You should spend about 20 minutes on Questions 1-13, which are based on the reading passage below.

Sleep Study on Modern-Day Hunter-Gatherer Dispels Popular Notions

Modern life's sleep troubles — the chronic bleary-eyed state that many of us live in — have long been blamed on our industrial society. The city lights, long work hours, commutes, caffeine, the Internet. When talking about the miserable state of our ability to get enough rest, sleep researchers have had a tendency to hark back to a simpler time when humans were able to fully recharge by sleeping and waking to the rhythms of the sun. It turns out that may not be quite right. In fact, it now appears that our ancestors may not have been getting the doctor-recommended eight hours of sleep, either.

In an intriguing study published in Current Biology this week, researchers traveled to remote corners of the planet to scrutinize the sleep patterns of some of the world's last remaining hunter-gatherers — the Hadza of Tanzania, the San of Namibia, and the Tsimane of Bolivia. Cut off from electricity, media and other distractions, these pre-industrial societies are thought to experience the same sort of natural sleep ancient humans enjoyed more than 10,000 years ago.

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Located in a woodland-savannah habitat 2 degrees south of the equator, the Hazda gather their wild foods each day. The San are not migratory but interact very little with surrounding villages and live as hunter-gatherers. The Tsimane, who live close to the Maniqui River and thereby have to live with humid climate, are hunter-horticulturalist. Using Actiwatch-2 devices, a medical-grade Fitbit hand-watch for sleep, researchers recorded the sleeping habits of 94 of these tribespeople and ended up collecting data representing 1,165 days.

What they found was a striking uniformity in their sleep patterns despite their geographic isolation. On average, all three groups sleep a little less than 6.5 hours a night, do not take naps and don't go to sleep when it gets dark. Like many of us, the Hazda, San and Tsimane spent more time in bed — from 6.9 to 8.5 hours — than they do actually sleeping. That computes to a sleep efficiency of between 81 to 86 percent — which is very similar to today's industrial populations. Jerome Siegel, director of the University of California at Los Angeles's Center for Sleep Research, and his colleagues explained that this suggests that sleep may not be environmental or cultural, but "central to the physiology of humans" living in the tropical latitudes where our species evolved.

"The short sleep in these populations challenges the belief that sleep has been greatly reduced in the 'modern world,' " Siegel said. "This has important implications for the idea that we need to take sleeping pills because sleep has been reduced from its 'natural level' by the widespread use of electricity, TV, the Internet, and so on."

The findings call into question the untold millions that have been spent on research that tries to get to the bottom of why "short" sleepers get only about six hours of sleep a night and the idea that lack of sleep may be a big reason that obesity, mood disorders and other physical and mental ailments have surged in recent decades.

Scientists have long documented that people have a tendency to "crash" in energy in the midafternoon, and some have speculated that it's because we've managed to suppress some innate need for a siesta. The new study provides evidence that this is unlikely. The data from the San in Namibia, for instance, shows no afternoon naps during 210 days of recording in the winter and 10 naps in 364 days in the summer. The findings were similar for the other two tribes, suggesting that napping isn't really a common thing among hunter-gatherers, either. At the high end, the researchers estimated that naps may have occurred on up to 7 percent of winter days and 22 percent of summer days. The researchers noted that the devices they were using weren't great at picking up naps of short durations, so it is possible that some of the study subjects were taking short power naps of less than 15 minutes.

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Another fascinating finding from the study had to do with the circadian rhythms related to sunlight. Instead of going to sleep right at dusk, the hunter-gatherers were sleeping an average of 2.5 and 4.4 hours after sunset — well after darkness had fallen. All three tribes had small fires going, but the light itself was much lower than you might get from your average 60-watt bulb. They did, however, have a tendency to wake up around sunrise — an hour before or an hour after, depending on the season and the group. Siegel and his co-authors investigated this further by looking into the significance of temperature and found that it may play a big role. The research showed that "sleep in both the winter and summer occurred during the period of decreasing ambient temperature and that wake onset occurred near the nadir of the daily temperature rhythm," they wrote.

It should be noted that the tribespeople studied are different from your average American in a number of respects. Importantly, very few of the hunter-gatherers suffer from chronic insomnia. There isn't even a word for it in their languages. In interviews with the researchers conducted through interpreters, 1.5 to 2.5 percent of the study subjects said they had sleep onset or sleep maintenance problems more than once a year, which is far lower than the 10 to 30 percent documented in many

countries today. Siegel suggested that this may mean that "mimicking aspects of the natural environment" may be effective in treating some sleep disorders.

The hunter-gatherers are also much healthier. Not a single one is obese, and the mean BMIs among the tribes were between 18.3 and 26.2, which is considered quite slim. They also tend to have lower blood pressure, better heart conditions and higher levels of physical fitness. Thus comes a critical question. If we can't blame the lack of sleep as causing our obesity, mood disorders and the like, could it be that the reason we feel so unrested is because of poor health?

Questions 1-6

Do the following statements agree with the information given in Reading Passage 1?

In boxes 1-6 on your answer sheet write

TRUE if the statement agrees with the information

FALSE if the statement contradicts the information

NOT GIVEN if there is no information on this

1. Those who lived before industrial era are considered to have similarities in sleep patterns with human beings of 10 000 years ago.
2. Apparatus researchers used was suitable for wet conditions.
3. The Hazda spent more time on bed than us.
4. Jerome Siegel opined that environment and culture have little effect on human's sleep.
5. Hunter-gatherers use a word meaning "sleeplessness".
6. Tribal subjects in the survey are highly respectful.

Questions 7-13

Answer the questions below.

Choose NO MORE THAN ONE WORD from the passage for each answer.

Write your answers in boxes 7-13 on your answer sheet.

7. Taking a nap might not be a common occurrence on cold days, but in

_____ time.

8. Devices may be incapable of covering _____ naps.
9. Despite of the presence of _____, it was not so bright at night.
10. Ancient human beings tended to be awake near to _____.
11. This early habit was mainly connected with _____, according to conclusions made by investigators.
12. Unlike Americans, these people were almost not prone to _____.
13. Any hunter-gatherers are not _____.

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READING PASSAGE 2:

You should spend about 20 minutes on Questions 14-26, which are based on Reading Passage 2 on pages 6 and 7.

The purpose of facial expressions

Do facial expressions reflect inner feelings? Or are they social devices for influencing others?

A The use of facial expressions for measuring people's emotions has dominated psychology since the late 1960s. This was when Paul Ekman of the University of California pioneered the idea that, by carefully measuring facial expression, he could evaluate people's true emotions. Ekman carried out experiments in which people were asked to label photos of basic facial expressions such as a smile, frown or scowl with words for emotions. He found, for example, that a smile represented joy and a scowl represented anger. In fact, since the 1970s Ekman has dominated the field of emotion research with his theory that when an emotion occurs, a large number of electrical impulses also occur, creating specific facial expressions and other physiological changes, such as increased or decreased heart rate or heightened blood pressure.

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B Many took Ekman's work to imply that facial expressions precisely indicated people's feelings. However, this theory has been attacked by a number of psychologists, such as Alan Fridlund of the University of California, who claim that there is no one-to-one correspondence between facial expressions and emotions. Expressions evolved to set off certain behaviors in other people, says Fridlund. So a smile may prompt people to approach, a scowl may warn them to stay away, and a look of sadness may elicit words of sympathy and reassurance. In other words, in Fridlund's view, facial expressions are inherently social they involve not one, but two or more people. Even when people are alone they are holding a dialog with another person internally, or imagining themselves in a social situation.

C Thus Fridlund thinks of facial expressions as tools for influencing social interactions, a view which, he claims, enables us to begin predicting when certain facial expressions will occur. This in turn will allow more precise theories about social interactions. His studies find that expressions occur most often during pivotal points, the turning points in social interactions during greetings, social crises, or times of appeasement, for example. At these pivotal points there is an approach, or closeness, or more intimacy, and facial expressions, as well as gestures, open up the possibilities of various social interactions.

D Although much work on the emotions relies on a link between facial expression and emotions, psychologist James Russell, of the University of British Columbia, says there is very little evidence supporting such a connection. 'There's some sense in which faces express emotion, but only in the sense that everything expresses emotion,' says Russell, a long-time critic of the expression-emotion link. 'Music does, posture does, words do, tone of voice does, your behavior does. The real question is, "Is there anything special about faces?"" And there we really do not know much. What is more likely, argues Russell, is that facial expressions tell others something about a person's overall mood and context, rather than provide details about specific emotions.

E .Others, including Ekman, argue that the face can display information about emotions, but they admit that it is not reliable one hundred percent of the time. And those who only examine faces when trying to study emotion will jump to false conclusions. But according to Ekman, to say, as Fridlund does, that there is no connection at all between facial expressions and emotions is simply wrong. 'There is a link between facial expression and emotion,' agrees developmental psychologist Linda Camras of DePaul University, 'but it's not a one-to-one kind of relationship as many once thought.' She believes there are many situations where emotion is experienced, yet no basic facial expression is displayed. And there are times when a facial expression appears with no corresponding emotion.

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F Ekman's theory states that if the emotion comes on slowly or is rather weak, the feeling might not be strong enough to trigger the expression. This would explain why there can sometimes be emotion without expression, he argues. In addition, cultural rules which determine when and whether people of certain cultures display emotional expressions can prevent this otherwise automatic process from being completed. Facial expressions evolved in humans as signals to others about how they feel, says Ekman. At times, though, it may be uncomfortable or inconvenient for us to let others know our emotions. But in the long run, over the course of evolution, it was useful to us as signalers: an angry look on someone's face may be a warning that they are preparing to behave in an angry fashion.

G Although Fridlund disagrees with Ekman on certain matters, the two basically share the opinion that facial expressions indicate people's future actions. The area of dispute between Fridlund and Ekman draws attention away from their major areas of agreement, says Joseph Campos of the University of California. Indeed, he says, 'there is profound agreement that the face, along with the voice, body posture and hand gestures, forecasts to outside observers what people will do next.' He goes on to say, 'The face is a component [of emotion], but to make it the center of study of the human being experiencing an emotion is like saying the only thing you need to study in a car is the transmission. Not that the transmission is unimportant, but it's only part of an entire system.'

Questions 14-18

Reading Passage 2 has seven paragraphs, **A-G**. *Which paragraph contains the following information?*

Write the correct letter, A-G, in boxes 14-18 on your answer sheet.

14 a recognition that facial expressions do not always provide a true guide to feelings

15 examples of ways that a person's facial expression can affect someone else's actions

16 a reference to reasons for hiding emotions

17 examples of times when facial expressions are used especially frequently

18 examples of changes inside the body when an emotion is felt

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Questions 19-23

Look at the following statements (Questions 19-23) and the list of researchers below.

Match each statement with the correct researcher, A-E.

Write the correct letter, A-E, in boxes 19-23 on your answer sheet.

NB You may use any letter more than once.

19 Focusing on the face in researching emotions is similar to researching a large structure by looking at just one small unit of it.

20 Facial expressions developed in order to encourage other people to react in particular ways.

21 Although certain researchers have different opinions about various points, they share some important ideas.

22 Both emotion and expression can exist independently of each other in certain circumstances.

23 It cannot be proved that there is a connection between facial expression and real emotion.

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List of Researchers

A Paul Ekman

B Alan Fridlund

C James Russell

D Linda Camras

E Joseph Campos

Questions 24-26

Complete the sentences below.

Choose **ONE WORD ONLY** from the passage for each answer.

Write your answers in boxes 24-26 on your answer sheet.

24. In Fridlund's view, a ..... come nearer. on someone's face may be intended as an invitation to

25. According to Fridlund, when we are by ourselves we still use facial expressions because we are having a ..... with someone in our minds.

26. Fridlund considers facial expressions to be ..... other people. that can affect our contact with

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READING PASSAGE 3

You should spend about 20 minutes on Questions 27-40, which are based on the reading passage below.

Why good food tastes good?

Barb Stuckey, who describes herself as a professional food developer (though she once worked as a restaurant inspector), has just released the latest in a recent spate of books on the multisensory perception of flavor. This new volume, though, is certainly targeted at a somewhat different audience from the others. It is part memoir, detailing the author's many years working in a major North American company focused on developing novel food and beverage products, and part self-help book, offering advice on how we could all improve our ability to taste (mindful eating plays a big role here). In his book, Stevenson provided us with what is, and undoubtedly will remain to be, by far the most comprehensive academic summary of pretty much every study that has ever been published concerning how the senses interact to give rise to the emergent property that is flavor (well that is certainly how it felt on reading it). By contrast, Prescott's much more easily-digestible contribution to the field tackled the question of why it is that we like what we like when it comes to food and drink. He too dealt with the differing roles of the senses in establishing and maintaining such preferences and, equally importantly, dislikes.

The author honestly lays out her position at the start of the book when she states that: "But as someone who had avidly avoided science classes in school, I longed to read a straightforward book written for a layperson that could teach me how to taste food without first having to teach myself science. There wasn't one, so I decided to write this book.". Consistent with this objective, complex terms that might prove difficult for a lay audience to understand, such as orthonasal and retronasal olfaction, are simplified as 'nose-smelling' and 'mouth-smelling', respectively.

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Like the famous North American food critic, Jeffrey Steingarten, when I tested him in the lab here in Oxford some years ago, Barb strenuously objects to the label 'supertaster'. This is the term, originally coined by Linda Bartoshuk, currently at the University of Florida, in order to describe those individuals (approximately one quarter to one third of the population) who exhibit an increased sensitivity to certain (especially bitter) tastants such as, for example, PROP (6-n-propylthiouracil) as well as to oral-somatosensory textural cues. Stuckey suggests that the putatively-pejorative terms 'non-taster' and 'supertaster' (which are typically used in the academic literature on the chemical senses) be replaced by the terms 'tolerant taster' and 'hypertaster', respectively. Barb and Roger are both hypertasters.

Stuckey has certainly been speaking to the right people while doing her research for the book. The text includes numerous quotes from the interviews that she conducted with many of the best-known international figures from the world of flavor research: These include Paul Breslin from Rutgers University and the Monell Chemical Senses Center talking about his work on salt perception, Barry Green from Yale talking about the major influence that touch/trigeminal stimulation has on our perception of food and drink, and, as already mentioned, Linda Bartoshuk talking about supertasters (amongst many other things). Barb also does a great job of extending just that little bit beyond what most academics are normally willing to say in print, but which may well turn out, ultimately, to be true. So, for example, she quotes Paul Breslin in this vein as saying "There might be around twenty qualities of taste but I am most comfortable saying that there's five." Stuckey herself goes even further. She puts forward the provocative suggestion that there may be as many as 25 different basic tastes! Yes, 25, if what one means by that term is any taste for which we have a receptor on our tongue. While most researchers who are happy

with the notion of a basic taste (though note that not all are) would agree with the inclusion of sweet, sour, salty, bitter, and nowadays probably also umami as basic tastes, it is interesting to realize that there are many others substances for which receptor sensitivity on the tongue has now been demonstrated.

Stuckey includes a number of case studies in her book, thus reminding me, in style at least, of Lawrence Rosenblum's popular press volume on the senses "See what I am saying". For example, Stuckey talks extensively about the case of Carlo Middione, an Italian chef working out of San Francisco who lost his sense of taste (or rather his sense of smell, and hence flavor) following a car accident. Barb's book also includes some fascinating material on the preparation, and consumption, of food and drink by those who have lost one of their senses (for example, vision or hearing). Also, when she finds out that no one has done the relevant research, as when it comes to the question whether those who are deaf suffer from reduced flavor perception - she goes and collects some relevant data herself.

Stuckey's book is strongest in the numerous industry examples she provides from her work with Mattson, the largest new food product development company in North America. Many of the cases she describes seem to hinge on trying to find just the right balance of the basic tastes, not to mention the right mouth-feel, for a particular food or beverage product. Indeed, one of the major themes that came out throughout the book was the importance of food texture and the temporal dynamics of changes in mouthfeel as we eat and drink for so many of the products and brands that we buy on a regular basis. This is certainly an area of food science research that is tricky to work on in an academic research setting. It is just much easier to change the color or aroma of a foodstuff, say. However, on numerous occasions we see just how important the tactile attributes of various foods and beverages are to their success amongst consumers. Take, for example, the case of the development of low-calorie cola drinks that Stuckey...

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Where I thought that Stuckey was on weaker ground was when it came to the neuroscience of tasting. For example, in the brief section on "The expert eater brain" she confidently asserts that "Not only do tasting experts use more areas of the brain, they can enjoy the processing better than novices." Now while the second part of the claim may, for all I know, be true, the former statement really just does not do justice to the complexity of much of the published data that is out there.

While Stuckey's book has the now-requisite recommendation from Heston Blumenthal on the back cover, what is striking about the remainder of the cover quotes is that they all come from people working in the food industry; that is, from chefs and those placed in cookery schools. Ultimately, I anticipate this volume will have a much more enthusiastic reception there, and, as per the subtitle to her book, amongst 'passionate eaters' everywhere, than necessarily amongst those working on the more academic side of flavor perception.

Questions 27 - 31

Choose the correct letter A, B, C or D.

Write the correct letter in boxes 27-31 on your answer sheet

27. What is the author's main reason for writing the book?

A) She wanted to create a scientific textbook on food tasting.
B) She felt there were no simple books on food tasting for non-experts.
C) She wanted to provide an in-depth analysis of olfactory science.
D) She was inspired by the complexity of the terms in food science.

28. According to Stuckey, what is the basis for determining the number of basic tastes?

A) The substances that activate receptors on the tongue.
B) The agreement among researchers on basic tastes.
C) The types of food tasted through receptors.
D) The scientific consensus on five tastes.

29. When Stuckey discovers the lack of research about flavor perception in disabled people,

A) she cites existing studies in her book.
B) she interviews people who are deaf.
C) she decides to focus on other aspects of sensory perception.
D) she conducts her own research.

30. What can be inferred from the sixth paragraph?

A) Texture is less important than flavor.
B) Changing color is easier than altering texture.
C) Balance of taste and texture is key for success.
D) Tactile attributes are irrelevant to success.

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31. The author suggests that Stuckey's book is likely to be more appreciated by

A) academic researchers focused on flavor perception
B) professionals working in the food industry
C) people with an academic interest in cookery schools
D) scholars studying the science of taste

Question 32-35

Do the following statements agree with the claims of the writer in Reading Passage 3?

In boxes 32-35 on your answer sheet, write

YES if the statement agrees with the claims of the writer

NO if the statement contradicts the claims of the writer

NOT GIVEN if it is impossible to say what the writer thinks about this

32. Stuckey's book was written for a distinct group of readers by chance.

33. With the intention of facilitating the language in food science, Stuckey created a book.

34. Before writing her book, Stuckey consulted experts.

35. The author agrees with the idea of "the expert eater brain" regarding more active functioning.

Questions 36-40

Complete each sentence with the correct ending, A-H, below.

Write the correct letter, A-H, in boxes 36-40 on your answer sheet.

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36. The author's new self-help book

37. In comparison to Stevenson's book, Stuckey's book

38. Barb Stuckey disagrees with the term 'supertaster' which

39. In resemblance to Lawrence Rosenblum's style, Barb's book

40. The focus of Stuckey's book on beverage development

A) offers practical advice on enhancing tasting ability.

B) describes people with high sensitivity to taste textures.

C) highlights texture and mouthfeel's role in food success.

D) explores mult isensory food perception in detail.

E) challenges views and suggests new basic tastes.

F) relies on expert interviews, not case studies.

G) emphasizes understanding science before food learning.

H) includes real-life scenarios.