PART I VOCABULARY 30%

Choose the word(s) that is closest in meaning to the word(s) **underlined** in the text.

Reading 1

Paleontological signal processing had its roots in one of the oldest and most common sense geological laws, Steno's law of superposition. Named after the seventeenth-century Danish geologist and anatomist Nicolaus Steno (the latinized form of Niels Steensen), the law states that the sedimentary record builds from the bottom up. As a result, within an undisturbed sequence of sediments the older layers are on the bottom and the younger layers are on the top.

In some places the sedimentary rocks preserve detailed (1) **temporal** signals with near-textbook (2) **fidelity**. In some tidal-flat deposits, for instance, couplets of sand and mud layers mark the daily ebb and flow of the ancient tides. The (3) **laminations** may even vary in thickness in regular cycles, corresponding to spring and neap tides. In the early 1980s J.R.L. Allen of the University of Reading, England, counted tidal cycles in the Lower Cretaceous strata of southeastern England and determined that, 112 million years ago, the lunar month was two days longer than it is today.

Such detailed windows into the past are relatively rare. More commonly, waves, currents, or bottom-dwelling animals (4) **churn up** the sediments, disrupting the chronological ordering of the fossils-to-be. That kind of mixing, which paleontologists call time averaging, can take place across a wide range of time scales. Particularly (5) **susceptible** are microfossils, remains of (6) **minute** organisms such as foraminifera, radiolaria, and coccolithophores. The result, in the language of signal processing, is a low-pass filter, one that screens out high frequency signals (in this case, short term trends) but lets low-frequency signals pass through. (Low-pass filters can screen out the grain in a photograph or reduce the tape hiss in a cassette player.) To complicate things still further, false signals can creep in whenever older deposits (7) **erode**, releasing the older fossil shells or bones into much younger sedimentary layers.

The first serious proposal for (8) **unscrambling the sedimentary omelette** came in 1940, in a paper by the Soviet paleontologist Ivan A. Efremov. Paleontologists, Efremov said, were too inclined to take the fossil record (9) **at face value**: instead, he advised, they ought to pay more attention to the process whereby living organisms become, or fail to become, fossils. A better understanding of burial and fossilization might enable paleontologists to "back calculate" and reclaim lost data from the fossil record. He proposed a new science, taphonomy (from the Greek *taphos*, meaning burial, and *nomos*, meaning laws), which he defined as the systematic study of "the transition (in all its details) of animal remains from the biosphere to the lithosphere."

Efremov's manifesto attracted little immediate notice outside the Soviet Union. Most paleontologists in the West were concerned less with data processing than with data gathering: mapping the distribution of known species, discovering and describing new ones, classifying specimens, establishing (10) **linkages**, piecing together family trees. The idea of formulating general laws about fossils seems hopelessly (11) **quixotic**. By the 1960s, however, attention had turned to more quantitative, theoretical questions. A number of paleontologists, (12) **taking a leaf from Efremov's book**, set out to investigate how fossilization takes place, how well various kinds of organisms are preserved in various environments, and how best to deal with the (13) **idiosyncracies** of fossil data. Since then some have conducted research, occasionally (14) **gruesome**, into the decay of animal tissues. Others have developed statistical techniques for correcting sampling bias. And a few have started (15) **toying with** signal processing.

1. (a) not permanent
    (b) speed
    (c) time
    (d) rate

2. (a) accuracy '
    (b) honor
    (c) loyalty
    (d) trust

3. (a) colors
    (b) lights
    (c) paints
    (d) layers

4. (a) stir up
    (b) turn up
    (c) call up
    (d) grind up

5. (a) sensitive
    (b) vulnerable
    (c) resistant
    (d) active

6. (a) having little importance
    (b) having a short life
    (c) having a small size
    (d) having three remaining forms

7. (a) gnaw
    (b) eat up
    (c) wash up
    (d) wash away

8. (a) making sense of a complicated situation
    (b) separating out the remains of fossilized eggs
    (c) arranging the fossils
    (d) re-arranging the buried remains

9. (a) at the rock's surface
    (b) by surface appearances
    (c) nearest the surface
    (d) of more valuable rocks

10. (a) connections
    (b) boundaries
    (c) paths
    (d) segments

11. (a) unreliable
    (b) unpredictable
    (c) imaginary
    (d) idealistic

12. (a) damaging his book
    (b) destroying his theory
    (c) following his recommendations
    (d) piecing together family trees from the leaves of his book

13. (a) eccentricities
    (b) foolhardiness
    (c) peculiarities
    (d) time discrepancies

14. (a) macabre
    (b) rigorous
    (c) unsuccessful
    (d) awesome

15. (a) making jokes about
    (b) experimenting with
    (c) making connections with
    (d) combining with

PART II READING COMPREHENSION 40%

Choose the most appropriate answer according to the readings for the following questions.

Questions 16 - 20 are from Reading 1 above.

16. By Steno's law of superposition, if you found A below B in an undisturbed sequence of sediments, which would be older?
    - (a) A would be older than B
    - (b) B would be older than A
    - (c) they would both be the same age
    - (d) Steno's law does not address this question

17. What kinds of activities can disrupt Steno's law?
    - (a) erosion
    - (b) the movements of minute organisms
    - (c) the screening of grains
    - (d) all of the above

18. What is the object of the study of taphonomy?
    - (a) how things that were once alive turn into rock
    - (b) how animals become fossils
    - (c) how organisms behave after they are buried
    - (d) all of the above

19. What was the reaction to Efremov's ideas at first?
    - (a) they were immediately accepted
    - (b) they were immediately rejected
    - (c) they were largely ignored in the West
    - (d) they became the basis of many research questions

20. This reading is an excerpt taken from the beginning of a longer article. From this excerpt we can conclude that the topic of the whole article is
    - (a) Steno's law
    - (b) signal processing
    - (c) paleontology
    - (d) sedimentation

Reading 2

Oliver Cromwell's campaign in Ireland in 1649 created the first wave of Irish immigration. Cromwell passed through the land, it was said, like lightening and shipped twelve thousand prisoners to the Caribbean, where they left place and family names scattered across the islands in addition to their accent. The scattering Irish also took their accents and language to the foggy shores of Newfoundland; they had first gone there as seasonal cod fishermen, but by the eighteenth century they were settled along the south coast in communities that are still reminiscent of their homeland.

In Ireland, another legacy of the Cromwellian settlement was the emergence of an Anglo-Irish ruling class known as the Ascendancy. At the beginning of the seventeenth century, they would have had to learn Irish, but after the Act of Union, when the center of influence and power was shifted to London, there was really no necessity to speak Irish. The Ascendancy performed a form of linguistic imperialism in Ireland, largely because to be Protestant, to be able to speak English, to be culturally and linguistically linked with England meant better status, better prospects of promotion. Adherence to the Protestant cause did a great deal to damage the Gaelicness, the Irishness of Ireland.

During the eighteenth century English continued to advance. In 1800 perhaps more than half the population spoke Irish, but a hundred years later more than eighty-five percent spoke only English. The cause of this linguistic upheaval was the potato famine. The great famine of the 1840s almost destroyed the Irish and their language. Perhaps a million died, many of them Gaelic speaking. Millions more fled abroad to Britain and the United States, where they were forced to speak English. But perhaps the most poignant of all, the Irish rejected their Gaelic as the cause of all their troubles and embraced English for the chance of a better future.

21. The main theme of this reading is
    (a) the Cromwell legacy
    (b) Irish immigration
    (c) the Ascendancy
    (d) the language situation in Ireland

22. Which of the following does not apply to members of the Ascendancy?
    (a) They spoke English to get better jobs
    (b) They had cultural ties to England
    (c) They were damaged by the Protestant cause
    (d) They rejected Gaelicness

23. From the reading we can conclude that Gaelic is
    (a) the name of a place
    (b) the Irish language
    (c) the English language
    (d) we can't tell from the reading

24. How did the potato famine contribute to the decline of Gaelic?
    (a) the famine forced many Gaelic speakers to emigrate
    (b) a lot of Gaelic speakers died as a result of the famine
    (c) many Irish people blamed their bad luck on their language
    (d) all of the above

25. Which of the following did not contribute to the decline of Gaelic in Ireland?
    (a) Irish emigration
    (b) adherence to their Gaelicness
    (c) the Ascendancy
    (d) the prestige of English

Reading 3

Scientists who study human thought and behavior have discerned many stereotyped, structured stages through which all of us move at various times. Some of the sequences are obvious, their logic a quick study. It is no surprise that infants learn to crawl before they take their first tentative steps, and only later learn to run. Other sequences are more subtle. Freudians claim that in normal development the child undergoes the invariant transition from a so-called oral stage to an anal stage to a genital stage, and they attribute various aspects of psychological dysfunction in the adult to an earlier failure to move successfully from one stage to the next.

Similarly, the Swiss psychologist Jean Piaget mapped stages of cognitive development. For example, he noted, there is a stage at which children begin to grasp the concept of object permanence. Before that developmental transition, a toy does not exist once it is removed from the child's sight. Afterward, the toy exists--and the child will look for it--even when it is no longer visible. Only at a reliably later stage do children begin to grasp concepts such as the conservation of volume--that two pitchers of different shapes can hold the same quantity of liquid. The same developmental patterns occur across numerous cultures, and so the sequence seems to describe the universal way that human beings learn to comprehend a cognitively complex world.

The American psychologist Lawrence Kohlberg mapped the stereotyped stages people undergo in developing morally. At one early stage of life, moral decisions are based on rules and on the motivation to avoid punishment: actions considered for their effects on oneself. Only at a later stage are decisions made on the basis of a respect for the community: actions considered for their effects on others. Later still, and far more rarely, some people develop a morality driven by a set of their own internalized standards, derived from a sense of what is right and what is wrong for all possible communities. The pattern is progressive: people who now act out of conscience invariably, at some earlier stage of life, believed that you don't do bad things because you might get caught.

26. The most likely topic of this reading is
    (a) universals of human development
    (b) psychological theories
    (c) theories of cognitive development
    (d) theories of moral development

27. According to followers of Freud, if a child does not progress successfully through certain stages, the result is
    (a) a functioning adult
    (b) an adult who fails early
    (c) a maladjusted adult
    (d) all of the above

28. What is the concept of object permanence?
    (a) an object exists only when it can be seen
    (b) an object always exists
    (c) objects never perceived cannot therefore exist
    (d) the existence of an object is independent of our visual contact with it

29. According to Kohlberg, a person at a certain stage
   (a) has definitely passed through a previous stage at some earlier time
   (b) can never advance beyond that stage
   (c) rarely develops beyond that stage
   (d) can regress to an earlier stage

30. According to the reading
   (a) the stages of human development differ across cultures
   (b) the stages of human development are remarkably similar across cultures
   (c) all humans move through the same stages at the same speed
   (d) all humans achieve the same stages of development

Reading 4

Many pioneers and frontiersmen of the computer culture were libertarians when it came to information, regarding at as a commodity to be shared and passed along freely, with little concern about its origin. Naturally, techniques for controlling the flow of information--passwords, user ID's, software protection schemes, computer security systems--were simply affronts to the libertarian mentality, and they themselves often became the focal points of the hackers' efforts. But in general, nothing malicious was intended, beyond perhaps demonstrating that it was uncivil--not to mention useless--to try to control the information flowing through computers.

Until recently, hackers were like supernumeraries in the theater, creeping through the shadows of cyberspace, doing at most a little mischief, but largely being ignored. People running computer systems had enough trouble merely keeping the systems up. If they had a night visitor who did no damage. it was hardly worth a week of effort to set traps into which the intruder might never stumble. In fact, setting the traps could well cause more damage to the system than would a hacker's visit.

Then, in 1988, a Cornell graduate student in computer science, Robert T. Morris Jr., built the network equivalent of a doomsday weapon, an invention that irrevocably changed the hacker community, its public image. and the psyches of computer users forever. Morris wrote a program that acted like a clumsy hacker. It knew about five ways to break into a rather large class of computers, and if it broke into one computer, it would replicate itself on the new computer and use that one to break into others. The paths it took from computer to computer were along the Internet.

Morris's program invaded hundreds of computers in a day, prompting universities and defense installations to cut their Internet connections and catapulting hackers onto the six o'clock news. The FBI was called in. Police agencies raided the system operators of computer bulletin boards and confiscated their equipment--often for dubious reasons. Responding to a vague and formerly low level danger had suddenly become a witch hunt. Overnight the hacker became persona non grata.

The Morris incident reinforced the public's fear of computing by connecting it with a fear of hacking. It became taboo to play on other people's computers and to check out files and resources that were created, in fact, expressly for visiting users. Is not access to other people's computers hacking? Does the FBI not arrest hackers and confiscate their computers? Most

people forgot--if they ever knew--that hacking is pretty harmless as long as the hacker avoids the temptation to cross the line and become a "malicious meddler".

31. How does the writer describe the first computer hackers?
    (a) as people who didn't like secrets
    (b) as people who believed in free access to information
    (c) as pioneers
    (d) all of the above

32. Before 1988, how did people treat hackers?
    (a) they damaged their systems
    (b) they set traps for them
    (c) they awaited their visits
    (d) they ignored them

33. After 1988, how did people regard hackers?
    (a) as students
    (b) as criminals
    (c) as witches
    (d) as TV stars

34. Why did the public become afraid of hackers?
    (a) they were afraid of computers
    (b) they were afraid of being arrested
    (c) they were afraid of having their computers taken away
    (d) all of the above

35. According to the reading, what is a "malicious meddler"?
    (a) someone who plays on someone else's computer
    (b) someone who gets a file from someone else's computer
    (c) someone who causes damage by entering another person's computer
    (d) someone who enters another person's computer program via Internet

PART III COMPOSITION 30%

Whenever a new technology has been introduced (for example, the train, the telephone, the computer), some people have resisted it. In at least 150 words, tell why you think some people are afraid of new technologies.