

Questions 1-11 are based on the following passage.

Survival in the Hostile Environment of NW Rota-1

[1] Sixty miles north of Guam and more than 1,700 feet under the ocean's surface is the summit of NW Rota-1, an undersea volcano discovered in 2003. [2] Surprisingly, the volcano appears to have been continuously active; it even grew 130 feet in height between 2006 and 2009. [3] Yet despite the hostile environment created by the constant volcanic activity, life is thriving there. [4] Special adaptations are the key to survival. [5] At that depth, water pressure suppresses the explosive force of the volcano's eruptions, allowing scientists to **1** watch and observe them up close via remotely operated vehicles. **2**

NW Rota-1 is far below the ocean's photic zone where sunlight drives photosynthesis; **3** nevertheless, bacteria supporting a unique food web have adapted to this perpetually dark environment. The bacteria have evolved to use hydrogen sulfide instead of sunlight for the energy that drives their metabolic processes, and hydrothermal venting is the source of the chemical soup necessary to support **4** him or her. Seawater seeping into fissures in the ocean floor is heated by underlying magma, and the heat drives chemical reactions that remove oxygen, sulfates, **5** and remove other chemicals from the water. Once the superheated water (up to 750°F) rises through vents in the ocean floor, additional reactions cause minerals and compounds to precipitate onto the seafloor, where bacteria feed on them.

1

- A) NO CHANGE
- B) watch
- C) observe to see
- D) visually watch

2

To make the paragraph most logical, sentence 5 should be placed

- A) where it is now.
- B) after sentence 1.
- C) after sentence 2.
- D) after sentence 3.

3

- A) NO CHANGE
- B) afterward,
- C) furthermore,
- D) similarly,

4

- A) NO CHANGE
- B) one.
- C) them.
- D) it.

5

- A) NO CHANGE
- B) it also removes
- C) also removing
- D) and

Loihi shrimp—originally thought to exist only around an undersea volcano near **6** Hawaii, survive by using tiny, shear-like claws to harvest rapidly growing bacterial filaments covering rocks near NW Rota-1's hydrothermal vents. The Loihi shrimp spend most of their time grazing on the bacteria and evading another, previously unknown, species of shrimp. Shrimp of that species also graze on bacterial filaments as juveniles, **7** resulting from their ability to cope with the noxious environment around the volcano. They feed on the Loihi shrimp and other organisms that are overcome by the toxic plumes of volcanic gas and ash.

During an underwater eruption, steam quickly **8** condenses. The steam leaves only carbon dioxide bubbles and droplets of molten sulfur. This means that the water near NW Rota-1 is more acidic than **9** that of stomach acid, presenting yet another challenge to life-forms living nearby. As the carbon dioxide level in Earth's atmosphere rises, the **10** worlds' ocean's absorb more carbon **11** dioxide. Organisms flourishing near the volcano may help biologists understand how life adjusts to very acidic conditions. In addition, NW Rota-1 is a natural laboratory where scientists can study conditions that may be similar to those that gave rise to life on Earth and perhaps even other worlds.

6

- A) NO CHANGE
- B) Hawaii;
- C) Hawaii—
- D) Hawaii

7

Which choice most effectively sets up the information in the next sentence?

- A) NO CHANGE
- B) but their adaptations are not yet fully understood by the scientific community.
- C) thriving in an unusual ecosystem that also includes crabs, limpets, and barnacles.
- D) but as adults, their claws are large enough for the shrimp to be predators.

8

Which choice most effectively combines the sentences at the underlined portion?

- A) condenses and leaves
- B) condenses, having to leave
- C) condenses, thereafter leaving
- D) condenses, and then, after this, it leaves

9

- A) NO CHANGE
- B) those of stomach
- C) the acid from stomach
- D) stomach

10

- A) NO CHANGE
- B) world's oceans'
- C) world's oceans
- D) worlds oceans

11

The writer is considering revising the underlined portion to the following.

dioxide, which increases their acidity.

Should the writer make this revision here?

- A) Yes, because it explains the relevance of this sentence to the point made in the paragraph.
- B) Yes, because it helps the reader understand why organisms near NW Rota-1 evolved the way they did.
- C) No, because it merely repeats information provided earlier in the passage without contributing to the paragraph's main idea.
- D) No, because it interrupts discussion of oceanic life-forms with an irrelevant detail.

Questions 12-22 are based on the following passage and supplementary material.

Free Public Transportation

City planners, concerned about vehicle traffic clogging their cities' roadways, are trying to find ways to get people out of their cars and onto buses and trains. One radical proposal some planners have considered is to make public transportation free to passengers. While fare-free policies do increase **12** ridership, but they have not been found to be an effective way to address traffic problems. Moreover, these policies may result in serious budget shortfalls.

Not surprisingly, **13** public transportation is used by more people when people do not have to pay a fare.

According to a report by the Center for Urban Transportation Research, public transit systems that abolish fares typically see a short-term increase in ridership of about 50 percent. However, this increase does not necessarily correlate with a decrease in car traffic. Evidence suggests that when buses and subways are free, people often take bus and train trips they would not have taken otherwise while still using their cars nearly as much as they did before. In 2013 Tallinn, Estonia, instituted fare-free rides for city residents (becoming the largest city in the world to do so), but car use in Tallinn has only slightly **14** declined; as a 2014 study by the KTH Royal Institute of Technology in Sweden found that car traffic in Tallinn was down less than 3 percent since **15** it was enacted.

Instituting a fare-free system **16** can also have a devastating effect on a city's transportation budget. All public transportation systems are subsidized by the government to some extent, but large systems gain a substantial portion of their operating revenue from fares. Since systems that go fare-free see increases in ridership, they often must operate more buses and trains and hire more drivers and other personnel at the same time that they are losing a key source of funding. Advocates of fare-free policies claim that the costs of these policies are largely offset by various **17** savings, however, a recent study comparing projected results of fare-free policies in different cities found this outlook to be **18** way too sunny. For example, in San Francisco, CA, fare-free

12

- A) NO CHANGE
- B) ridership, and while
- C) ridership,
- D) ridership;

13

Which choice is the most effective version of the underlined portion?

- A) NO CHANGE
- B) more people use public transportation if they do not have to pay a fare.
- C) if people do not have to pay a fare, more of those people use public transportation.
- D) using public transportation is done by more people when they do not have to pay a fare.

14

- A) NO CHANGE
- B) declined:
- C) declined,
- D) declined. As

15

- A) NO CHANGE
- B) that
- C) one
- D) the policy

16

Which choice best introduces the paragraph?

- A) NO CHANGE
- B) also requires planners to make careful considerations about changes in service.
- C) might also have a negative impact on the environment as more service is added.
- D) also has the drawback of increasing crowding on public transportation.

17

- A) NO CHANGE
- B) savings,
- C) savings, but
- D) savings; and

18

- A) NO CHANGE
- B) looking too much on the bright side.
- C) pretty upbeat.
- D) overly optimistic.

public transit was projected to save \$8.4 million per year in fare collection costs **19** but create a deficit of \$72 million per year in lost fares, on top of capital investments in new equipment and infrastructure. **20**

Projected Yearly Savings and Costs of Implementing a Fare-Free Policy

| Transit agency | Savings from eliminating fare collection | Cost in lost fares | Cost of adding service | Total additional operating costs |
|----------------------------------|--|--------------------|------------------------|----------------------------------|
| Lane Transit, Eugene, OR | \$100,000 to \$500,000 | \$5 million | not provided | \$5 million |
| Muni, San Francisco, CA | \$8.4 million | \$112 million | \$72 million* | \$184 million |
| Public Transit, Hamilton, Canada | not provided | \$900,000 | \$30 million | \$30.9 million |

*plus \$512 million in capital investments

Adapted from Transportation Research Board, "Implementation and Outcomes of Fare-Free Transit Systems." ©2012 by Transportation Research Board.

This is not to say that fare-free public transportation is always a bad idea. Some college towns and resort communities embrace the model because buses can go faster when drivers **21** would not have had to collect fares. For large cities looking to reduce automobile traffic, though, **22** research about Tallinn, Estonia, could be instructive.

19 Which choice provides an accurate interpretation of the chart?

- A) NO CHANGE
- B) and save an additional \$112 million from lost fares,
- C) but result in a total increase of \$184 million per year in operating costs,
- D) and save \$72 million per year in costs related to adding service,

20 The writer is considering adding the following sentence based on information from the chart.

By contrast, Lane Transit in Eugene, OR, would lose only \$5 million in fares if it instituted a fare-free system.

- Should the writer make this addition here?
- A) Yes, because it proves how little money Eugene would lose under a fare-free system compared with San Francisco.
- B) Yes, because it reinforces the claim made by advocates of fare-free policies mentioned earlier in the paragraph.
- C) No, because it does not support the argument that fare-free systems cause a substantial loss for governments.
- D) No, because it contradicts a point about fare-collection made earlier in the paragraph.

21 Which choice provides an accurate interpretation of the chart?

- A) NO CHANGE
- B) do not have
- C) did not have
- D) will not have

22 Which choice provides the best conclusion to the passage?

- A) NO CHANGE
- B) subways will prove to be more important than buses.
- C) public transportation should be cheaper but not free.
- D) fare-free public transportation is not the answer.

Questions 23-33 are based on the following passage.

Wet Plate Photography: An Old Technique Makes a New Splash

[1] Upon the arrival of the digital camera, professional photographers harrumphed that **23** they produced ugly, low-resolution images. [2] Yet eventually the vast majority of them traded film for megapixels. [3] The latest digital cameras take pictures so crisp that the images in them appear to be die-cut. [4] Even today's humblest smartphones snap bright, sharp photos. [5] A few contemporary photographers, however, have embraced an anachronistic method that was state-of-the-art technology when it was invented in 1851: wet plate photography. **24**

Wet plate photographers essentially create their own film. The process can be dangerous, given that it requires the use of several volatile chemicals. **25** To take a wet plate photograph, photographers usually first arrange or pose **26** it's subjects before mixing collodion (a viscous, light-sensitive chemical solution) with bromide, iodide, or chloride and applying the mixture to a clean, polished glass plate. Dried collodion is unusable, **27** so once the photo is snapped with a massive, tripod-mounted

23

- A) NO CHANGE
- B) it
- C) one
- D) he or she

24

The writer plans to add the following sentence to this paragraph.

Why wouldn't they?

To make the paragraph most logical, the sentence should be placed

- A) after sentence 1.
- B) after sentence 2.
- C) after sentence 4.
- D) after sentence 5.

25

At this point, the writer is considering adding the following sentence.

It's also labor-intensive, involving several intricate steps.

Should the writer make this addition here?

- A) Yes, because it serves as an effective transition by reiterating the main idea of the previous paragraph.
- B) Yes, because it sets up the paragraph's outline of the process of wet plate photography.
- C) No, because it blurs the paragraph's focus on the dangers involved in wet plate photography.
- D) No, because it provides an opinion in a paragraph that is focused on facts.

26

- A) NO CHANGE
- B) its
- C) there
- D) their

27

- A) NO CHANGE
- B) but
- C) and
- D) for

camera, the photographer has **28** nominal minutes to develop it, using more chemicals. When the image appears in the negative, water is used to stop the process. A chemical “fix bath” turns the negative image into a positive one. The photo is then immersed in water and warmed. **29** In conclusion, it is coated with lavender **30** oil to give it (a protective finish).

Wet plate photos are marvelously fine-grained and detailed, and they seem to glow with an ethereal silvery light. One misstep or a speck of dust on the glass plate, though, and flaws appear. Smudges resembling oyster shells **31** swirl around the photos’ edges. Sunbursts or streaks emerge where collodion pools unevenly. Since the film requires long exposures, moving subjects blur. **32** A shifting arm or leg might even disappear because of the lengthy exposure time required. The exposure time required explains why people in wet plate photographs often look dour: it’s hard to hold a smile for that long.

Prominent among contemporary wet plate photographers is Joni Sternbach, whose work centers, appropriately, on water and people’s relationship to it. Sternbach’s photo series *Ocean Details*, *Sea/Sky*, and *SurfLand* depict surging surfs, roiling waves, and the surfers who ride them. **33** Her subjects could be nineteenth-century wave riders, if not for the modern board shorts and bikinis they wear. Sternbach characterizes wet plate photography as “one part photography, one part performance art, and one part three-ring circus,” a worthwhile endeavor because it produces the unique, haunting images she seeks. “When I look at a digital print,” she says, “it might be gorgeous and smooth, but it’s on a piece of paper and it’s one of many.”

28

The writer wants to emphasize how quickly wet plate photographers have to work. Which choice most effectively accomplishes this goal?

- A) NO CHANGE
- B) a few
- C) a matter of
- D) mere

29

- A) NO CHANGE
- B) Finally,
- C) Thus,
- D) Nevertheless,

30

- A) NO CHANGE
- B) oil—to give it a protective finish.
- C) oil, to give it, a protective finish.
- D) oil to give it a protective finish.

31

- A) NO CHANGE
- B) will have swirled
- C) have swirled
- D) swirled

32

- A) NO CHANGE
- B) An arm or a leg, shifting during the long exposure time required by wet plate photography, might even disappear.
- C) A wet plate photographer’s subject’s arm or leg might even disappear during this long exposure time.
- D) A shifting arm or leg might even disappear.

33

The writer wants to highlight the contrast between Sternbach’s techniques and the people Sternbach photographs. Which choice most effectively accomplishes this goal?

- A) NO CHANGE
- B) The subjects of her photos could be ordinary people,
- C) It would be hard to tell her subjects are surfers,
- D) They would appear to come from all walks of life,

Questions 34-44 are based on the following passage.

Digging Up Cities

In 2010, as a construction crew began to tear up sidewalks in New York City's South Street Seaport to replace a water pipe, Alyssa Loorya and her team watched eagerly, picks and brushes in hand. Loorya, an urban archaeologist, studies the history of **34** cities. Any New York City construction project using municipal funds **35** are required to consider whether historical artifacts will be affected during construction, and if that possibility **36** exists or is possible, an urban archaeologist must be consulted. Since the South Street Seaport area was a bustling commercial center for early colonists, Loorya anticipated that a rich history lay beneath the pavement. "It's our job to document and recover that history before it's lost," she said.

As the work continued, **37** therefore, the team faced obstacles. Fieldwork in a city has to be done intermittently; the construction crew had to proceed one block at a time to avoid interrupting traffic, and the archaeology team's work was periodically **38** halted—by stormy weather and the discovery of toxic materials underground. Moreover, as archaeologists underground attempted to relay information to those at the surface, they had to contend with the noise of construction vehicles, car horns, and **39** pedestrians' noise on the busy New York City streets.

34

The writer is considering revising the underlined portion to the following.

cities by excavating artifacts that have accumulated over centuries of land development.

Should the writer make this revision here?

- A) Yes, because it helps set up the rest of the passage by explaining what urban archaeologists do.
- B) Yes, because it identifies the characteristics that make particular cities worthy of archaeological study.
- C) No, because it does not give enough detail about the kinds of artifacts that urban archaeologists typically find.
- D) No, because it does not explain how excavation benefits the study of a city's history.

35

- A) NO CHANGE
- B) have been
- C) is
- D) were

36

- A) NO CHANGE
- B) exists potentially,
- C) exists, it is necessary that
- D) exists,

37

- A) NO CHANGE
- B) though,
- C) meanwhile,
- D) similarly,

38

- A) NO CHANGE
- B) halted;
- C) halted,
- D) halted

39

- A) NO CHANGE
- B) the noise of pedestrians
- C) pedestrians
- D) that of pedestrians

Despite these setbacks, Loorya and her team eventually began to uncover some interesting artifacts. In 2012, the team discovered a foundation wall, a network of wooden pipes, and several well bases dating to the eighteenth century. In August 2013, the archaeologists discovered thousands of objects in a single fifteen-foot stretch that was likely a garbage disposal **40** site.

Including buttons from Revolutionary War uniforms, clay pipes, and an imported mineral water bottle from Germany.

As they cleaned and catalogued the artifacts, the archaeologists took stock of their findings. The team's discoveries provided a snapshot of **41** the various kinds of construction materials that were used in the eighteenth century. Colonial-era New Yorkers went to great lengths to secure fresh drinking water, Loorya noted, given the **42** effort involved in laying wooden pipes to bring in fresh water from surrounding areas, digging very deep wells, brewing alcohol to mask the water's salty taste, and even importing bottled water.

Through such discoveries, **43** they tell the story of a city's history in a new way. **44** "One of my favorite things is putting together someone's life," Loorya said.

40

- A) NO CHANGE
- B) site, among these were
- C) site, including
- D) site; including

41

Which choice most effectively sets up the example discussed in the following sentence?

- A) NO CHANGE
- B) the numerous rituals associated with hospitality
- C) public utility planning and infrastructure development
- D) how major construction projects were financed

42

Which choice best maintains the style and tone of the passage?

- A) NO CHANGE
- B) blood, sweat, and tears
- C) hassle
- D) feats of strength and fortitude

43

- A) NO CHANGE
- B) we
- C) colonial-era New Yorkers
- D) urban archaeologists

44

The writer wants to conclude the passage with a quotation from Loorya that illustrates the broad impact of her team's work. Which choice most effectively accomplishes this goal?

- A) NO CHANGE
- B) "New York City construction has a lot of stops and starts."
- C) "Finding the bits and pieces that were actually used by the people in the past makes New York City's history real."
- D) "We call our archaeological technique 'monitoring,' and we work hand-in-hand with the contractors and are a part of their team."