Questions 1-10

Potash (the old name for potassium carbonate) is one of the two alkalis (the other being soda, sodium carbonate) that were used from remote antiquity in the making of glass, and from the early Middle Ages in the making of soap: the former being the product of heating a mixture of alkali and sand, the latter a product of alkali and *(5)* vegetable oil. Their importance in the communities of colonial North America need hardly be stressed.

Potash and soda are not interchangeable for all purposes, but for glass-or soap making either would do. Soda was obtained largely from the ashes of certain Mediterranean Sea plants, potash from those of inland vegetation. Hence potash was *(10)* more familiar to the early European settlers of the North American continent. The settlement at Jamestown in Virginia was in many ways a microcosm of the economy of colonial North America, and potash was one of its first concerns. It was required for the glassworks, the first factory in the British colonies, and was produced in sufficient quantity to permit the inclusion of potash in the first cargo shipped out of *(15)* Jamestown. The second ship to arrive in the settlement from England included among its passenger's experts in potash making.

The method of making potash was simple enough. Logs was piled up and burned in the open, and the ashes collected. The ashes were placed in a barrel with holes in the bottom, and water was poured over them. The solution draining from the barrel was *(20)* boiled down in iron kettles. The resulting mass was further heated to fuse the mass into what was called potash.

In North America, potash making quickly became an adjunct to the clearing of land for agriculture, for it was estimated that as much as half the cost of clearing land could be recovered by the sale of potash. Some potash was exported from Maine and New *(25)* Hampshire in the seventeenth century, but the market turned out to be mainly domestic, consisting mostly of shipments from the northern to the southern colonies. For despite the beginning of the trade at Jamestown and such encouragements as a series of acts "to encourage the making of potash," beginning in 1707 in South Carolina, the softwoods in the South proved to be poor sources of the substance.

1. What aspect of potash does the passage mainly discuss?
(A) How it was made
(B) Its value as a product for export
(C) How it differs from other alkalis
(D) Its importance in colonial North America

2. All of the following statements are true of both potash and soda EXPECT:
(A) They are alkalis.
(B) They are made from sea plants.
(C) They are used in making soap.
(D) They are used in making glass.

3. They phrase "the latter" in line 4 refers to
(A) alkali (B) glass (C) sand (D) soap

4. The word "stressed" in line 6 is closest in meaning to
(A) defined (B) emphasized (C) adjusted (D) mentioned

5. The word "interchangeable" in line 7 is closest in meaning to
(A) convenient (B) identifiable (C) equivalent (D) advantageous

6. It can be inferred from the passage that potash was more common than soda in colonial North America because

(A) the materials needed for making soda were not readily available
(B) making potash required less time than making soda
(C) potash was better than soda for making glass and soap
(D) the colonial glassworks found soda more difficult to use

7. According to paragraph 4, all of the following were needed for making potash EXCEPT
(A) wood (B) fire (C) sand (D) water

8. The word "adjunct" in line 22 is closest in meaning to
(A) addition (B) answer (C) problem (D) possibility

9. According to the passage, a major benefit of making potash was that
(A) it could be exported to Europe in exchange for other goods
(B) it helped finance the creation of farms
(C) it could be made with a variety of materials
(D) stimulated the development of new ways of glassmaking

10. According to paragraph 5, the softwoods in the South posed which of the following problems for southern settles?
(A) The softwoods were not very plentiful.
(B) The softwoods could not be used to build houses.
(C) The softwoods were not very marketable.
(D) The softwoods were not very useful for making potash.

Questions 11-19

The response of most animals when suddenly faced with a predator is to flee. Natural selection has acted in a variety of ways in different species to enhance the efficacy of the behaviors, known as "flight behaviors" or escape behaviors that are used by prey in Line fleeing predators: Perhaps the most direct adaptation is enhanced flight speed and agility. 5 Adaptations for speed. However, are likely to require sacrifices biter attributes, so we might expect only some species to adopt a simple fast flight strategy. Another way of enhancing the effectiveness of flight is to move in an erratic and unpredictable way. Many species, like ptarmigans, snipes, and various antelopes and gazelles, flee from predators in a characteristic zigzag fashion. Rapid unexpected changes in flight direction make it 10 difficult for a predator to track prey.

In some species, like the European hare, erratic zigzag flight might be more effective in the presence of predators that are faster than they are and straight flight more effective against predators that are slower. One observation that supports this suggestion is the recorded tendency for slow flying black-headed gulls, which are normally able to escape predators by means of direct flight, to show frequent 15 changes in flight direction when they spot a peregrine falcon (peregrines are adept at capturing flying birds). A quite different way of enhancing escape by flight is to USB so-called "flash" behavior. Here, the alarmed prey flees for a short distance and then "freezes."

Some predators are unexcited by immobile prey, and a startling flash of activity followed 20 by immobility may confuse them. "Flash" behavior is used in particular by frogs and orthopteran insects, which make conspicuous jumps and then sit immobile. In some species,

"flash" behavior is enhanced by the display of bright body markings. Good examples of insects with colorful markings are the red and yellow underwing moths. At rest, both species are a cryptic brown color. When they fly, however, brightly colored 25 hind wings are exposed, which render the moths highly conspicuous. Similarly, some frogs and lizards have brightly colored patches or frills that may serve a 'flash" function when they move quickly, some species even appear to possess "flash" sounds. The loud buzzing and clicking noises made by some grasshoppers when they jump may serve to emphasize the movement.

11. The word “enhance” in line 2 is closest in meaning to

(A) encourage

(B) resist

(C) increase

(D) reveal

12. The description of the prey’s movement as “zigzag” in line 9 suggests that the movement is

(A) reliable

(B) fast

(C) constant

(D) unpredictable

13. It can be inferred from the passage that the European hare

(A) is faster than mast of its predators

(B) is capable of two kinds of flight

(C) is more likely to escape using straight flight

(D) is preyed upon by gulls and falcons

14. The behavior of black-headed gulls is most comparable to that of

(A) gazelles

(B) European hares

(C) Peregrine falcons

(D) frogs

15. It can be inferred that black-headed gulls change direction when they spot a peregrine falcon for which of the following reasons?

(A) The falcons are faster than the gulls.

(B) The gulls want to capture the falcons.

(C) The falcons are unpredictable.

(D) The gulls depend on the falcons for protection.

16. The word “alarmed” in line 15 is closest in meaning to

(A) moving

(B) selected

(C) frightened

(D) exhausted

17. All of the following are mentioned as characteristics of “flash” behavior EXCEPT

(A) brief conspicuous activity

(B) immobility

(C) bright body markings

(D) aggressive fighting

18. The phrase “in particular” in line 17 is closest in meaning to

(A) especially

(B) with difficulty

(C)expertly

(D) frequently

19. The hind wings of red and yellow underwing moths function in a way that is most similar to

(A) the hind wings of peregrine falcons

(B) the zigzag flight of European hares

(C) the colored patched on frogs

(D) the clicking of grasshoppers

Questions 20-30

Some animal behaviorists argue that certain animals can remember past events, anticipate future ones, make plans and choices, and coordinate activities within a group. These scientists, however, are cautious about the extent to which animals can be credited with conscious processing.
(5) Explanations of animal behavior that leave out any sort of consciousness at all and ascribe actions entirely to instinct leave many questions unanswered. One example of such unexplained behavior: Honeybees communicate the sources of nectar to one another by doing a dance in a figure-eight pattern. The orientation of the dance conveys the position of the food relative to the sun's position in the sky, (10) and the speed of the dance tells how far the food source is from the hive. Most researchers assume that the ability to perform and encode the dance is innate and shows no special intelligence. But in one study, when experimenters kept changing the site of the food source, each time moving the food 25 percent farther from the previous site, foraging honeybees began to anticipate where the food source would (15) appear next. When the researchers arrived at the new location, they would find the bees circling the spot, waiting for their food. No one has yet explained how bees, whose brains weigh four ten-thousandths of an ounce, could have inferred the location of the new site.

Other behaviors that may indicate some cognition include tool use. Many (20) animals, like the otter who uses a stone to crack mussel shells, are capable of using objects in the natural environment as rudimentary tools. One researcher has found that mother chimpanzees occasionally show their young how to use tools to open hard nuts. In one study, chimpanzees compared two pairs of food wells containing chocolate chips. One pair might contain, say, five chips and three chips, the other (25) our chips and three chips. Allowed to choose which pair they wanted, the chimpanzees almost always chose the one with the higher total, showing some sort of summing ability. Other chimpanzees have learned to use numerals to label quantities of items and do simple sums.

20. What does the passage mainly discuss?
(A) The role of instinct in animal behavior
(B) Observations that suggest consciousness in animal behavior
(C) The use of food in studies of animal behavior
(D) Differences between the behavior of animals in their natural environments and in laboratory experiments.

21. Which of the following is NOT discussed as an ability animals are thought to have?
(A) Selecting among choices
(B) Anticipating events to come
(C) Remembering past experiences
(D) Communicating emotions

22. What is the purpose of the honeybee dance?
(A) To determine the quantity of food at a site
(B) To communicate the location of food
(C) To increase the speed of travel to food sources

(D) To identify the type of nectar that is available

23. The word "yet" in line 16 is closest in meaning to
(A) however (B) since (C) generally (D) so far

24. What did researchers discover in the study of honeybees discussed in paragraph 2?
(A) Bees are able to travel at greater speeds than scientists thought.
(B) The bees could travel 25% farther than scientists expected.
(C) The bees were able to determine in advance where scientists would place their food.
(D) Changing the location of food caused bees to decrease their dance activity.

25. It can be inferred from the passage that brain size is assumed to
(A) be an indicator of cognitive ability (B) vary among individuals within a species
(C) be related to food consumption (D) correspond to levels of activity

26. Why are otters and mussel shells included in the discussion in paragraph 3?
(A) To provide an example of tool use among animals
(B) To prove that certain species demonstrate greater ability in tool use than other species

27. The word "rudimentary" in line 21 is closest in meaning to
(A) superior (B) original (C) basic (D) technical

28. It can be inferred from the statement about mother chimpanzees and their young (lines 21-23) that young chimpanzees have difficulty
(A) communicating with their mothers (B) adding quantities
(C) making choices (D) opening hard nuts

29. The phrase "the one" in line 26 refers to the
(A) study (B) pair (C) chimpanzee (D) ability

30. Scientists concluded from the experiment with chimpanzees and chocolate chips that chimpanzees
(A) lack abilities that other primates have
(B) prefer to work in pairs or groups
(C) exhibit behavior that indicates certain mathematical abilities
(D) have difficulty selecting when given choices

Questions 31-40

According to the controversial sunspot theory, great storms or eruptions on the surface of the sun hurl streams of solar particles into space and eventually into the atmosphere of our planet, causing shifts in the weather on the Earth and interference with radio and television communications.

A typical sunspot consists of a dark central umbra, a word derived from the Latin word for shadow, which is surrounded by a lighter penumbra of light and dark threads extending out from the center like the spokes of a wheel. Actually, the sunspots are miler than the rest of the photosphere, which may account for their apparently darker color. Typically, the temperature in a sunspot umbra is about 4000 K, whereas the temperature in a penumbra registers 5500 K, and the granules outside the spot are 6000 K.

Sunspots range in size from tiny granules to complex structures with areas stretching for billions of square miles. About 5 percent of all sunspots are large enough so that they can be seen from Earth without instruments; consequently, observations of sunspots have been recorded for thousands of years.

Sunspots have been observed in arrangements of one to more than one hundred spots, but they tend to occur in pairs. There is also a marked tendency for the two spots of a pair to have opposite magnetic polarities. Furthermore, the strength of the magnetic field associated with any given sunspot is closely related to the spot's size. Sunspots have also been observed to occur in cycles, over a period of eleven years. At the beginning of a cycle, the storms occur between 20 and 40 degrees north and south of the equator on the sun. As the cycle continues, some of the storms move closer to the equator.

As the cycle diminishes, the number of sunspots decreases to a minimum and they cluster between 5 and 15 degrees north and south latitude. Although there is no theory that completely explains the nature and function of sunspots, several models show scientists' attempts to relate the phenomenon to magnetic field lines along the lines of longitude from the north and south poles of the sun.

31. What is the author's main purpose in the passage?
(A) To describe the nature of sunspots
(B) To propose a theory to explain sunspots
(C) To compare the umbra and the penumbra in sunspots
(D) To argue for the existence of magnetic fields in sunspots

32. The word controversial in paragraph 1 is closest in meaning to
(A) widely accepted
(B) open to debate
(C) just introduced
(D) very complicated

33. The word particles in paragraph 1 refers to
(A) gas explosions in the atmosphere
(B) light rays from the sun
(C) liquid streams on the sun
(D) small pieces of matter from the sun

34. Solar particles are hurled into space by
(A) undetermined causes
(B) disturbances of wind
(C) small rivers on the surface of the sun
(D) changes in the Earth's atmosphere

35. How can we describe matter from the sun that enters the Earth's atmosphere?
(A) Very small
(B) Very hot
(C) Very bright
(D)Very hard

36. The word They in paragraph 3 refers to
(A) structures
(B) spots (C)
miles
(D)granules

37. How are sunspots explained?
(A) Sunspots appear to be related to magnetic fields on the Earth.
(B) Sunspots may be related to magnetic fields that follow longitudinal lines on the sun.
(C) Sunspots are explained by storms that occur on the Earth.
(D) Sunspots have no theory or model to explain them.

38. The sunspot theory is
(A) not considered very important
(B) widely accepted
(C) subject to disagreement
(D)relatively new

39. The word consequently in paragraph 3
could best be replaced by
(A)as a result
(B) nevertheless (C)
without doubt (D) in
this way

40. In which configuration do sunspots usually occur?
(A) In one spot of varying size
(B) In a configuration of two spots
(C) In arrangements of one hundred or more spots
(D) In groups of several thousand spots