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1 次の英文を読み，設問に答えよ。

Around the world, governments and automakers are promoting electric vehicles as a key technology to reduce oil use and fight climate change, and the United States is no exception. Electric cars function by plugging into a charge point and taking electricity from the electric grid. They store the electricity in rechargeable batteries that power an electric motor, which turns the wheels. But as electric cars and trucks go mainstream, they have faced a persistent question: Are they really as green as advertised? Experts broadly agree that electric vehicles are a more climate-friendly option than traditional vehicles. However, they can still have their own environmental impacts, depending on how they're charged up and manufactured. Here's a guide to some of the biggest worries and how they might be addressed.

First of all, it matters how the electricity is made. Broadly speaking, most electric cars sold today tend to produce significantly fewer planet-warming emissions than most cars fueled with gasoline. But a lot depends on how much coal is being burned to charge up those plug-in vehicles. And electric grids still need to get much, much cleaner before electric vehicles are truly emissions-free. The average electric grid in the United States typically includes a mix of fossil fuel and renewable power plants. Electric vehicles that draw their power from such grids are almost always much greener than conventional cars. Their electric motors are more efficient than traditional engines that burn gasoline. An all-electric Chevrolet Bolt, for instance, can be expected to produce 189 grams of carbon dioxide (CO_2) for every mile driven over its lifetime, on average. By contrast, a new gasoline-fueled Ford F-150 pickup truck is much less fuel-efficient, producing 636 grams of carbon dioxide per mile.

On the other hand, many electric grids, such as those currently found in the Midwest, are extremely coal-heavy. If the Chevrolet Bolt is charged up on such a grid, it can actually be a bit worse for the climate than a modern hybrid car that uses both gasoline and a battery. "Coal tends to be the critical factor," says Jeremy Michalek, a professor of engineering at Carnegie Mellon University. "If you've got electric cars that are being plugged in at night and causing nearby coal plants to burn more coal to charge them, then the climate benefits won't be as great, and you can even get more air pollution."

The good news for electric vehicles is that most countries are now pushing to clean up their electric grids. In the United States, utilities have closed down hundreds of coal plants over the last decade and shifted to a mix of natural gas, wind, and solar power. As a result, electric vehicles have generally gotten cleaner, too. And they are likely to get cleaner still. "Electric

vehicles look like an appealing climate solution. Why? Because if we can make our grids zero-carbon, then vehicle emissions drop way, way down," says Jessika Trancik, an associate professor of energy studies at M.I.T. "However, even the best hybrid cars that burn gasoline will always have a baseline of emissions they can't go below."

The second big worry is that the raw materials used to make the batteries for electric vehicles have been linked to important environmental and human rights concerns. One raw material, cobalt, has been especially problematic. First, the mining of cobalt produces dangerous waste that can leak into the environment. Studies have found high exposure to cobalt in communities near the mines, especially among children. Moreover, extracting cobalt requires a process called smelting which can emit harmful air pollution. Finally, as much as 70 percent of the world's cobalt supply is mined in the Democratic Republic of the Congo, often in unregulated "artisanal" mines. Workers—including many children—dig the metal from the earth using only hand tools, and human rights groups warn that this is a great risk to their health and safety.

Lithium is another raw material that is used in making batteries for electric cars. The world's lithium is either mined in Australia or taken from salt flats in Argentina, Bolivia, and Chile. These operations use large amounts of water to pump out the salt. This reduces the water that is available to local farmers and herders. Due to the large amount of water required for producing batteries, the manufacturing of electric vehicles uses about 50 percent more water than the production of traditional cars.

Focusing on cobalt, automakers and other manufacturers have promised to eliminate "artisanal" cobalt from their supply chains. They have also said they will develop batteries that decrease, or do away with, cobalt altogether. But these promises aren't realistic, says Mickaël Daudin of Pact, a nonprofit organization that works with mining communities in Africa. Instead, Mr. Daudin says, manufacturers need to work with these "artisanal" mines to decrease their environmental footprint and make sure miners are working in safe conditions. If companies acted responsibly, the rise of electric vehicles would be a great opportunity for countries like Congo. But if they don't, they will put the environment and many, many miners' lives at risk.

The third challenge is that the recycling of lithium batteries could be better. As earlier generations of electric vehicles start to reach the end of their lives, dealing with the large number of used batteries will be a challenge. While 99 percent of traditional batteries in the United States are recycled, the recycling rate for lithium batteries is only about 5 percent. Experts point out that used batteries contain valuable metals and other materials that can be recovered and reused. "The percentage of lithium batteries being recycled is very low, but with

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time and innovation, that's going to increase," says Radenka Maric, a professor at the University of Connecticut.

A different approach to used electric vehicle batteries is finding them a second life in storing energy. "For cars, when the battery goes below about 80 percent of its capacity, that's a problem," says Amol Phadke, a senior scientist at the University of California, Berkeley. "But that's not a problem for stationary storage." Various automakers have piloted the use of old electric vehicle batteries for storing electricity on the grid. In fact, General Motors has said that it designs its battery packs with second-life use in mind. But there are challenges. Reusing these batteries requires extensive testing and upgrades to make sure they perform reliably. If done properly, though, used car batteries could continue to be used for a decade or more as backup storage for solar power.

問1 *Choose the best answer based on the reading.*

1. What is the source of power for electric vehicles?
   A. Electric plugs.
   B. Electric motors.
   C. The electric grid.
   D. Gasoline engines.

2. In the U.S., electric vehicles are greener than traditional cars when . . .
   A. their engines burn gasoline more efficiently.
   B. coal is being burned to charge up their batteries.
   C. they get their power from electric grids using fossil fuels.
   D. they are powered by electric grids that include renewable power.

3. What reduces the benefits of electric vehicles for the climate?
   A. Plugging in the electric cars at night.
   B. Recharging the batteries on the vehicles.
   C. Using electric grids that use a lot of coal.
   D. Buying hybrid cars with batteries and gasoline engines.

4. Why have electric vehicles generally become cleaner in the U.S.?

A. The electric grids are now zero-carbon.

B. Utility companies now use only wind and solar power.

C. Less and less electricity is being made by burning coal.

D. The government is pushing other countries to use clean energy.

5. What is one reason why using cobalt is problematic for making batteries?

A. Water pollution results from smelting cobalt.

B. The people in the mines work without proper tools.

C. It wastes energy when cobalt leaks into the environment.

D. Communities living near the mines experience explosions.

6. What is one reason why using lithium is problematic for making batteries?

A. Producing it requires about 50% more salt.

B. The lithium mines fill up with salt water.

C. Local farmers are protesting lithium production.

D. Large amounts of water are needed to produce it.

7. What have automakers promised to do?

A. Stop using “artisanal” cobalt.

B. Ensure that cobalt miners can work safely.

C. Increase the amount of cobalt used in batteries.

D. Provide more opportunities for countries like Congo.

8. In the U.S., what is one challenge for recycling the batteries from electric cars?

A. There is a very high recycling rate for traditional batteries.

B. The recycling rate of lithium batteries is very low.

C. Experts expect that the rate of recycling will remain low.

D. The batteries are worthless despite the materials they contain.

9. As an alternative to recycling, used batteries from electric cars can be used . . .

A. over and over without a lot of testing.

B. again in vehicles if they are 80% full.

C. for at least ten years with no upgrades.

D. to store electricity from solar power panels.

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10. What would be a good title for this passage?

A. Cleaning Up the Electric Grid

B. The Dangers of Cobalt Mining

C. How Green Are Electric Vehicles?

D. A Bright Future for Electric Vehicles

問2 *Complete the following chart.*

People	Opinions
Jessika Trancik	(11) will help reduce vehicle emissions significantly.
Mickaël Daudin	Automakers and other manufacturers should (12).
Radenka Maric	The percentage of recycled lithium batteries will (13).
Amol Phadke	Car batteries that are below about 80 percent of their capacity can be (14) for other purposes.

11. A. Burning gasoline

B. Making more grids

C. Using electric vehicles

D. Using the best hybrid vehicles

12. A. close “artisanal” mines

B. increase their carbon footprint

C. do away with cobalt

D. work towards making mines safer

13. A. remain stable over time

B. eventually rise through innovation

C. decrease with time

D. remain low for a long time

14. A. piloted

B. reused

C. stationed

D. stored

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問3　*Mark A for TRUE and B for FALSE for each of the following statements.*

15. A Chevrolet Bolt will probably produce less than a third as much CO_2 as a Ford pickup truck.
16. The Democratic Republic of the Congo supplies as much as 70% of the world's cobalt.
17. Most of the world's lithium is mined in salt flats in Australia.
18. Nearly 100% of traditional batteries in the United States are recycled.

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2 次の 19 ～ 26 の空所に入れる語句として最も適切なものを A ～ D の中から選べ。

19. X: Have you read that review of David Johnson's book? It openly questions the merits of the book.
Y: It doesn't surprise me. The reviewer is well known as an extremely (　　) critic.
A. harsh　B. mild　C. pitiful　D. sympathetic

20. X: The bronze sculpture in the hall is of Ms. Suzuki. Does anyone know who she was?
Y: Yes, ma'am. She was the (　　) of our school.
A. settler　B. explorer　C. founder　D. finder

21. X: I found Hathaway's most recent novel so fascinating.
Y: Right, she said the birth of her first child (　　) her to write it.
A. attempted　B. corrupted　C. opted　D. prompted

22. X: You've lost your wallet again! Twice this week!
Y: Please don't (　　) at me. The neighbors might hear you.
A. yield　B. praise　C. approve　D. yell

23. X: So you're saying that Anne's speech was great. How did the audience react?
Y: Very positively. There was (　　) applause right in the middle of it.
A. spontaneous　B. conscious　C. planned　D. expected

24. X: I went to Susie's house the other day. She has a huge number of books on modern history.
Y: Yes, everyone knows she is (　　) knowledgeable in that field.
A. remarkably　B. scarcely　C. barely　D. slightly

25. X: Look at my skin! I got a suntan playing tennis.
Y: You have to be careful because excessive (　　) to the sun is harmful to your skin.
A. hit　B. enclosure　C. heat　D. exposure

26. X: I noticed a small mistake on this official document. What should we do?
Y: Nice catch! We need to (　　) the boss. Maybe we still have time to revise it.
A. notify　B. modify　C. classify　D. qualify

3 次の 27 ～ 36 の空所に入れる語句として最も適切なものを A ～ D の中から選べ。

27. X: Which one is Steve's new girlfriend?
Y: She's the one wearing a (　　) skirt.
A. short black leather　　B. black short leather
C. leather short black　　D. black leather short

28. X: We're in a hurry. Let's go.
Y: Wait. We need to bring in the laundry in case it (　　) while we are out.
A. will rain　　B. rains　　C. has rained　　D. rained

29. X: Did you buy a loaf of bread?
Y: No, the supermarket was closed and I didn't know where else (　　) get some.
A. can I　　B. could I　　C. I can　　D. I could

30. X: Is everybody here?
Y: Mary is late again. She (　　) here half an hour ago.
A. shall be　　B. shall have been
C. should be　　D. should've been

31. X: Excuse me, can I eat over here?
Y: No, sir. Eating or drinking (　　) in this building.
A. is allowed　　B. isn't allowed
C. doesn't allow　　D. wasn't allowed

32. X: There's a lot of snow on the ground.
Y: It kept snowing (　　) this morning.
A. by　　B. to　　C. until　　D. at

33. X: The party last night was a disaster.
Y: I'm sorry. Everything (　　) was my fault.
A. that happened　　B. what happened
C. it happened　　D. happened

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34. X: How do you like the life in this city?

Y: Wonderful! I especially like the weather here. It (　　) much.

A. isn't raining　　B. didn't

C. doesn't rain　　D. won't rain

35. The brilliant news from you really (　　) my day.

A. boosted　　B. helped　　C. made　　D. gave

36. I would like to thank my supervisor, my classmates, and, last but not (　　), my parents.

A. first　　B. best　　C. most　　D. least

4 それぞれの会話の空所に入れる最も適切な選択肢を A ～ D の中から選べ。ただし，同じ選択肢が 2 箇所に入ることはない。

Man: How was the SDGs online workshop for high school students?

Woman: I enjoyed it very much. Students from around Japan were there together on the same screen. (37)

Man: That's too bad. What kind of problems?

Woman: Some students' microphones didn't work well so they had to shout. (38)

Man: Audio problems are common when using online video conference tools. You gave a talk too, didn't you?

Woman: (39) It went smoothly.

Man: I'm so glad it went well.

A. But there were some minor technical problems.

B. Yes, there's so much to learn about SDGs.

C. Yes, I talked about my survey on the use of mobile devices by students.

D. Also, the conference chairperson gave a talk, but we couldn't hear him well.

Man: Hello. I'm having a problem with my credit card. My PIN number isn't being recognized. (40)

Woman: No problem. These things happen. Would you like to reset the number?

Man: Before requesting the PIN reset, can I ask you a question? (41)

Woman: It usually takes between five and ten working days before the change is approved.

Man: Really, that long? I need the card for an important payment tomorrow.

Woman: (42) It's because of the security, you know.

Man: OK, I guess I don't have any choice.

A. I'm afraid it can't be helped.

B. How long will it take before I can use my card again?

C. Maybe I forgot it.

D. Could you stay on the line and I'll check?

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5 次の文章の空所に入れる文として最も適切なものを A ～ D の中から選べ。ただし，同じ文が 2 箇所に入ることはない。

Everyone loves koala bears. In fact, koalas are not bears but are related to kangaroos. Like kangaroos, koalas have pouches where their tiny newborns develop. A koala mother usually gives birth to one baby at a time. A newborn koala is tiny, only the size of a jellybean. The baby koala, called a joey, is blind, naked, and earless. As soon as it's born, this tiny creature makes its way from the birth canal to its mother's pouch. (43) There it stays, safely tucked away, growing and developing for about seven months. After a joey has been in the pouch for about six months, its mother begins to produce a special substance called pap. (44) Pap comes from the mother's digestive system, so it contains bacteria. The joey needs to have these bacteria in its digestive system so that it will be able to eat an adult diet of eucalyptus leaves. At about seven months, the joey is finally able to leave the pouch to eat eucalyptus leaves. (45) By the time the joey is about one year old, it stops drinking milk and eats only leaves.

A. However, it still returns to drink its mother's milk.
B. Koala bears and kangaroos are both native to Australia.
C. To do so, it uses its strong front legs and claws.
D. The baby feeds on this in addition to the milk it's already getting.

出典追記：Koala, Koalas are marsupials, related to kangaroos. , National Geographic. 一部改変

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6 *Read the following email and answer the questions.*
（1部および工学部受験者のみ）

From:	Lily.MacDonald@edu.intl.ut
To:	Satoshi.Kato@edu.ut
Date:	Monday, February 15, 2021
Subject:	Campus closed and vaccination rescheduled

Hi Satoshi,

How are you doing? I hope your classes are going OK. It's too bad everyone must stay at home because of COVID-19. But also, we have this snowstorm and the weather report says it will get worse.

The university president sent the attached message to all the university staff and students yesterday. Did you receive it? I think your host father, Jack, also received the same message. Please see the message and check what you should do, especially the part about the COVID-19 vaccine operation. If you need any help, send me a reply, or ask Jack.

Keep in touch and stay positive.

Lily MacDonald, President, International Exchange Support Association (IESA)

(Attached message)

Campus closed through Wednesday morning
February 14, 2021

Dear University students and staff,

Due to the severe weather conditions, the campus will close at 4 p.m. Sunday, February 14, and will remain closed until at least Wednesday, February 17, at 8 a.m. We will announce a reopening when conditions are determined to be safe. We expect many will experience power failure and other challenges, so all classes and events are canceled including virtual/online classes and events. Only core essential staff members will go to work during this closure.

Students: COVID-19 vaccine operations on Tuesday will be suspended. Individuals with appointments are being contacted directly to reschedule for a later date, and we expect to resume our vaccination effort as soon as the weather permits.

Staff: If you are essential staff and unable to get to campus due to special circumstances, such as unsafe roadways or child care issues, please contact your supervisor as soon as possible.

The university is monitoring the situation and will keep you updated via email and local radio. Stay warm, be safe, and take care.

Jason Hartwell, President of H & G University

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46. Why did Lily MacDonald send the email to Satoshi?

A. To ask about Satoshi's online classes.

B. To tell Satoshi that the president was infected.

C. To check if Satoshi received the email from the president.

D. To inform Satoshi that his host father can't come home.

47. Who wrote the attached message?

A. Satoshi's host father.

B. The president of IESA.

C. An essential staff member.

D. The university president.

48. The campus was closed because of . . .

A. a winter storm.

B. the COVID-19 pandemic.

C. a lack of essential workers.

D. a power failure.

49. What is the campus closing date?

A. February 13.

B. February 14.

C. February 17.

D. February 19.

50. Satoshi needs to make an appointment again if his vaccination day is this . . .

A. Tuesday.

B. Thursday.

C. Saturday.

D. Sunday.

51. If you are an essential staff member of the university without a babysitter, you should . . .

A. get vaccinated.

B. monitor the situation.

C. reschedule your vaccination appointment.

D. contact your boss.

52. The university will inform students and staff of new developments via . . .

A. Zoom.

B. the weather report.

C. email and radio.

D. social media.