

## Questions 1-11

The preservation of embryos and juveniles is a rare occurrence in the fossil record. The tiny, delicate skeletons are usually scattered by scavengers or destroyed by weathering before they can be fossilized. Ichthyosaurs had a higher chance of being preserved than did terrestrial creatures because, as marine animals, they tended to live in environments less subject to erosion. Still, their fossilization required a suite of factors: a slow rate of decay of soft tissues, little scavenging by other animals, a lack of swift currents and waves to jumble and carry away small bones, and fairly rapid burial. Given these factors, some areas have become a treasury of well-preserved ichthyosaur fossils.

The deposits at Holzmaden, Germany, present an interesting case for analysis. The ichthyosaur remains are found in black, bituminous marine shales deposited about 190 million years ago. Over the years, thousands of specimens of marine reptiles, fish, and invertebrates have been recovered from these rocks. The quality of preservation is outstanding, but what is even more impressive is the number of ichthyosaur fossils containing preserved embryos. Ichthyosaurs with embryos have been reported from 6 different levels of the shale in a small area around Holzmaden, suggesting that a specific site was used by large numbers of ichthyosaurs repeatedly over time. The embryos are quite advanced in their physical development; their paddles, for example, are already well formed. One specimen is even preserved in the birth canal. In addition, the shale contains the remains of many newborns that are between 20 and 30 inches long.

Why are there so many pregnant females and young at Holzmaden when they are so rare elsewhere? The quality of preservation is almost unmatched and quarry operations have been carried out carefully with an awareness of the value of the fossils. But these factors do not account for the interesting question of how there came to be such a concentration of pregnant ichthyosaurs in a particular place very close to their time of giving birth.

1. The passage supports which of the following conclusions?  
(A) Some species of ichthyosaurs decayed more rapidly than other species.  
(B) Ichthyosaur newborns are smaller than other new born inuring reptiles.  
(C) Ichthyosaurs were more advanced than terrestrial creatures.  
(D) Ichthyosaurs may have gathered at Holzmaden lo give birth.
2. The word "they" in line 3 refers to  
(A) skeletons  
(B) scavengers  
(C) creatures  
(D) environments
3. All of the following are mentioned as factors that encourage fossilization EXCEPT the  
(A) speed of burning  
(B) conditions of the water  
(C) rate at which soft tissues decay  
(D) cause of death of the animal
4. Which of the following is true of the fossil deposits discussed in the passage ?  
(A) They include examples of newly discovered species.

- (B) They contain large numbers of well-preserved specimens.
- (C) They are older than fossils found in other places.
- (D) They have been analyzed more carefully than other fossils.

5. The word "outstanding" in line 15 is closest in meaning to

- (A) extensive
- (B) surprising
- (C) vertical
- (D) excellent

6. The word "site" in line 19 is closest in meaning to

- (A) example
- (B) location
- (C) development
- (D) characteristic

7. Why does the author mention the specimen preserved in the birth canal (line 21-22)?

- (A) To illustrate that the embryo fossils are quite advanced in their development
- (B) To explain why the fossils are well preserved
- (C) To indicate how the ichthyosaurs died
- (D) To prove that ichthyosaurs are marine animals

8. The word "they" in line 25 refers to

- (A) pregnant females and young
- (B) quarry operations
- (C) the value of the fossils
- (D) these factors

9. The phrase "account for" in line 27 is closest in meaning to

- (A) record
- (B) describe
- (C) equal
- (D) explain

10. Which of the following best expresses the relationship between the first and second paragraphs?

- (A) The first paragraph describes a place which the second paragraph describes a field of study.
- (B) The first paragraph defines the terms that are used in the second paragraph
- (C) The second paragraph describes a specific instance of the general topic discussed in the first Paragraph
- (D) The second paragraph presents information that contrasts with the information given in the first paragraph

11. Where in the passage does the author mention the variety of fossils found at holzmaden?

- (A) Line 1
- (B) Lines 3-5
- (C) Lines 13-15
- (D) Lines 21-23

## Questions 12-21

Mountaineers have noted that as they climb, for example, up to the 12,633-foot Humphreys Peak in the San Francisco Peaks in Arizona, plant life changes **radically**. Starting among the cacti of the Sonoran Desert, one climbs into a pine forest at 7,000 feet and a treeless alpine tundra at the summit. It may seem that plants at a given altitude are associated in what can be called “communities” – groupings of interacting species. The idea is that over time, plants that require particular climate and soil conditions come to live in the same places, and hence are frequently to be found together. Scientists who study the history of plant life are known as paleo botanists, or Paleo bots for short. They build up a picture of how groups of plants have responded to climate changes and how ecosystems develop. But are these associations, **which** are real in the present, permanent?

A great natural experiment took place on this planet between 25,000 and 10,000 years ago, when small changes in the earth’s orbit and **axis** of rotation caused great sheets of ice to spread from the poles. These glaciers covered much of North America and Europe to depths of up to two miles, and then, as the climate warmed, they retreated. During this retreat, they left behind newly uncovered land for living things to colonize, and as those living things moved in they laid down a

record we can read now. As the ice retreated and plants started to grow near a lake, they would release pollen. Some would fall into the lake, sink to the bottom, and be incorporated into the sediment. By drilling into the lake bottom it is possible to read the record of **successive** plant life around the lake. The fossil record seems clear; there is little or no evidence that entire groups of plants moved north together. Things that lived together in the past don’t live together now, and things that live together now didn’t live together in the past. Each individual organism moved at its own pace. The fossil record seems to be telling us that we should be thinking about preserving species by giving them room to maneuver – to respond to environmental changes.

12. What is the passage mainly about?

- A. The effects of the ice age on plants
- B. Plant migration after the ice age
- C. The need to develop a new approach to environmental issues
- D. Communities of plants live at different altitudes

13. The word “**radically**” in line 2 is closest in meaning to

- A. variably
- B. demonstrably
- C. quickly
- D. dramatically

14. The author mentions “**cacti**” in line 3 and a “treeless alpine tundra” in line 4 to illustrate

- A. changes in climate
- B. the effects of the ice age
- C. communities of plants
- D. plant migration

15. The word “**which**” in line 9 refers to

- A. the responses of plants to climate changes
- B. the current theories of ecosystems
- C. the developments of ecosystems
- D. plant life changes

16. The word “**axis**” in line 12 is closest in meaning to

A. center

B. method

C change

D. slowdown

17. The word “**successive**” in line 18 is closest in meaning to

A. extinct

**B consecutive**

C. accumulative

D following

18. The passage states that by drilling into the lake bottom it is possible to find successive fossils of

A. sediment

B. ice

**C. plant life**

D. pollen

19. Which of the following can be inferred from the passage

A. that the migratory patterns of plants are dependent upon changes in climate

**B. that modern conservation methods should consider the migratory patterns of plants**

C. that current associations of plants are similar to those in the past

D. that another ice age is likely to occur at some time

20. According to the passage, the movement of individual species of plants

A. occurs in groups

B. often depends upon the formation of lakes

**C. does not occur in groups**

D. depends upon climate and soil conditions

21. All of the following are true except

A. The ice age occurred when small changes affected the movement of the earth

B. Fossil records seem to indicate that plants will be preserved if they have sufficient room to move

C. Fossil records clearly show that entire groups of plants are unlikely to have moved together

**D. In the ice age glaciers covered the world to depths of up to two miles**

## Questions 22-30

With the onset of the Industrial Revolution, knowing the age of rocks became a necessary prerequisite to finding industrial minerals, such as coal, iron, and the other materials that fueled and sustained the great Western industrialization of the eighteenth and nineteenth centuries. It was in the mining regions where engineers, who needed a better system for organizing the various types of rock scattered across Earth's surface, first grappled with scientific approaches to understanding the age of various rocks—and the age of Earth. They realized that if the various rock units could be dated by their relative ages, correlations among even widely separated rocks could be established and from this, some order recognized.

The pioneering European geologists first believed that identifying a rock's type would give them a strong clue to the age of the rock formation and that one of the most powerful clues came from the hardness of a given rock. Specific rock types were thus assumed to have formed at characteristically different times, the softest rocks having formed the most recently. This crude type of dating was first used to understand the way mountains were formed. In the mid-1700's it was thought that there were three distinct types of mountains in Europe, each formed by a different type of rock and each created at a different time. According to this theory, the oldest were the Alps, which had interior cores composed of very hard, crystalline rocks (such as granite, schist, or basalt). These mountains were called Primitive. Sitting on the flanks of the Primitive mountains were younger, smaller, Secondary mountains composed of layered sedimentary rocks such as limestone. They were often rich with fossils and intermediate in

hardness. The youngest Tertiary mountains were composed of softer mudstones and sandstone. Rock type, hardness, and size thus established mountain type, and rock type also became a proxy for age. However, study soon exposed the fallacy of these early notions. It was discovered that some of the very high mountains were composed of the softest sediments and that even hard volcanic rock was sometimes found in very low mountains. By the early 1800's, it was understood that rock type was of no help in establishing age.

22. What does the passage mainly discuss?

- (A) An early attempt to find reliable rules for dating rocks and mountains
- (B) The search for different rock types to be used in industry
- (C) Changing views about what caused high mountain ranges to form
- (D) A controversy about rocks between mining engineers and geologists

23. The word "grappled" in line 5 is closest in meaning to

- (A) competed
- (B) struggled
- (C) agreed
- (D) searched

24. According to the passage, how could knowing the age of rocks benefit industry'?

- (A) It reduced the dependence of industry on coal.
- (B) It helped miners find new types of minerals.
- (C) It helped people in their search for industrial minerals.
- (D) It made it possible to mine rocks under Earth's surface.

25. According to the passage, mining engineers were the first to realize that

- (A) various types of rock were scattered across Earth's surface
- (B) rocks in different locations could be related by their age
- (C) there were wide differences in the appearance of different types of rocks
- (D) older rocks were better suited for industrial use

26. The word "They" in line 16 refers to

- (A) crystalline rocks
- (B) the flanks
- (C) the Primitive mountains
- (D) layered sedimentary rocks

27. Why does the author mention rock type, hardness, and size in lines 18?

- (A) To describe the development of European geology
- (B) To explain the differences between mudstone and sandstone
- (C) To introduce the new theories that were about to emerge in the 1800's
- (D) To summarize the characteristics thought to distinguish mountain types

28. According to the passage, pioneer geologists believed that to determine a rock's age, it was helpful to know

- (A) how deep under the surface the rock was located
- (B) how much power was needed to remove the rock
- (C) how rough the rock's texture was
- (D) how soft the rock was

29. According to the passage, early geologists believed which of the following about Primitive mountains?

(A) They had interior cores of sandstone and mudstone,

(B) They contained a large number of fossils.

(C) They had been formed during the same limited period in Earth's history.

(D) They were smaller than the Tertiary mountains.

30. The word "proxy" in line 19 is closest in meaning to

(A) substitute

(B) preparation

(C) product

(D) choice

### Questions 31-40

Although noise, commonly defined as unwanted sound, is a widely recognized form of pollution, it is very difficult to measure because the discomfort experienced by different individuals is highly subjective and, therefore, variable.

Exposure to lower levels of noise may be slightly irritating, whereas exposure to higher levels may actually cause hearing loss. Particularly in congested urban areas, the noise produced as a byproduct of our advancing technology causes physical and psychological harm but it also detracts from the quality of life for those exposed to it.

Unlike the eyes, which can be covered by the eyelids against strong light, the ear has no lid, and is, therefore, always open and vulnerable; noise penetrates without protection. Noise causes effects that the hearer cannot control and to which the body never becomes accustomed. Loud noises instinctively signal danger to any organism with a hearing mechanism, including human beings. In response, heartbeat and respiration accelerate, blood vessels constrict, the skin pales, and muscles tense. In fact, there is a general increase in functioning brought about by the flow of adrenaline released in response to fear, and some of these responses persist even longer than the noise, occasionally as long as thirty minutes after the sound has ceased.

Because noise is unavoidable in a complex, industrial society, we are constantly responding in the same ways that we would respond to danger. Recently, researchers have concluded that noise and our response may be much more than an annoyance. It may be a serious threat to physical and psychological health and well-being, causing damage not only to the ear and brain but also to the heart and stomach. We have long known that hearing loss is America's number one nonfatal health problem, but now we are learning that some of us with heart disease and ulcers may be victims of noise as well. Fetuses exposed to noise tend to be overactive, they cry easily, and they are more sensitive to gastrointestinal problems after birth. In addition, the psychological effect of noise is very important. Nervousness, irritability, tension, and anxiety increase, affecting the quality of rest during sleep, and the efficiency of activities during waking hours, as well as the way that we interact with one another.

31. Which of the following is the author's main point?

A. Noise may pose a serious threat to our physical and psychological health.

B. Loud noises signal danger.

C. Hearing loss is America's number one nonfatal health problem.

D. The ear is not like the eye.

32. According to the passage, what is noise?

- A. Unwanted sound
- B. A byproduct of technology
- C. Physical and psychological harm
- D. Congestion

33. Why is noise difficult to measure?

- A. It causes hearing loss.
- B. All people do not respond to it in the same way.
- C. It is unwanted.
- D. People become accustomed to it.

34. The word **congested** in paragraph 1 could best be replaced by

- A. hazardous
- B. polluted
- C. crowded
- D. rushed

35. According to the passage, people respond to loud noises in the same way that they respond to

- A. annoyance
- B. danger
- C. damage
- D. disease

36. The word **accelerate** in paragraph 1 could best be replaced by

- A. Decrease
- B. increase
- C. response
- D. occasionally

37. The phrase **as well** in paragraph 4 is closest in meaning to which of the following?

- A. after all
- B. also
- C. instead
- D. regardless

38. It can be inferred from this passage that the eye

- A. responds to fear
- B. enjoys greater protection than the ear
- C. increases functions
- D. is damaged by noise

39. With which of the following statements would the author most probably agree?

- A. Noise is not a serious problem today.
- B. Noise is America's number-one problem.
- C. Noise is an unavoidable problem in an industrial society.
- D. Noise is a complex problem