

文部科学省後援

技術英検

プロフェッショナル試験問題

サンプル

<注意事項>

1. 受験番号、氏名をこのページ下欄に必ず記入してください。
記入漏れの場合は無効となります。
2. 大問は I から V まであります。すべての問題を英語で解答してください。
3. 合計で60%以上の得点（120点以上）で準プロフェッショナル認定となります。
記入漏れの場合は、無効となります。
4. 合計で75%以上の得点（150点以上）でプロフェッショナル認定となります。
ただし、得点が50%未満の解答が1問でもあると、合計得点に関わらずプロフェッショナル認定されません。白紙解答の設問がないよう、気を付けてください。
5. 解答は「解答用紙」に書いてください。
6. 「試験問題」「解答用紙」はお持ち帰りにならず、提出してください。

受験番号	(会場)	-P-	(番号)
氏名			

I Read the article and answer questions (1) and (2). (50 点)

Back in the 1930s, aviation manufacturer Boeing came up with a new airliner, the Model 307 Stratoliner, which featured a game-changing innovation. It was equipped with a pressurized cabin, which enabled the plane to fly more swiftly and safely at altitudes above the weather, without causing passengers and crew to have difficulty getting enough oxygen from breathing the thinner air at 20,000 feet (6,096 meters). Since then, cabin pressurization has become one of those technologies that most of us who fly probably take for granted.

Cabin pressurization works so well that passengers barely even notice it, in part because it gradually adjusts the air pressure inside the plane as it climbs in altitude, and then adjusts it again on the way down, explains Chuck Horning, an expert on aviation maintenance.

“It's not a terribly complex system,” says Horning, who explains that the basic technology has pretty much stayed the same for decades, though the advent of electronic, computerized controls has made it more precise. Essentially, the aircraft uses some of the excess air that is pulled in by the compressors in its jet engines. “The engines don't need all that air for combustion, so some of it is tapped off and used both for air conditioning and pressurization.”

The excess air from the compressors is cooled, and then pumped into the cabin. It is regulated by a device called the air cabin pressure controller, which Horning describes as “the brains of the pressurization system.”

“That controller automatically regulates the pressurization,” Horning explains. “It knows from information that the flight crew enters what the cruising altitude is. It schedules the pressurizing so that as the airplane climbs and the external pressure goes down, it goes to work.”

Pressurizing an aircraft too much could put its fuselage under too much stress from differential pressure as the plane climbs, Horning says. To avoid that, airliners do not try to duplicate the air pressure at sea level. Instead, at a cruising altitude of 36,000 feet (10,973 meters), most commercial jets simulate the air pressure at an elevation of 8,000 feet (2,438 meters), about the same as Aspen, Colorado.

The Boeing 787 Dreamliner, which has super-strong carbon fiber in its airframe, can get that down to the equivalent of air pressure at 6,000 feet (1,829 meters). “That's better, because as the cabin altitude goes up, you have less oxygen in your blood,” Horning explains. “That's why when you get off a plane, you may feel tired.”

How much air needs to be added to pressurize depends on the volume of the cabin, Horning says. Because the aircraft's pressurization system works in combination with the air conditioning system, it's also continuously cycling that air through the cabin, recirculating some of it and venting the rest as it draws in fresh air from the engine compressor. Most airplanes will completely exchange the air inside the cabin in three to five minutes, according to Horning.

Airliners have to be careful to pressurize gradually as they ascend and depressurize just as gradually when they descend toward the destination airport, because humans are pretty sensitive to changes in air pressure—something anyone who's ever suffered from airplane ear already knows. That is one reason why the air pressurization system has automated controls. As Horning explains, if the controller were to malfunction, the aircraft's pilot could manually depressurize the aircraft during the descent, but it might be

an uncomfortable experience for passengers and crew, since it's tough to do it as deftly by hand.

The air pressurization system also contains safety mechanisms designed to ward off mishaps. The positive pressure release valve will pop open if inside pressure gets too high because too much air is being pumped in the cabin. It will relieve that pressure. There is also the negative pressure valve, which protects the aircraft from the effects of a shift in which the outside pressure would become greater than inside the cabin. This might occur during a sudden descent.

“Airplanes are not designed to be submarines,” Horning says. “They're designed to have a higher inside pressure than the outside. That's why that negative pressure relief valve is much more sensitive.” As a result, when you are on a plane that is descending, occasionally you hear a loud rush of air. That is the negative pressure valve kicking in.

In the rare event that depressurization fails during a flight, there are other safeguards, Horning notes. There is a sensor that detects when the pressure declines to the equivalent of 12,000 feet (3,658 meters) in elevation. That switch automatically drops oxygen masks into the cabin, so that the passengers can continue to breathe without difficulty. In some aircraft, the oxygen comes from cylinders, while others get it from generators that release oxygen through a chemical reaction.

(1) Describe the main idea of the article in a sentence of approximately 15 words. (10 点)

(2) Summarize the article in approximately 120 words. (40 点)

II Translate the following Japanese passage into English. (30 点)

本メールソフトを開くと、お持ちの全ての E メールアカウントのメールを同時に見ることができます。また、やり取りの流れがつかみやすいよう、メッセージはスレッド形式で表示されます。文章のみのメールだけではなく、埋め込み画像のあるメールの送受信も可能です。メール本文、そして添付ファイルのプリントアウトはクリック 1 つで行うことができます。本ソフトでメッセージを送受信するためには PC がインターネットに接続されていなければなりません。本メールソフトには Web 版もありますが、ログイン時の 2 段階認証、IP アドレスの非公開、そしてメールの暗号化によって、本ソフトと同様に安全にご使用いただけます。

III Summarize the following Japanese passage within approximately 100 words in English.
(40 点)

X 部長

試作品の製作に向けての進捗をご報告させていただきます。

昨日、設計部より設計の一部を変更したい、という申し出がありました。変更の要請があった箇所は、製品のスピードを調整するところで、今の設計のままですと、回転数が 12,000 rpm を超えると、振動が許容限界を超えてしまうようです。この製品は 15,000 rpm まで回転数を上げて使用されることが多いことが昨年の顧客からのフィードバックでわかっていますので、そうなりますと、製品寿命が短くなってしまい、とのことです。設計部の話では、A 回路の代わりに B 回路を使用してスピードを調節する、という選択肢に絞り込んでいるようです。

その他の箇所については C チームからの連絡待ちですが、それを除けば、プロジェクトは計画通りに進行しております。設計部から変更された設計が届きましたら、一度、改変された設計図に基づいた試作品の製作にとりかかります。

試作品が完成するまでに 2 週間、と見えています。完成後、D 試験場にて 2 回テストを行う予定です。設計の変更箇所以外は 2 ヶ月前のテストで基準をクリアしていることが社内で確認済みですので、今回のテストでは設計変更を行った箇所を主に見たいと思っております。

IV Read the passage below and answer questions (1) and (2). (20 点×2)

We assume that if a person has ideas, putting them on the page is a simple matter of recording them, when in fact the process is usually more complicated. As we've all experienced, our ideas do not necessarily arise in a linear form. We may have a scattering of related ideas, a hunch that something feels true, or some other sense that an idea is "right" before we have worked out the details. It is often through the act of writing that we begin to create the logical relationships that develop the idea into something that someone else may receive and perhaps find interesting. The process of putting ideas into words and arranging them for a reader helps us to see, create, and explore new connections. So not only does a writer need to "have" ideas, but the writer also must put them in a linear form, to "write" them for a reader, in order for those ideas to be meaningful. As a result, when we are writing, we often try to immediately fit our choices into linear structures.

- (1) According to the article, how do ideas arise before we put them into writing? Answer the question in a sentence of around 10 words.

- (2) Why does the author say, "the process is usually more complicated"? Answer the question in a sentence of around 15 words.

V The following (a)-(d) contain two sentences each, and in the two sentences, there is one grammatical error in one of them. Correct the errors, and rewrite the sentences into **one** clear, concise, and correct sentence. (10 点×4)

(a) This manual is consisting of two parts. This manual describes how to build the computer.

(b) The experiment will temporarily stop soon. The next team will have continued the experiment next month.

(c) This company is much profitable. This company's products have a high reputation around the world.

(d) The part is no longer manufactured. We must either make the part or find the part we need it.

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技術英検 文部科学省 後援

プロフェッショナル サンプル試験問題 模範解答例

試験時間： 14:00～16:00（120分）

注意事項： 全問記述式

- ・問題用紙・解答用紙とも持ち帰り不可
- ・辞書または辞典を2冊まで持ち込み可（ただし、電子辞書類は持ち込み不可）

200点満点

解答用紙、解答欄省略

〒105-8522 東京都港区芝公園 3-1-22
TEL: (03)3434-2350 FAX: (03)3434-2486
<https://jstc.jma.or.jp/> E-mail: jstc@jma.or.jp



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《I》 配点 : 50 点 【(1) 10 点 (2) 40 点】

(1)

< 模範解答例 >

Pressurized cabins allow airplanes to cruise faster and ensure safer and more comfortable flights.

(14 words)

(2)

< 模範解答例 >

Flying drastically changed when the innovative cabin pressurization system was introduced in the 1930s. Since then, airplanes have been flying at higher altitudes to cruise faster and to avoid the weather underneath. Although airplanes now use a computerized system called the air cabin pressure controller, the principle of cabin pressurization has not changed: excess air from the engines' compressors is pulled in and is used for cabin air conditioning and pressurization. Humans are sensitive to changes in air pressure, so a gradual pressurization and depressurization is required. The controller has several safeguards, such as a manual depressurizing system, air valves that adjust cabin pressure, and an automatic release of oxygen masks when the onboard sensor detects a sudden pressure change.

(120 words)

《II》 配点 : 30 点

< 模範解答例 >

When the software is opened, the emails from all your email accounts are displayed at once. The messages are in threads, so it is easy to follow the sequence of your mails. In addition to text-only emails, you can send or receive emails with images embedded. Email and attachment printing can be done with a single click. To send or receive messages in this software, your PC must have an Internet connection. There is a web version of this software, which offers the same level of security by employing two-step authentication when you log in, IP address concealment, and email encryption.

《III》 配点：40 点

<模範解答例>

Dear Mr. X,

I would like to report on the progress of our prototype.

Yesterday, the design department said they wanted to change the current A circuit to B circuit for speed regulation, because the vibration exceeded the tolerance limits when the revolution went over 12,000 rpm, far below the expected service range. For the other parts, we are waiting for C team's report. Overall, the project is proceeding as scheduled.

It will take about two weeks to finish the prototype. We will run two tests at D facility and mainly check the parts where the design has been altered.

(100 words)

《IV》 配点：40 点 (20 点×2) (IV 内での配点は回により異なる)

(1)

<模範解答例>

They emerge instinctively in obscure and scattered fragments.

(2)

<模範解答例>

Because in writing, ideas must be in a logical and linear form.

《V》 配点：40点（10点×4）（V内での配点は回により異なる）

(a)

<模範解答例>

This manual, which describes how to build the computer, consists of two parts.

(b)

<模範解答例>

The experiment, which will be continued by the next team next month, will temporarily stop soon.

(c)

<模範解答例>

This company, whose products have a high reputation around the world, is very profitable.

(d)

<模範解答例>

The part is no longer manufactured, so we must either make or find one when we need it.

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