

**MARINHA DO BRASIL**  
**SERVIÇO DE SELEÇÃO DO PESSOAL DA MARINHA**

***CONCURSO PÚBLICO DE ADMISSÃO À ESCOLA NAVAL  
CPAEN/2022***

**NÃO ESTÁ AUTORIZADA A UTILIZAÇÃO DE  
MATERIAL EXTRA**

**1º Dia – Prova de Matemática e Inglês**

**QUESTÃO 1**

Seja  $A$  o conjunto de valores reais para o qual

$$f(x) = \log_{10} \left[ \log_{\frac{1}{3}}(x^2 - x + 1) \right] \text{ esteja definida. Seja } B \text{ o}$$

conjunto dos valores reais de  $k$  de forma que a equação

$$x^2 - 2x + \log_{10}(k - 2) = 0 \text{ admita raízes reais distintas.}$$

Desse modo, assinale a opção que apresenta o conjunto

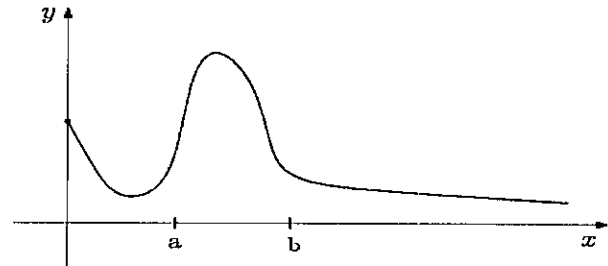
$A \cap B$ .

- (A)  $\emptyset$
- (B)  $(2; 12)$
- (C)  $[0; 12]$
- (D)  $(1; 2]$
- (E)  $(0; 1)$

**QUESTÃO 2**

Seja  $f$  a função definida por  $f(t - a) = \begin{cases} 0, & 0 \leq t < a \\ 1, & t \geq a \end{cases}$ .

Considere o esboço do gráfico de  $g$  representado pela figura abaixo.



Assinale a opção que apresenta o esboço da parte positiva do gráfico de  $g(t - a) f(t - a) - g(t - a) f(t - b)$ .

- (A)
- (B)
- (C)
- (D)
- (E)

### QUESTÃO 3

Para que valores reais de  $x$ , a sequência geométrica  $\left(\frac{2x}{3x+1}; \frac{2x}{(3x+1)^2}; \frac{2x}{(3x+1)^3}; \dots\right)$  possui o limite da soma de seus termos iguais a  $\frac{2}{3}$ ?

- (A)  $\forall x \in R$
- (B)  $R - \left\{-\frac{1}{3}\right\}$
- (C)  $(0; 1)$
- (D)  $\left(-\infty; -\frac{2}{3}\right) \cup (0; +\infty)$
- (E)  $\left(-\infty; -\frac{1}{3}\right) \cup (0; +\infty)$

### QUESTÃO 4

Seja  $f$  uma função definida no conjunto dos números reais. Supondo que  $\lim_{x \rightarrow 0} \frac{f(x)}{x} = L$ , é correto afirmar que o

valor do  $\lim_{x \rightarrow 1} \frac{f(x^2 - 1)}{x - 1}$  é igual a:

- (A)  $-2L$
- (B)  $-L$
- (C)  $0$
- (D)  $L$
- (E)  $2L$

### QUESTÃO 5

Um ângulo agudo de um triângulo retângulo ABC, reto em C, é igual a  $\alpha$ . Sabe-se que a hipotenusa desse triângulo e os prolongamentos de CA e CB são tangentes a uma circunferência de raio  $R$ . Desse modo, o comprimento da hipotenusa é igual a:

- (A)  $\frac{R\sqrt{2}}{2\cos\left(\frac{\alpha}{2}\right)\cos\left(45^\circ - \frac{\alpha}{2}\right)}$
- (B)  $\frac{R\sqrt{3}}{\operatorname{sen}\left(\frac{\alpha}{2}\right)\cos\left(45^\circ - \frac{\alpha}{2}\right)}$
- (C)  $\frac{R\sqrt{2}}{2\operatorname{sen}\left(\frac{\alpha}{2}\right)\operatorname{sen}\left(45^\circ - \frac{\alpha}{2}\right)}$
- (D)  $\frac{R\sqrt{3}}{\cos\left(\frac{\alpha}{2}\right)\operatorname{sen}\left(45^\circ - \frac{\alpha}{2}\right)}$
- (E)  $\frac{R\sqrt{2}}{2\cos\left(\frac{\alpha}{2}\right)\operatorname{sen}\left(45^\circ - \frac{\alpha}{2}\right)}$

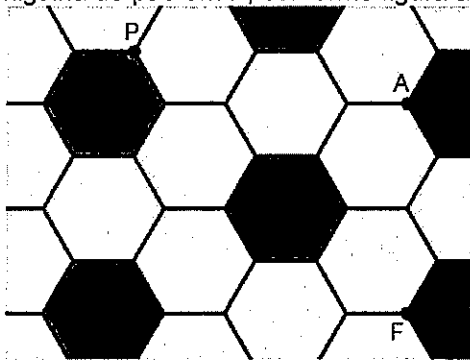
### QUESTÃO 6

Considere dois navios e um submarino da Marinha do Brasil em um exercício de Operações Navais. Os navios serão chamados de P31 e P32 e o submarino de S40. Supondo que, às 12h, S40 verifica que, em seu sonar, P31 está 100km a oeste de P32 e que P31 está navegando para o sul a 35km/h e P32 está indo para norte a 25km/h. O comandante do S40 determina ao operador de sonar que verifique e lhe dê a resposta de quão rápido estará variando a distância entre P31 e P32, às 16h. Assinale a opção que apresenta a resposta correta do operador de sonar ao comandante do S40, aproximadamente.

- (A) 52,3 km/h
- (B) 55,4 km/h
- (C) 56,8 km/h
- (D) 59,3 km/h
- (E) 59,9 km/h

### QUESTÃO 7

Em um piso formado por ladrilhos nos formatos de hexágonos regulares congruentes de lados iguais a 2cm, uma formiga se encontra no ponto F, uma aranha no ponto A e uma migalha de pão em P, conforme figura abaixo.



A formiga e a aranha se deslocam em direção a P no mesmo instante e com velocidades constantes iguais. A formiga somente se desloca através dos segmentos determinados pelos lados dos hexágonos. Quando a aranha chega em P, qual é a menor distância possível, em cm, dela até a formiga?

- (A)  $2\sqrt{58 - 11\sqrt{3}}$
- (B)  $2\sqrt{29 - 3\sqrt{21}}$
- (C)  $2\sqrt{58 - 11\sqrt{21}}$
- (D)  $2\sqrt{37 - 11\sqrt{3}}$
- (E)  $2\sqrt{37 - 4\sqrt{21}}$

### QUESTÃO 8

Suponha que duas aeronaves da Marinha do Brasil, F1 e F2, estejam percorrendo as trajetórias dadas pelas retas

$$r: X = (-1, 2, 0) + \beta(1, 3, 1) \quad \text{e} \quad S: \begin{cases} 3x - 2z - 3 = 0 \\ y - z - 2 = 0 \end{cases}$$

respectivamente. É correto afirmar que a distância entre essas retas é igual a:

- (A)  $\frac{7\sqrt{7}}{12}$
- (B)  $\frac{6}{\sqrt{23}}$
- (C)  $\frac{6\sqrt{21}}{7}$
- (D)  $\frac{12}{\sqrt{46}}$
- (E)  $\frac{4\sqrt{21}}{8}$

### QUESTÃO 9

Seja  $ABC$  um triângulo de lados  $\overline{AB} = 4$ ,  $\overline{BC} = 3$  e  $\overline{CA} = 6$ . Sejam  $D$ ,  $E$  e  $F$  os pontos onde o círculo inscrito a  $ABC$  tangencia os lados  $BC$ ,  $CA$  e  $AB$ , respectivamente, e suponha, ainda, que o círculo ex-inscrito a  $BC$  tangencia tal lado em  $M$  e os prolongamentos de  $AC$  e  $AB$  respectivamente em  $N$  e  $P$ . Desse modo, assinale opção que apresenta o comprimento de  $\overline{FD}$ .

- (A) 2
- (B) 3
- (C) 4
- (D) 5
- (E) 6

### QUESTÃO 10

Considere a seguinte definição: "Diz-se que uma matriz  $A$ , de ordem  $n \times n$  é estritamente diagonal dominante

quando  $|a_{ii}| > \sum_{\substack{j=1 \\ j \neq i}}^n |a_{ij}|$  é válido para cada  $i = 1, 2, \dots, n$ ."

Suponha que  $A$  e  $B$  sejam matrizes  $n \times n$  estritamente diagonais dominantes. Com base nessa definição assinale a opção correta.

- (A) É falso que  $A - B$  é estritamente diagonal dominante.
- (B) É falso que  $-A$  é estritamente diagonal dominante.
- (C) É verdadeiro que  $A^T$  (transposta de  $A$ ) é estritamente diagonal dominante.
- (D) É verdadeiro que  $A + B$  é estritamente diagonal dominante.
- (E) É verdadeiro que  $A^2$  é estritamente diagonal dominante.

### QUESTÃO 11

Sejam o número real  $x$  e  $i$  a unidade imaginária. O produto dos valores de  $x$  que torna a igualdade  $|7 - xi + 4i| = 8$  verdadeira é igual a:

- (A) -1
- (B) 0
- (C) 1
- (D) 15
- (E) 16

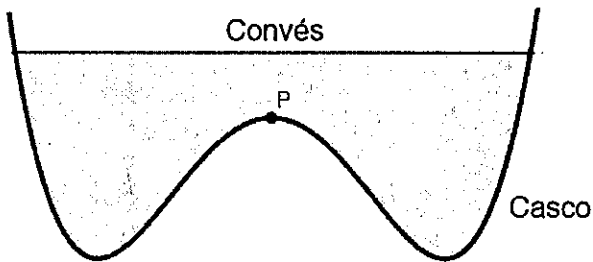
**QUESTÃO 12**

Na última corrida de automóveis em um campeonato, Lewis precisa completar a prova, no mínimo, duas posições à frente de Max para ser declarado campeão. Nessa última corrida, com apenas dez participantes, Lewis larga em primeiro e Max na última posição. Considerando os resultados possíveis da corrida e que todos os pilotos completem a prova, qual a probabilidade de Lewis ser o campeão?

- (A)  $\frac{1}{90}$   
 (B)  $\frac{7}{10}$   
 (C)  $\frac{4}{5}$   
 (D)  $\frac{2}{5}$   
 (E)  $\frac{3}{8}$

**QUESTÃO 13**

Um barco catamarã foi construído de forma que a parte central do casco possui seção transversal modelada pela função  $f$ , definida por  $f(x) = \frac{1}{3}x^4 - 1,2x^2$ , com  $x$  em metros, conforme apresentado na figura abaixo.



A linha do convés encontra-se a 0,5 m do ponto alto P (distância vertical). Considerando apenas a figura plana, a distância, em metros, do convés ao ponto mais baixo do casco é igual a:

- (A) 1,08  
 (B) 1,34  
 (C) 1,58  
 (D) 1,84  
 (E) 2,08

**QUESTÃO 14**

Sejam  $f$  e  $g$  funções definidas nos reais, tais que  $f(x) = 4x^3 - 24x^2 + 48x - 40$  e  $f \circ g(x) = x$ . Dessa forma  $g(x)$  é igual a:

- (A)  $1 + \sqrt[3]{x - 2}$   
 (B)  $2 - \sqrt[3]{\frac{x}{4} + 2}$   
 (C)  $2 - \sqrt[3]{\frac{x}{4} + 4}$   
 (D)  $2 + \sqrt[3]{x + 2}$   
 (E)  $2 + \sqrt[3]{\frac{x}{4} + 2}$

**QUESTÃO 15**

O escudo do atual campeão de futebol na série de acesso, o Botafogo, possui como principal símbolo uma estrela (figura 1).



Figura 1

Considere que a estrela foi formada a partir de uma circunferência unitária dividida em cinco partes iguais, determinando os pontos A, C, E, G e I (figura 2). As cordas AE, AG, CG, CI e EI determinam um pentagrama, isto é, formam a estrela. Assinale a alternativa que representa a área da estrela, em unidades de área, ou seja, do polígono ABCDEFGHIJ.

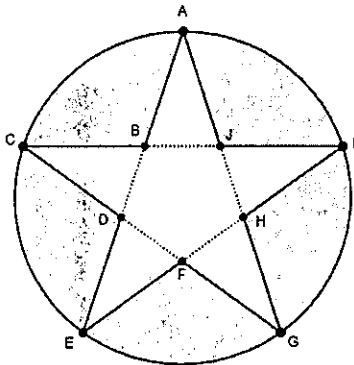
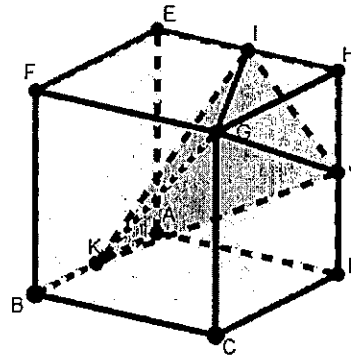


Figura 2

- (A)  $5 \cdot \text{tg}(36^\circ) \cdot \cos(72^\circ)$
- (B)  $\text{tg}(72^\circ) \cdot \cos(36^\circ)$
- (C)  $5 \cdot \text{tg}(36^\circ) \cdot \text{sen}(72^\circ)$
- (D)  $5 \cdot \text{sen}(36^\circ) \cdot \cos(36^\circ)$
- (E)  $\text{tg}(72^\circ) \cdot \text{sen}(72^\circ)$

**QUESTÃO 16**

Seja o cubo ABCDEFGH de aresta 2 cm e I, J e K pontos médios das arestas EH, DH e AB, respectivamente.



O volume da pirâmide GIJK, em  $\text{cm}^3$ , é igual a:

- (A)  $\frac{7}{6}$
- (B)  $\frac{3}{2}$
- (C)  $\frac{5}{4}$
- (D)  $\frac{11}{8}$
- (E)  $\frac{13}{12}$

**QUESTÃO 17**

Seja  $F$  uma função real definida por

$$F(t) = \lim_{b \rightarrow \infty} \int_0^b e^{-tx} g(x) dx, \text{ em que } g(x) = xe^{-ax} \text{ com } a$$

um número real. Assinale a opção que apresenta todos os valores de  $t$  para os quais  $F(t)$  exista.

- (A)  $t > -a$
- (B)  $t < a$
- (C)  $t < -2a$
- (D)  $t > a$
- (E)  $t > 2a$

### QUESTÃO 18

Sejam as funções  $f$  e  $g$  tais que  $f(x) = 5x^4 - 2x^3 + 2x$ ,  
 $g'(x) = \frac{2}{x+3}$  e  $g(1) = 0$ . O valor de  $(f \circ g)'(1)$  é igual a :

- (A)  $\ln(16)$
- (B)  $5 \cdot \ln(4)$
- (C) 0
- (D) 1
- (E)  $\frac{1}{2}$

### QUESTÃO 19

Na observação astronômica, o telescópio refletor, com espelho parabólico no fundo de um tubo (figura 1), é bastante utilizado. Os raios provenientes de corpos celestes formam um feixe praticamente paralelo, refletem no espelho parabólico e formam a imagem no foco  $F$  da parábola.

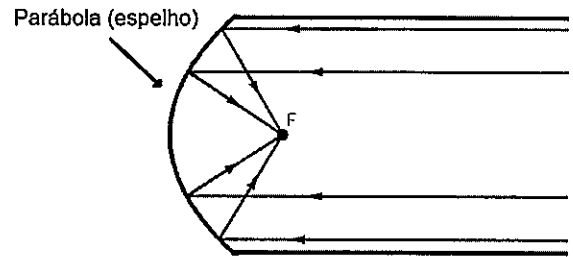


Figura 1

Esse modelo de telescópio apresenta um problema: o observador precisa estar no foco da parábola para ver a imagem. Em 1672, o astrônomo Cassegrain propôs a utilização de um espelho hiperbólico (espelho E) para resolver o problema. Essa hipérbole do espelho terá  $F$  como um dos seus focos. Os raios que iriam formar a imagem em  $F$  são refletidos no espelho E e formam a imagem no ponto  $F_1$  fora do tubo do telescópio (figura 2).

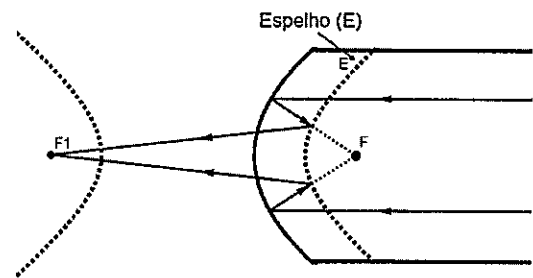


Figura 2

Considerando o modelo plano, como sugerem as figuras, tomamos a parábola com equação  $y^2 = 16x$  e foco  $F$ , a hipérbole (do espelho E e um dos focos  $F$ ) com excentricidade  $\frac{3}{2}$ , focos na horizontal e uma de suas assintotas de equação  $y = \frac{\sqrt{5}}{2}x + \sqrt{5}$ ; podemos afirmar que a distância, em unidades de comprimento, entre  $F$  e  $F_1$  é igual a :

- (A)  $6\sqrt{5}$
- (B) 12
- (C) 10
- (D)  $4\sqrt{5}$
- (E)  $3\sqrt{5}$

**QUESTÃO 20**

Seja  $z = \frac{\sqrt{3}}{2} + \frac{1}{2}i$  um número complexo, sendo  $i$  a unidade imaginária.

Considere a soma  $S = 1 + Z + Z^2 + Z^3 + \dots + Z^{49} + Z^{50}$ . Desse modo, assinale a opção que apresenta o intervalo  $R$  ao qual a parte real de  $S$  pertence. Dados:  $\sqrt{2} = 1,4$ ;  $\sqrt{3} = 1,7$  e  $\sqrt{5} = 2,2$ .

- (A) (-1; 0)
- (B) (-3; -2)
- (C) (-2; -1)
- (D) (0; 1)
- (E) (2; 3)

**QUESTÃO 21**

Uma perpendicular de comprimento  $p$  é traçada do pé da altura de uma pirâmide regular  $SABC$  até uma aresta lateral ( $SC$ ,  $SB$  ou  $SA$ ). Assinale a opção que apresenta o volume da pirâmide  $SABC$  se o ângulo entre suas faces é  $2\alpha$ .

- (A)  $\frac{6}{5}p^2 \frac{\operatorname{tg}^2(\alpha)}{\sqrt{2 - \cot^2(\alpha)}}$
- (B)  $\frac{1}{12}p^2 \frac{\cot^2(2\alpha)}{\sqrt{3 - \operatorname{tg}^2(\alpha)}}$
- (C)  $\frac{2}{3}p^3 \frac{\operatorname{tg}^2(2\alpha)}{\sqrt{2 - \cot^2(\alpha)}}$
- (D)  $\frac{3}{2}p^2 \frac{\operatorname{tg}^2(\alpha)}{\sqrt{1 - \cot^2(2\alpha)}}$
- (E)  $\frac{9}{4}p^3 \frac{\operatorname{tg}^2(\alpha)}{\sqrt{3 - \cot^2(\alpha)}}$

**QUESTÃO 22**

Sabendo que  $\int_0^\pi (f(x) + \operatorname{sen}(2x)) dx = 2$ , assinale a

alternativa que indica o valor de  $\int_0^\pi \left( f(x) + 9 \left( \frac{x}{\pi} \right)^2 \right) dx$ .

- (A)  $1 + 3\pi$
- (B)  $2 + 3\pi$
- (C)  $2 + \pi$
- (D) 5
- (E) 4



Read the text below and answer questions 23, 24 and 25.

### What It's Like to Live in the Jungle for a Month

December 10, 2018  
Lesley de Souza (Keller Science Action Center)

Our team of Field Museum scientists - experts on fish, plants, amphibians, mammals, and more - traveled to Colombia to join regional and national scientists for a month, with the goal of going deep into the rainforest and documenting as much wildlife as possible. We've done several trips like this, called rapid inventories, in the Amazon basin, but this one felt especially important. We were exploring an area that no scientists had entered for over sixty years because of guerrillas.

Now we're able to venture into this region, but it is also exposed to threats. Deforestation is moving into this area at an alarming rate. With a focused mission, we explore the beautiful landscape and its many diverse critters while working and learning from the people who live there.

But getting into the rainforest - it's no easy feat! After taking a commercial airliner from Chicago, we made our way into the jungle by bush plane, upriver by boat, and lastly, on our own two feet. To get to one campsite, we hiked for a mile in a flooded creek, balancing on floating logs.

Each campsite is a little different, but it's always important to set up a kitchen and dining area! Typical meals include fish, rice, beans, plantains, and oatmeal - repeat, repeat, repeat. A definite bonus of fieldwork life? Brewing fresh hot chocolate from local cacao in the jungle. Plus, lots of coffee keeps us going for long days (and late nights) of collecting and recording data.

You realize what a force nature is - especially during rainy season in the Amazon. That's why I prefer sleeping off the ground in a hammock. At one particular site, I woke up with water below me. The river had risen so much that it flooded the forest. But I also love the breeze being suspended in the air. I'm convinced you sleep better with the swaying...

Of course, we're here to work. That means finding, measuring, photographing, identifying, and in some cases, collecting specimens. I focus on Neotropical fish species, and I learn A LOT from talking to local people about fishes. It is an important part of their diet and the economy. Because they're fishermen themselves, they have firsthand knowledge of things like fish behavior, where and when to find them, and how to catch them. It's such important information when trying to understand the landscape, people, and fishes for conservation.

At the end of each day, we have seen, collected and photographed so many specimens. But there is still more work to do at night - which means working by candlelight or putting on our headlamps. Some groups stay

up until one in the morning, like the botany team pressing plants. The reptile & amphibian and fish teams go out for their night survey, and the mammal team sets up mist nets to catch bats! It's activity around the clock for a rapid inventory team.

At the end of the day, we may be exhausted, but it really is a privilege to set foot in these natural areas and learn from the local people and scientists. On this trip alone, we documented 750 species of plants and 686 species of vertebrates! And we estimate there are more than double these numbers in the area. The more we know about what lives in rich natural areas like the Amazon rainforest, the easier it is for us to work together to protect the landscapes where they live and the people who depend on them.

(Adapted from <https://www.fieldmuseum.org/blog>)

#### QUESTÃO 23

The word "creek" in the sentence "To get to one campsite, we hiked for a mile in a flooded creek, balancing on floating logs." (para. 3) means:

- (A) small river.
- (B) light breeze.
- (C) deep ocean.
- (D) arid desert.
- (E) strong wind.

#### QUESTÃO 24

The author does research on:

- (A) amphibians.
- (B) fish.
- (C) mammals.
- (D) plants.
- (E) reptiles.

#### QUESTÃO 25

Decide if the statements below are true (T) or false (F) according to the text. Then choose the option that contains the correct sequence.

- ( ) The text is about a leisure trip.
- ( ) They spent more than twenty days in Colombia.
- ( ) Their journey into the forest was hard.
- ( ) In the forest, the author sleeps better on the ground.
- ( ) They documented less than six hundred species of animals during the trip.

- (A) (T) (F) (F) (T) (F)
- (B) (F) (T) (T) (T) (T)
- (C) (T) (F) (T) (T) (F)
- (D) (F) (T) (T) (F) (F)
- (E) (T) (T) (F) (F) (T)

Read the text below and answer question 26.

### Brazilian Navy releases new 20-year plan

By Victor Barreira

The Brazilian Navy is looking to acquire medium-sized general-purpose helicopters and attack, anti-submarine (ASW) and reconnaissance helicopters, according to the recently released Brazilian Navy latest Strategic Plan (Plano Estratégico da Marinha 2040/PEM 2040).

The Plan, which was publicly released on 10 September, calls for a host of other new measures to be implemented over the next 20 years. For example, the Navy wants to significantly increase research-and-development (R&D) to develop shipboard systems such as communications, detection, navigation, and electronic warfare. The R&D increases are also meant to help boost the country's Defence Technological and Industrial Base (DTIB).

The Navy also wants to achieve a minimum of 65% of ships and aircraft operational availability, create a cyber-warfare squadron, and bolster its satellite ability to intercept maritime communications.

According to the Plan, the Navy is now going to focus more heavily on operations in the Southern Atlantic Ocean, paying particular attention to threats such as piracy, illegal fishing, organised crime, urban conflicts, natural resources dispute, cyber warfare, terrorism, illegal access to knowledge, the pandemics, natural disasters, and environmental issues.

The document, which does not describe exact schedules, also covers a range of modernisation projects that were previously planned or initiated, but not yet effectively implemented or concluded. These include the acquisition of vessels (mine-hunting ships, escort ships, aircraft carriers, a logistics support ship, coastal and offshore patrol ships, Antarctic support ship, training ships, and survey ships), unmanned aerial vehicles (UAVs), fighter jets, and lightweight training and utility helicopters. In addition, the Plan aims at the enlargement and modernisation of equipment used by the Marines Corps, the development of anti-ship missiles, and the local construction of the country's first nuclear-powered submarine SN Álvaro Alberto.

(Adapted from <https://www.janes.com/>)

### QUESTÃO 26

According to the text, which option is correct?

- (A) The Navy has a new Strategic Plan that will start in 2040.
- (B) The R&D that will be carried out is expected to have little impact on DTIB.
- (C) The Plan measures are restricted to activities that involve sea patrolling.
- (D) The Plan contains a detailed calendar for the purchases and projects.
- (E) The Plan includes projects that were once started but not finished.

Read the text below and answer questions 27 and 28.

**Sleeping longer than 6.5 hours a night associated with cognitive decline according to research - what's really going on here?**

November 5, 2021

A good night's sleep is important for many reasons. It helps our body repair itself and function as it should, and is linked to better mental health and lower risk of many health conditions - including heart disease and diabetes. It has also been shown that not getting enough sleep is linked to cognitive decline and conditions such as Alzheimer's disease.

However, more is not always better, as one recent study found. Researchers from the Washington University School of Medicine have published a paper that indicates that just like getting too little sleep, sleeping too much may also be linked with cognitive decline.

The research team wanted to know how much sleep was linked to cognitive impairment over time. To do this, they looked at 100 older adults in their mid-to-late-70s, and tracked them for between four and five years. At the time of their study, 88 people did not show any signs of dementia, while 12 showed signs of cognitive impairment (one with mild dementia and 11 with the pre-dementia stage of mild cognitive impairment).

Throughout the study, participants were asked to complete a range of commonplace cognitive and neuropsychological tests to look for signs of cognitive decline or dementia. Their scores from these tests were then combined into a single score, called the Preclinical Alzheimer Cognitive Composite (PACC) score. The higher the score, the better their cognition was over time.

Sleep was measured using a single-electrode encephalography (EEG) device, which participants wore on their forehead while sleeping, for a total of between four to six nights. This was done once, three years after people first completed their annual cognitive tests. This EEG allowed the researchers to accurately measure brain activity, which would tell them whether someone was asleep (and for how long), and how restful that sleep was.

Sleep was only measured at one period during the study, but this still gave the research team a good indication of participants' normal sleep habits. While using an EEG to measure brain activity may be somewhat disruptive to sleep on the first night, as people get used to the equipment, sleep tends to return to normal the following night. This means that when sleep is tracked from the second night onwards, it is a good representation of a person's normal sleep habits.

The researchers also took into account other factors that can affect cognitive decline - including age, genetics and whether a person had signs of the protein beta-amyloid or tau, which are both linked to dementia.

Overall, the researchers found that sleeping less than 4.5 hours and more than 6.5 hours a night - alongside

poor quality sleep - was associated with cognitive decline over time. Interestingly, the impact of sleep duration on cognitive function was similar to the effect of age, which is the greatest risk factor for developing cognitive decline.

(Adapted from <https://theconversation.com/>)

**QUESTÃO 27**

Decide if the statements below are true (T) or false (F) according to the text. Then choose the option that contains the correct sequence.

- ( ) The study aimed at finding out how much sleep in a year could cause dementia.
- ( ) People who were 70 years old were not included in the group of 100 older adults.
- ( ) Less than 15% of the subjects already had some level of cognitive decline.
- ( ) Cognition tests were administered before the subjects' sleep patterns were tracked.
- ( ) The team concluded that the amount and the quality of sleep are linked to cognition.

- (A) (T) (T) (T) (T) (F)
- (B) (F) (T) (F) (F) (T)
- (C) (F) (T) (T) (T) (T)
- (D) (F) (F) (T) (T) (F)
- (E) (T) (F) (F) (T) (F)

**QUESTÃO 28**

What element does the pronoun "which" refer to in the sentence "Interestingly, the impact of sleep duration on cognitive function was similar to the effect of age, which is the greatest risk factor for developing cognitive decline." (para. 8)?

- (A) Interestingly.
- (B) Impact.
- (C) Sleep duration.
- (D) Cognitive function.
- (E) Age.

### QUESTÃO 29

Read the paragraph below. Complete the sentences with *a*, *an*, *the* or  $\emptyset$  (no article).

Not everyone is cut out for traveling or being away from \_\_\_\_\_ home for \_\_\_\_\_ long period of time, and that's perfectly fine! As someone with \_\_\_\_\_ younger brother still in high school, I personally chose to attend college at \_\_\_\_\_ university \_\_\_\_\_ hour away from my hometown.

(Adapted from <https://www.collegeraptor.com/>)

Now mark the option that completes the paragraph correctly.

- (A)  $\emptyset$  / a / a / an / a
- (B) the / a / an / a / a
- (C)  $\emptyset$  / a / a / a / an
- (D) a /  $\emptyset$  / an / the / a
- (E) the / a / a / an / an

### QUESTÃO 30

Mark the option that completes the text below correctly.

Bill Gregg never suspected that he would solve a 67-year-old mystery when he began digging a place for a pool. It was the middle of July when he started the excavation. He found a ring and set out to locate its owner.

"I can't believe that he took the time to find me," said Mrs. Gardner, who is 85 years old.

Having already planned a trip back to the area to meet Gregg, Mrs. Gardner \_\_\_\_\_ the ring in person.

(Adapted from <https://www.sharonherald.com/>)

- (A) said him wants to give herself
- (B) told that she wanted he gave her
- (C) said she wanted him to give her
- (D) said that she wanted he to give hers
- (E) told him she wants him to give hers

### QUESTÃO 31

Choose the correct option to complete the text below.

Drone saves missing 65-year-old climber in the Himalayas

Daniel Van Boom  
July 18, 2018

Scottish climber Rick Allen \_\_\_\_\_ a drone after he had fallen during a solo climb of Broad Peak mountain in the Himalayas. Allen's climbing bag \_\_\_\_\_ a base camp worker, prompting the drone \_\_\_\_\_ to successfully locate him. Then, Rick Allen \_\_\_\_\_ without significant injury.

(Adapted from <https://www.cnet.com>)

- (A) was saved for / spotted / to be sent out / rescued
- (B) saved / was spotted by / to send out / rescued
- (C) was saved for / was spotted for / to send out / was rescued
- (D) was saved by / spotted / to send out / was rescued
- (E) was saved by / was spotted by / to be sent out / was rescued

### QUESTÃO 32

Which option completes the paragraph below correctly?

Listen to this advice. \_\_\_\_\_ your toothache, joint pains, headache or cough in your lungs, for example. Some small issues may turn into a complicated situation as you start getting old, so \_\_\_\_\_ an appointment from your doctor and \_\_\_\_\_ diagnosed.

(Adapted from <https://www.eatthis.com/>)

- (A) Don't ignore / make / get
- (B) Don't to ignore / to make / to get
- (C) Don't ignoring / making / getting
- (D) Don't ignore / to make / get
- (E) Don't to ignore / make / to get

### QUESTÃO 33

Which option completes the text below correctly?

Dr. How Hoong Au: Learning Mandarin at 75

Dr. How Hoong Au \_\_\_\_\_ born in Malaysia to parents from mainland China. His family \_\_\_\_\_ it would be better for him to learn in English than Mandarin or Cantonese. That \_\_\_\_\_ Au without much knowledge of any Chinese language.

At the age of 75, Au now attends the Toronto Mandarin School alongside his grandchildren, who \_\_\_\_\_ the language as well.

(Adapted from <https://www.cbc.ca>)

- (A) is / figured / left / was learning
- (B) was / figured / left / are learning
- (C) were / figures / will leave / are learning
- (D) is / figures / left / is learning
- (E) was / figured / will leave / was learning

### QUESTÃO 34

Which option completes the text below correctly?

McLaren rue difficult day

Anna Francis  
November 6, 2021

McLaren admit they have \_\_\_\_\_ work to do after enduring a difficult start to their Mexican Grand Prix weekend.

Daniel Ricciardo and Lando Norris ended up in 14th and 15th respectively on the Free Practice 1 timesheets, whilst Free Practice 2 brought further issues.

"These things happen, and we'll just have to get into it tomorrow. We don't have \_\_\_\_\_ time to waste so we'll get amongst it. We've got \_\_\_\_\_ challenges ahead but we'll be alright. We got \_\_\_\_\_ information from Lando today to be able to pick it up tomorrow," said Ricciardo.

(Adapted from <https://racingnews365.com>)

- (A) enough / no / some / a lot
- (B) a lot / some / a few / some
- (C) plenty of / no / a little / enough
- (D) enough / any / a little / a lot
- (E) plenty of / any / a few / enough

### QUESTÃO 35

Which is the correct option to complete the paragraph below?

Aging is inevitable and yet it's hard \_\_\_\_\_ it's happening. Inside, you feel like you're 24 years old still, wanting \_\_\_\_\_ the most of life, maybe even more so now that you know there are more years behind you than ahead of you. And yet, no one told your body. It's not the same as it used \_\_\_\_\_. Acknowledging this can \_\_\_\_\_ your life. You just need \_\_\_\_\_ a few habits. [...] Start by \_\_\_\_\_ yourself [...] 'What do I want?' That answer will drive every decision you make.

(Adapted from <https://www.eatthis.com>)

- (A) admitting / to make / be / saving / to change / asking
- (B) admitting / make / being / to save / changing / ask
- (C) to admit / make / being / saving / change / ask
- (D) to admit / to make / to be / save / to change / asking
- (E) admitting / make / to be / to save / change / asking

### QUESTÃO 36

Which is the correct option to complete the text below?

TAMPA, Fla. - A Lutz man is now a millionaire after nearly \_\_\_\_\_ gas and buying a scratch-off ticket at a gas station in Tampa when he stopped to \_\_\_\_\_, according to the Florida Lottery.

Feras Al Younes, 48, won the top prize and chose to take his winnings as a one-time payment.

"I was standing at the pumps when I suddenly realized I was holding a \$2 million winning ticket! I was so excited that I left before my tank was full!" Al Younes said.

(Adapted from <https://www.abcactionnews.com>)

- (A) running out of / pass away
- (B) running out of / fill up
- (C) catching up with / pass away
- (D) looking up to / fill up
- (E) looking up to / take away

### QUESTÃO 37

Which is the correct option to complete the paragraph below?

"Age-related macular degeneration (AMD) is the leading cause of blindness in people over the age of 50 in the United States. [...]. It's important \_\_\_\_\_ regularly to proactively protect your vision."

(Adapted from <https://www.eatthis.com>)

- (A) to have your eyes examined
- (B) to have examined your eyes
- (C) your eyes have examined
- (D) have examined your eyes
- (E) to have your eyes examine

### QUESTÃO 38

Which option completes the paragraph below correctly?

\_\_\_\_\_ I went to Georgetown University on October 9, 2003, to interview Dr. James Alatis, I have to admit that I was nervous. \_\_\_\_\_ I had met him previously at an international convention (a mutual friend introduced us), I was sure that he wouldn't remember me.

(Adapted from ANCKER, William P. A call to service. *English Teaching Forum*. v. 50, n. 1, p.18-19, 2012.)

- (A) Before / Since
- (B) After / Therefore
- (C) While / Besides
- (D) When / Although
- (E) During / Despite

### QUESTÃO 39

Which option completes the sentence below correctly?

You had a dog when you were a kid, \_\_\_\_\_?

- (A) hadn't you
- (B) had you
- (C) didn't you
- (D) have you
- (E) weren't you

### QUESTÃO 40

Which option completes the dialogue below correctly?

"I want to have an animal," Rick said futilely, and gestured empty-handed.

\_\_\_\_\_ Deckard replied.

(Adapted from DICK, Philip K. *Do androids dream of electric sheep?* 1968, p. 7)

- (A) "So have I,"
- (B) "So do I,"
- (C) "Nor have I,"
- (D) "So did I,"
- (E) "Nor did I,"

**INSTRUÇÕES GERAIS AO CANDIDATO**

- 1 - Verifique se a prova recebida e a folha de respostas são da mesma cor (consta no rodapé de cada folha a cor correspondente) e se não faltam questões ou páginas. Escreva e assine corretamente o seu nome, coloque o seu número de inscrição e o dígito verificador (DV) apenas nos locais indicados;
- 2 - O tempo para a realização da prova será de **05 (cinco) horas**, incluindo o tempo necessário à marcação das respostas na folha de respostas, e não será prorrogado;
- 3 - Só inicie a prova após ser autorizado pelo Fiscal, interrompendo sua execução quando determinado;
- 4 - Iniciada a prova, não haverá mais esclarecimentos. O candidato somente poderá deixar seu lugar, devidamente autorizado pelo Supervisor/Fiscal, para se retirar definitivamente do recinto de prova ou, nos casos abaixo especificados, devidamente acompanhado por militar designado para esse fim:
  - atendimento médico por pessoal designado pela MB;
  - fazer uso de banheiro; e
  - casos de força maior, comprovados pela supervisão do certame, sem que aconteça saída da área circunscrita para a realização da prova.
 Em nenhum dos casos haverá prorrogação do tempo destinado à realização da prova, em caso de retirada definitiva do recinto de prova, esta será corrigida até onde foi solucionada;
- 5 - Use caneta esferográfica preta ou azul para preencher a folha de respostas;
- 6 - Confira nas folhas de questões as respostas que você assinalou como corretas antes de marcá-las na folha de respostas. Cuidado para não marcar duas opções para uma mesma questão na folha de respostas (a questão será perdida);
- 7 - Para rascunho, use os espaços disponíveis nas folhas de questões, mas só serão corrigidas as respostas marcadas na folha de respostas;
- 8 - O tempo mínimo de permanência dos candidatos no recinto de aplicação de provas é de **150 minutos**.
- 9 - Será eliminado sumariamente do processo seletivo/concurso e suas provas não serão levadas em consideração, o candidato que:
  - a) der ou receber auxílio para a execução de qualquer prova;
  - b) utilizar-se de qualquer material não autorizado;
  - c) desrespeitar qualquer prescrição relativa à execução das provas;
  - d) escrever o nome ou introduzir marcas identificadoras noutro lugar que não o determinado para esse fim;
  - e) cometer ato grave de indisciplina; e
  - f) comparecer ao local de realização da prova após o horário previsto para o fechamento dos portões.
- 10 - Instruções para o preenchimento da folha de respostas:
  - a) use caneta esferográfica azul ou preta;
  - b) escreva seu nome em letra de forma no local indicado;
  - c) assine seu nome no local indicado;
  - d) no campo inscrição DV, escreva o seu número de inscrição nos retângulos, da esquerda para a direita, um dígito em cada retângulo. Escreva o dígito correspondente ao DV no último retângulo. Após, cubra todo o círculo correspondente a cada número. Não amasse, dobre ou rasgue a folha de respostas sob pena de ser rejeitada pelo equipamento de leitura ótica; e
  - e) só será permitida a troca de folha de respostas até o início da prova, por motivo de erro no preenchimento nos campos nome, assinatura e número de inscrição, sendo de inteira responsabilidade do candidato qualquer erro ou rasura na referida folha de respostas, após o início da prova.
- 11 - Procure preencher a folha com atenção de acordo com o exemplo abaixo:

**Nome:** ROBERTO SILVA  
**Assinatura:** Roberto Silva

**INSCRIÇÃO:** 5 7 0 2 0 7  
**DV:** 0

**P:** 2    **G:** 4

**INSTRUÇÕES DE PREENCHIMENTO:**  
 • Não rasure esta folha.  
 • Não rabisque nas áreas de respostas.  
 • Faça marcas adicionais nos círculos.  
 • Não use canetas que borrem o papel.  
**ERRADO:** (exemplos de marcas incorretas)    **CORRETO:** (exemplo de marcação correta)

**PREENCHIMENTO DO CANDIDATO:** (exemplo de preenchimento)

**Gratuito de DEBEM**

**T A R J A**

- 12 - Não será permitido levar a prova após sua realização. O candidato está autorizado a transcrever suas respostas, dentro do horário destinado à solução da prova, utilizando o modelo impresso no fim destas instruções para posterior conferência com o gabarito que será divulgado. É proibida a utilização de qualquer outro tipo de papel para anotação do gabarito.

ANOTE SEU GABARITO										PROVA DE COR _____														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50