (B) portray.. abstract
 - (C) deny.. concrete
 - (D) adumbrate.. fragmented
 - (E) render.. realistic
-

6. He had expected gratitude for his disclosure, but instead he encountered — bordering on hostility.

- (A) patience
 - (B) discretion
 - (C) openness
 - (D) ineptitude
 - (E) indifference
-

7. The diplomat, selected for her demonstrated patience and skill in conducting such delicate negotiations, — to make a decision during the talks because any sudden commitment at that time would have been —.

- (A) resolved.. detrimental
- (B) refused.. apropos

- (C) declined.. inopportune
 - (D) struggled.. unconscionable
 - (E) hesitated.. warranted
-

8. CONDUCTOR: INSTRUMENTALIST::

- (A) director: actor
 - (B) sculptor: painter
 - (C) choreographer: composer
 - (D) virtuoso: amateur
 - (E) poet: listener
-

9. QUARRY: ROCK

- (A) silt: gravel
 - (B) sky: rain
 - (C) cold: ice
 - (D) mine: ore
 - (E) jewel: diamond
-

10. STICKLER: EXACTING::

- (A) charlatan: forthright
 - (B) malcontent: solicitous
 - (C) misanthrope: expressive
 - (D) defeatist: resigned
 - (E) braggart: unassuming
-

11. WALK: AMBLE::

- (A) dream: imagine
 - (B) talk: chat
 - (C) swim: float
 - (D) look: stare
 - (E) speak: whisper
-

12. JAZZ: MUSIC::

- (A) act: play
 - (B) variety: vaudeville
 - (C) portraiture: painting
 - (D) menu: restaurant
 - (E) species: biology
-

13. REPATRIATE: EMIGRATION::

- (A) reinstate: election
 - (B) recall: impeachment
 - (C) appropriate: taxation
 - (D) repeal: ratification
 - (E) appeal: adjudication
-

14. PLACEBO: INNOCUOUS::

- (A) antibiotic: viral
 - (B) vapor: opaque
 - (C) salve: unctuous
 - (D) anesthetic: astringent
 - (E) vitamin: synthetic
-

15. DISSEMINATE: INFORMATION::

- (A) amend: testimony
 - (B) analyze: evidence
 - (C) investigate: crime
 - (D) prevaricate: confirmation
 - (E) foment: discontentment
-

16. VOICE: QUAVER::

- (A) pace: quicken
- (B) cheeks: dimple
- (C) concentration: focus
- (D) hand: tremble

(E) eye: blink

Directions (Questions 17-20): The following questions are based on the reading passage below.

Mary Barton, particularly in its early chapters, is a moving response to the suffering of the industrial worker in the England of the 1840's. What is most impressive about the book is the intense and painstaking effort made by the author, Elizabeth Gaskell, to convey the experience of everyday life in working-class homes. Her method is partly documentary in nature: the novel includes such features as a carefully annotated reproduction of dialect, the exact details of food prices in an account of a tea party, an itemized description of the furniture of the Bartons' living room, and a transcription (again annotated) of the ballad "The Oldham Weaver." The interest of this record is considerable, even though the method has a slightly distancing effect.

As a member of the middle class, Gaskell could hardly help approaching working-class life as an outside observer and a reporter, and the reader of the novel is always conscious of this fact. But there is genuine imaginative re-creation in her accounts of the walk in Green Heys Fields, of tea at the Bartons' house, and of John Barton and his friend's discovery of the starving family in the cellar in the chapter "Poverty and Death." Indeed, for a similarly convincing re-creation of such families' emotions and responses (which are more crucial than the material details on which the mere reporter is apt to concentrate), the English novel had to wait 60 years for the early writing of D. H. Lawrence. If Gaskell never quite conveys the sense of full participation that would completely authenticate this aspect of Mary Barton, she still brings to these scenes an intuitive recognition of feelings that has its own sufficient conviction.

The chapter "Old Alice's History" brilliantly dramatizes the situation of that early generation of workers brought from the villages and the countryside to the urban industrial centers. The account of Job Legh, the weaver and naturalist who is devoted to the study of biology, vividly embodies one kind of response to an urban industrial environment: an affinity for living things that hardens, by its very contrast with its environment, into a kind of crankiness. The early chapters—about factory workers walking out in spring into Green Heys Fields; about Alice Wilson, remembering in her cellar the twig-gathering for brooms in the native village that she will never again see; about Job Legh, intent on his impaled insects—capture the characteristic responses of a generation to the new and crushing experience of industrialism. The other early chapters eloquently portray the development of the instinctive cooperation with each other that was already becoming an important tradition among workers.

17. Which of the following best describes the author's attitude toward Gaskell's

use of the method of documentary record in *Mary Barton*?

- (A) Uncritical enthusiasm
 - (B) Unresolved ambivalence
 - (C) Qualified approval
 - (D) Resigned acceptance
 - (E) Mild irritation
-

18. According to the passage, *Mary Barton* and the early novels of D. H. Lawrence share which of the following?

- (A) Depiction of the feelings of working-class families
 - (B) Documentary objectivity about working-class circumstances
 - (C) Richly detailed description of working-class adjustment to urban life
 - (D) Imaginatively structured plots about working-class characters
 - (E) Experimental prose style based on working-class dialect
-

19. Which of the following is most closely analogous to Job Legh in *Mary Barton*, as that character is described in the passage?

- (A) An entomologist who collected butterflies as a child
 - (B) A small-town attorney whose hobby is nature photography
 - (C) A young man who leaves his family's dairy farm to start his own business
 - (D) A city dweller who raises exotic plants on the roof of his apartment building
 - (E) A union organizer who works in a textile mill under dangerous conditions
-

20. It can be inferred from examples given in the last paragraph of the passage that which of the following was part of "the new and crushing experience of industrialism" (lines 46-47) for many members of the English working class in the nineteenth century?

- (A) Extortionate food prices
 - (B) Geographical displacement
 - (C) Hazardous working conditions
 - (D) Alienation from fellow workers
 - (E) Dissolution of family ties
-

21. It can be inferred that the author of the passage believes that Mary Barton might have been an even better novel if Gaskell had

- (A) concentrated on the emotions of a single character
 - (B) made no attempt to re-create experiences of which she had no firsthand knowledge
 - (C) made no attempt to reproduce working-class dialects
 - (D) grown up in an industrial city
 - (E) managed to transcend her position as an outsider
-

22. Which of the following phrases could best be substituted for the phrase "this aspect of Mary Barton" in line 29 without changing the meaning of the passage as a whole?

- (A) the material details in an urban working-class environment
 - (B) the influence of Mary Barton on Lawrence's early work
 - (C) the place of Mary Barton in the development of the English novel
 - (D) the extent of the poverty and physical suffering among England's industrial workers in the 1840's.
 - (E) the portrayal of the particular feelings and responses of working-class characters
-

23. The author of the passage describes Mary Barton as each of the following EXCEPT

- (A) insightful
 - (B) meticulous
 - (C) vivid
 - (D) poignant
 - (E) lyrical
-

Directions (Questions 24-27): The following questions are based on the reading passage below.

As of the late 1980's, neither theorists nor large-scale computer climate models could accurately predict whether cloud systems would help or hurt a warming globe. Some studies suggested that a four percent increase in stratocumulus clouds over the ocean could compensate for a doubling in atmospheric carbon dioxide, preventing a potentially disastrous planetwide temperature increase. On the other hand, an increase in cirrus clouds could increase global warming.

That clouds represented the weakest element in climate models was illustrated by a study of fourteen such models. Comparing climate forecasts for a world with double the current amount of carbon dioxide, researchers found that the models agreed quite well if clouds were not included. But when clouds were incorporated, a wide range of forecasts was produced. With such discrepancies plaguing the models, scientists could not easily predict how quickly the world's climate would change, nor could they tell which regions would face dustier droughts or deadlier monsoons.

24. The author of the passage is primarily concerned with

- (A) confirming a theory
 - (B) supporting a statement
 - (C) presenting new information
 - (D) predicting future discoveries
 - (E) reconciling discrepant findings
-

25. It can be inferred that one reason the fourteen models described in the passage failed to agree was that

- (A) they failed to incorporate the most up-to-date information about the effect of clouds on climate
 - (B) they were based on faulty information about factors other than clouds that affect climate.
 - (C) they were based on different assumptions about the overall effects of clouds on climate
 - (D) their originators disagreed about the kinds of forecasts the models should provide
 - (E) their originators disagreed about the factors other than clouds that should be included in the models
-

26. It can be inferred that the primary purpose of the models included in the study discussed in the second paragraph of the passage was to

- (A) predict future changes in the world's climate
 - (B) predict the effects of cloud systems on the world's climate
 - (C) find a way to prevent a disastrous planetwide temperature increase
 - (D) assess the percentage of the Earth's surface covered by cloud systems
 - (E) estimate by how much the amount of carbon dioxide in the Earth's atmosphere will increase
-

27. The information in the passage suggests that scientists would have to answer which of the following questions in order to predict the effect of clouds on the warming of the globe?

- (A) What kinds of cloud systems will form over the Earth?
 - (B) How can cloud systems be encouraged to form over the ocean?
 - (C) What are the causes of the projected planetwide temperature increase?
 - (D) What proportion of cloud systems are currently composed of cirrus clouds?
 - (E) What proportion of the clouds in the atmosphere form over land masses?
-

28. SUSPEND:

- (A) force
 - (B) split
 - (C) tilt
 - (D) slide down
 - (E) let fall
-

29. CREDULITY:

- (A) originality
 - (B) skepticism
 - (C) diligence
 - (D) animation
 - (E) stoicism
-

30. MILD:

- (A) toxic
 - (B) uniform
 - (C) maximal
 - (D) asymptomatic
 - (E) acute
-

31. IMPLEMENT:

- (A) distort
- (B) foil

- (C) overlook
 - (D) aggravate
 - (E) misinterpret
-

32. DIFFIDENCE::

- (A) trustworthiness
 - (B) assertiveness
 - (C) lack of preparation
 - (D) resistance to change
 - (E) willingness to blame
-

33. BYZANTINE:

- (A) symmetrical
 - (B) variegated
 - (C) discordant
 - (D) straightforward
 - (E) unblemished
-

34. PROCLIVITY:

- (A) confusion
 - (B) deprivation
 - (C) obstruction
 - (D) aversion
 - (E) hardship
-

35. PROTRACT:

- (A) treat fairly
 - (B) request hesitantly
 - (C) take back
 - (D) cut short
 - (E) make accurate
-

36. VAUNTING:

- (A) plucky
 - (B) meek
 - (C) chaste
 - (D) cowardly
 - (E) ardent
-

37. HALE:

- (A) unenthusiastic
 - (B) staid
 - (C) odious
 - (D) infirm
 - (E) uncharacteristic
-

38. SEMINAL:

- (A) derivative
 - (B) substantiated
 - (C) reductive
 - (D) ambiguous
 - (E) extremist
-