I　次の会話を読み，下記の設問に答えよ。（配点 25）

(A father and his son are talking.)

Son:　　Hi, Dad. Did you find any good books at the library?

Father:　Maybe. But I couldn't find anything that looked really interesting. To be honest, it seems to get more difficult for me to find a great book these days.

Son:　　I try to only read books that have good reviews. When I do that, they are usually all good.

Father:　I should do that too.

Son:　　While we are on the subject of libraries, have you heard of the "human library"?

Father:　I don't think I have. What is it exactly?

Son:　　It's a library where you can borrow, as the name suggests, a person rather than a book.

Father:　That's an idea. I could do with some help around the house.

Son:　　No, not a home help or anything like that. Rather than reading a book, we can borrow a fellow human being and listen to their experience. The aim seems to be that by hearing from someone with a completely different life experience, we can recognize the diversity in society and become more tolerant of others.

Father:　I see. So, how does it work in practice?

Son:　　When you go to the library, you are given a number of topics on which you can hear someone talk. You can borrow a person for 20 minutes or so and listen to their experience. You listen to their point of view, ask questions or enjoy a discussion with them. You can find out about a life experience completely different to your own. And, hopefully, you become a more tolerant person.

Father:　It does sound interesting.

Son:　　The idea started in Denmark in 2000 and has now spread to more than 70 countries.

Father:　Is there anywhere doing it around here?

Son:　　Yes. That's how I heard about it. They've opened a human library event at the university. I picked up a leaflet about it.

Father:　Shall we go over and take a look sometime?

Son:　　Sure. I was even thinking that you might want to 1)volunteer as one of the human "books."

Father:　Me? 2)I'm not sure anyone would want to listen to me.

Son:　　I don't know. But you've lived a different life. Maybe some people could be inspired by listening to your point of view.

Father:　OK. Let's go and see what it's all about.

(1) Which expression has a similar meaning to 1) "volunteer"? Choose the best answer and mark the number on the answer sheet. ☐1☐

① put yourself forward ② take yourself seriously
③ make yourself at home ④ pull yourself together

(2) Make a sentence which has a similar meaning to 2) "I'm not sure anyone would want to listen to me." Choose the SIXTH word in the sentence from the following ① to ⑥ and mark the number on the answer sheet. ☐2☐

{ ① anyone ② doubtful ③ It ④ is ⑤ want ⑥ would } to hear about me.

(3) Which of the following sentences about the father and son is NOT correct according to the conversation? Choose the best answer and mark the number on the answer sheet. ☐3☐

① They both enjoy reading.
② They both choose books to read after reading book reviews.
③ The son thinks people would be interested in hearing about his father's life.
④ The father thinks it is sometimes difficult to decide on a book to borrow at the library.

(4) Which of the following sentences about the human library is NOT correct according to the conversation? Choose the best answer and mark the number on the answer sheet. ☐4☐

① People have been able to visit the human library in many countries around the world.
② The human library is based on the idea of sharing diverse human experience.
③ Participants in the human library have to share their experience to be able to listen to experiences of others.
④ The human library involves listening rather than reading.

(5) Which of the following best summarizes the human library? Choose the best answer and mark the number on the answer sheet. ☐5☐

① It is a project developed in Denmark at the turn of the century which aims to promote understanding of the social problems and various life experiences of people in Denmark.
② It is an international movement that began in Denmark in 2000. It tackles prejudice by letting people hear life stories of others they would not usually meet.
③ It is an organization which gets people to talk about life experiences as a means to attract a new generation of users to public libraries.
④ It is a group who believe that libraries should include other resources besides books. A human library provides a useful resource for library users and also accommodation for people who have experienced social problems.

II 次の英文を読み，下記の設問に答えよ。(配点 25)

Do you check the weather forecast every day? I acquired this habit when living in Japan, but since moving back to Singapore, I ☐6☐ do so. After all, Singapore's weather doesn't vary that much. As an equatorial country, high temperatures and humidity are pretty much a constant throughout the year. We are also relatively sheltered from natural disasters such as earthquakes and tropical cyclones. What we aren't sheltered from are sudden showers and small-scale thunderstorms. On average, Singapore experiences about 170 thunderstorm days per year and we have one of the highest occurrences of lightning activity in the world. For people who work outdoors, forecasts of thunderstorms and real-time warnings of lightning risks are crucial to safeguarding their lives. For the rest of us, we simply make sure we have an umbrella with us. Of course, we try to check the weather forecast before we plan certain activities, for instance a picnic at the beach or an ☐7☐ to the zoo. But many say the forecasts aren't always accurate. (① tend to ② overseas ③ who've ④ those ⑤ wonder ⑥ lived) : Why is it that Singapore's forecasts don't seem as accurate as those in foreign countries?

Contrary to common perception, weather forecasting in the tropics is actually relatively challenging. As a small island country surrounded by the sea, Singapore is subject to *copious amounts of heat from the sun, moisture and atmospheric instability — all of which are key ingredients for the formation of rain showers and thunderstorms. Moreover, our thunderstorms tend to be *transient in nature. As a *meteorologist explained to me recently, our rain clouds can be highly localised. It is common for one part of tiny Singapore to experience rain and another part to be sunny at the same time. What complicates things further is that the winds over the tropics are often light. So even a slight shift in wind conditions may result in the difference between rain falling within or outside Singapore.

Countries located in the *mid-latitudes have weather systems which are vastly different from ours. While the weather has higher variation, it is typically driven by larger-scale weather systems that span a few hundred kilometres to a thousand kilometres and can be tracked a few days ahead. In the tropics, rain clouds may be as small as a couple of kilometres wide. They may develop rapidly overhead before disappearing just as quickly.

Unfortunately, heavy rain and flooding have become more common in Singapore in recent years. With increasing awareness of climate change and extreme weather phenomena, I believe more Singaporeans may start to check weather forecasts more regularly, too. ☐8☐ where we live, weather forecasts and data are likely to become increasingly important in our everyday lives.

— 3 —

注　*copious amounts of　多量の　　　　*transient 一時的な

　　*meteorologist　気象学者　　　　　*mid-latitudes　中緯度帯

(1)　空所 6 ～ 8 に入る最も適切なものを，次の中からそれぞれ1つ選び，その番号をマークせよ。

6 　① always　　　　　② absolutely　　　　③ frequently　　　④ seldom

7 　① emotion　　　　② exhibition　　　　③ excursion　　　　④ extension

8 　① Regardless of　② As long as　　　　③ In addition to　④ Unless

(2)　下線部（① tend to　② overseas　③ who've　④ those　⑤ wonder　⑥ lived）を並べかえて英文を完成し，①〜⑥の中で4番目にくるものの番号をマークせよ。なお，文頭にくるものも小文字で示してある。 9

(3)　シンガポールの天気予測が難しい理由として本文で述べられていないものを，次の中から1つ選び，その番号をマークせよ。 10

① 熱帯地方に属しているため

② 小さな島国であるため

③ 雨雲が局所的に発生するため

④ 風が強いことが多いため

(4)　本文で述べられているものとして最も適切なものを，次の中から1つ選び，その番号をマークせよ。 11

① シンガポールの人は頻繁に天気予報を確認する。

② シンガポールの湿度は季節によって変化する。

③ シンガポールでは地震が頻繁に起こる。

④ シンガポールでは近年洪水が増加している。

Ⅲ 次の会話を読み，下記の設問に答えよ。（配点 25）

(Antony and Declan are talking about their vacations.)

Antony: How was your vacation?

Declan: It was fantastic.

Antony: Where did you say you went to?

Declan: Okinawa. We were there for four days.

Antony: How was it?

Declan: Great. The weather was perfect. We did all kinds of water sports.

Antony: Where did you stay?

Declan: We found a great B&B place online. It was a big house, and it came with lots of sports equipment, so we didn't need to hire anything. The owner was really nice too. He's a local and he told us about so many cool places to visit. He even brought over some of his kids' toys for our kids to play with.

Antony: I expect they enjoyed it. Kids love the beach.

Declan: They certainly did. We were staying right on the beach, so they were on the beach from morning until night.

Antony: That sounds like heaven. I could do with a beach holiday for a change.

Declan: Really? 1)I didn't think it was your cup of tea. I thought you preferred more adventurous holidays. Are you planning anything this year?

Antony: I'd been planning to go with my caving club and try out some caves in Croatia. But it's starting to look like I won't be able to get time off to go with them.

Declan: I thought your workplace was pretty flexible in terms of taking time off.

Antony: It is. I have no complaints there. It's just that the week the caving club has planned for the trip just happens to be at the time when a project at work is finishing. It would be irresponsible of me to miss that.

Declan: That's too bad. Can't you go caving somewhere by yourself?

Antony: No, not really. It's not a good idea in terms of staying safe. 2)Safety in numbers, as they say. Also, I enjoy doing something in a group more than by myself. But I might have to go on a solo trip this year. In that case, I could do a beach trip and some scuba diving while I'm there.

Declan: I have a friend who is a keen diver. She sends me the most amazing photos.

Antony: Yes. It's another world down there. Have you ever tried it?

Declan: No, I've thought about it but haven't had a chance to do the training.

Antony: It only takes a few days, so if you can incorporate that into your holiday you can do it all

at once.

Declan: You're right. Perhaps I'll get organized and do it this year.

(1) Make a sentence which has a similar meaning to 1) "I didn't think it was your cup of tea." Choose the FIFTH word in the sentence from the following ① to ⑥ and mark the number on the answer sheet.   12
　　　{ ① had　② idea　③ liked　④ no　⑤ you　⑥ I } it.

(2) According to the conversation, what is the meaning of 2) "Safety in numbers"? Choose the best answer and mark the number on the answer sheet.   13

① There is a safe number of people.

② There is no safe number of people.

③ You are safer in a large group.

④ You are safer by yourself or in a small group.

(3) Which of the following sentences about Declan's vacation is NOT correct according to the conversation? Choose the best answer and mark the number on the answer sheet.   14

① Declan rented a place to stay.

② Declan's children loved the beach.

③ Declan tried some water sports.

④ Declan took a lot of sports equipment with him.

(4) Which of the following sentences about Antony is NOT correct according to the conversation? Choose the best answer and mark the number on the answer sheet.   15

① Antony had been planning to go caving in Croatia.

② Antony is satisfied with the policy on holidays at his workplace.

③ Antony likes group holidays better than holidays by himself.

④ Antony is looking forward to getting scuba diving training.

(5) Which of the following best summarizes the conversation? Choose the best answer and mark the number on the answer sheet. ☐ 16 ☐

① Antony and Declan share their holiday experiences. Declan had a lovely holiday. Antony, on the other hand, had a less than ideal experience, but he is happy that he at least enjoyed a short solo trip to the beach.

② Declan tells Antony about his fun vacation. Although Antony is unable to go on his ideal vacation, he is still aiming to get away on a trip by himself even if it means going to the beach.

③ Antony and Declan couldn't take a vacation together this year partly as a result of Antony being busy at work. However, they have decided to go on a diving trip together as soon as Declan has received certification.

④ Antony and Declan talk about their shared love of beach holidays. Declan could enjoy a fantastic beach holiday thanks to finding some great value accommodation. Antony is still struggling to find a suitable place for his caving club members to stay.

次の英文を読み，下記の設問に答えよ。（配点 25）

The American space agency NASA says it has used a new technology method to help confirm the existence of 301 new exoplanets. 1) <u>Exoplanets</u> are planets that orbit stars other than the sun. Before the latest discoveries, NASA had confirmed the existence of more than 4,569 such planets. Thousands of other "candidate" exoplanets have been identified. But these require additional study. Exoplanets are difficult for telescopes to identify. One reason is that the bright light of the stars they orbit can ⬚17⬚ them. The search process can involve looking for decreases in the light level of stars. Such drops could be caused by a planet passing in front of a star.

NASA has used two space telescopes to confirm thousands of exoplanets. The Kepler space telescope was launched in 2009 and operated until October 2018. At that time, NASA announced it was retiring Kepler because the spacecraft had "run out of fuel needed for further science operations." The ⬚18⬚ space telescope is called the Transiting Exoplanet Survey Satellite, or TESS. NASA launched TESS in April 2018 to build on Kepler's observations. TESS continues to operate today. NASA's confirmations of the 301 new exoplanets were based on data collected by the Kepler space telescope. The data was processed through a machine learning system called 2) <u>ExoMiner</u>.

Machine learning systems are a form of artificial intelligence (AI). They are trained to learn a task over time by being fed huge amounts of data. In this case, NASA said it used the machine learning method to examine existing data to identify real exoplanets from so-called "3) <u>imposters</u>." ExoMiner is powered by data gathered from past efforts to confirm or rule out possible exoplanets. The system was designed to use the same methods that human experts use to confirm new exoplanets. NASA said the system provides much-needed assistance to scientists who are expertly trained to confirm the existence of such planets. The agency's space telescopes collect data on thousands of stars. It is a huge effort for humans to examine so many stars. ExoMiner is designed to ease that load and improve the accuracy of identifying new exoplanets.

Jon Jenkins is an exoplanet scientist at NASA's Ames Research Center in California. He said in a statement that ExoMiner offers big improvements over other machine learning programs used to identify exoplanets in the past. The main reason for this, Jenkins said, is that the new system permits scientists to easily confirm ExoMiner's findings. "There is no mystery as to why it decides something is a planet or not," he said. "We can easily explain which 4) (① ExoMiner　② reject　③ in the data　④ features　⑤ to　⑥ lead) or confirm a planet."

The machine learning system was developed and tested by NASA researchers and the team's international partners. It was described by a paper published in the *Astrophysical Journal*. The paper explains that ExoMiner discovered the 301 exoplanets from a list of candidates based on data

from the Kepler space telescope. They had been identified and declared [19] possible exoplanets by scientists at the Kepler Science Operations Center. But NASA said no human researchers had been able to confirm them. "When ExoMiner says something is a planet, you can be sure it's [20]," said Hamed Valizadegan. He is the ExoMiner project lead and oversees machine learning operations at the Universities Space Research Association at the Ames center. Valizadegan added that the system is "in some ways more reliable" than both existing machine learning methods as well as human experts. He said one reason for this is that ExoMiner is free of "biases" that can affect human identification operations. The NASA team said it plans to build on ExoMiner's success by expanding the system. The goal would be to include data from TESS and future telescopes that aim to discover new exoplanets.

(1) 空所 [17] ～ [20] に入る最も適切なものを，次の中からそれぞれ１つ選び，その番号をマークせよ。

[17] ① reduce　　　② rotate　　　③ shine　　　④ hide

[18] ① large　　　② small　　　③ one　　　④ other

[19] ① as　　　② to　　　③ in　　　④ for

[20] ① a good system　　　　　② not a good system
　　　③ a planet　　　　　④ not a planet

(2) 下線部 1) "Exoplanets"の意味として最も適切なものを，次の中から１つ選び，その番号をマークせよ。 [21]
① 太陽系を周回する彗星
② 太陽系外の惑星
③ 太陽系内の地球より太陽に近い惑星
④ 太陽系内の地球より太陽から遠い惑星

(3) 下線部 2) "ExoMiner"の説明として適切でないものを，次の中から１つ選び，その番号をマークせよ。 [22]
① 大量のデータがなくても効率よく運用できる。
② 人工知能が取り入れられている。
③ 専門家と同じ手法が利用されている。
④ 研究者の負担を減らすことができる。

(4) 下線部 3) "imposters"の意味として最も適切なものを，次の中から１つ選び，その番号をマークせよ。 ☐23

① Things that have been identified as exoplanets

② Things that look like exoplanets, but are not

③ Things that are used to rule out possible exoplanets

④ Things that NASA has announced as exoplanets

(5) 下線部 4) (① ExoMiner　② reject　③ in the data　④ features　⑤ to　⑥ lead) を並べかえて英文を完成し，①〜⑥の中で３番目にくるものの番号をマークせよ。 ☐24

(6) 本文の内容に合うものとして最も適切なものを，次の中から１つ選び，その番号をマークせよ。 ☐25

① ケプラー宇宙望遠鏡の運用を終えたのは，経年劣化と機体の損傷のためである。

② TESS はケプラー宇宙望遠鏡に取って代わったが，目標を達成したため現在は稼働していない。

③ ExoMiner が既存の機械学習より信頼できるのは，人間と同じ思考法を採っているからである。

④ NASA は今後 TESS 以外の望遠鏡を利用することも考えている。