İTALYA'DA ÜNİVERSİTEYE GİRİŞ SINAVI

# CENT-S

## *8 deneme sınavı*

Çıkmış sorular ve sınavda çıkma ihtimali yüksek sorular
520 soru · Cevap anahtarı · Türkçe çözümler

*Prof. Dr. Deniz Herand*

HERAND ACADEMY



HERAND
ACADEMY & CONSULTANCY

# CEnT-S

## Örnek Soruları

**Gerçek Sınava En Yakın Tahminler**

8 tam deneme sınavı · 520 soru · ayrıntılı Türkçe çözümler

**Prof. Dr. Deniz Herand**

HERAND ACADEMY PRESS

**CEnT-S Örnek Soruları** — Gerçek Sınava En Yakın Tahminler

Yazar: Prof. Dr. Deniz Herand
Yayınevi: **Herand Academy Press**, İstanbul
herandacademy.com

© 2026 Herand Academy Press. Tüm hakları saklıdır. Bu kitabın tamamı ya da herhangi bir bölümü, yayınevinin yazılı izni olmadan hiçbir biçimde çoğaltılamaz, kopyalanamaz, dağıtılamaz ve elektronik ortamda yayımlanamaz.

CEnT-S, CISIA (Consorzio Interuniversitario Sistemi Integrati per l'Accesso) tarafından düzenlenen bir sınavdır. Bu kitap CISIA ile bağlantılı değildir ve CISIA tarafından onaylanmamıştır. Kitaptaki tüm sorular, sınavın resmî yapısı ve geçmiş sınav örnekleri esas alınarak Herand Academy Press tarafından hazırlanmıştır.

Birinci baskı: 2026

ÖNSÖZ

# Değerli Öğrenciler,

Elinizdeki bu kitap, yıllardır yabancı öğrenci sınavları ve yurt dışı eğitim alanında edindiğimiz deneyimin bir ürünüdür. Bu süre boyunca pek çok öğrencinin sınava hazırlık sürecine tanıklık ettik; hangi konuların sıkça sorulduğunu, öğrencilerin nerede zorlandığını ve hangi hatalara tekrar tekrar düştüğünü yakından gördük.

Kitabı hazırlarken bu birikimi, CEnT-S'te çıkmış sorularla pekiştirdik. Çıkmış soruların yapısını, konularını ve zorluk düzeyini ayrıntılı biçimde inceledik; sınavda çıkması muhtemel soruları da bu sorulardan yola çıkarak geliştirdik. Böylece sizi gerçek sınava en yakın biçimde hazırlayacak, önemli bir eser ortaya koyduğumuza inanıyorum.

Kitaptaki sekiz deneme sınavı, gerçek sınavın bölüm yapısını, soru sayılarını ve sürelerini birebir izliyor. Her sorunun Türkçe çözümünde yalnızca doğru cevabın neden doğru olduğunu değil, yanlış seçeneklerin neden cazip göründüğünü de açıkladık. Bu "tuzak" notlarının, sınav gününde size önemli puanlar kazandıracağını düşünüyorum.

Bu kitap, özellikle İtalya'da üniversite eğitimi almayı düşünen öğrenciler için hazırlandı. Ancak kitaptaki okuma, matematik, akıl yürütme ve fen soruları, İtalya'daki diğer giriş sınavlarına ve benzer yapıdaki farklı sınavlara hazırlanan öğrenciler için de son derece yararlı bir kaynak olacaktır.

Denemeleri gerçek sınav koşullarında çözmenizi, her denemeden sonra çözümleri dikkatle okumanızı ve hatalarınızdan ders çıkarmanızı öneririm. Düzenli ve bilinçli bir çalışmayla hedefinize ulaşacağınıza inanıyorum.

Bu kitabın sınav hazırlığınızda size faydalı olmasını, İtalya'daki eğitim yolculuğunuzda ilk adımlarınızı güçlendirmesini diliyor; hepinize başarılar diliyorum.

**Prof. Dr. Deniz Herand**

Yazar ve Kurucu, Herand Academy
İstanbul, 2026

BAŞLARKEN

# Bu Kitap Hakkında

Bu kitap, İtalya'daki üniversitelere giriş için kullanılan **CEnT-S** sınavına hazırlanan öğrenciler için hazırlandı. Kitapta, sınavın 2026 yapısıyla birebir aynı düzende hazırlanmış **8 tam deneme sınavı** yer alıyor. Her deneme 65 sorudan oluşuyor ve gerçek sınavdaki bölüm sırasını, soru sayılarını ve süreleri izliyor.

Sorular, gerçek sınavda olduğu gibi **İngilizce** hazırlandı. Geçmiş sınavlarda öne çıkan konular ve soru tipleri incelenerek, sınavda karşılaşmanız en olası konulara ağırlık verildi. Matematik ve akıl yürütme bölümlerindeki soruların bir kısmı grafik, tablo ve şekil içeriyor.

Her denemenin sonunda önce **cevap anahtarı**, ardından her soru için **Türkçe ayrıntılı çözüm** bulunuyor. Çözümlerdeki **"Tuzak"** notları, öğrencilerin en sık düştüğü hataları ve yanlış seçeneklerin nereden geldiğini gösteriyor.

## CEnT-S sınav yapısı (2026)

| Bölüm | Soru sayısı | Süre |
|---|---|---|
| **Reading and Comprehension**<br>Okuma ve Anlama | 10 | 30 dk |
| **Mathematics**<br>Matematik | 15 | 30 dk |
| **Reasoning on Texts and Data**<br>Metin ve Veri Üzerinde Akıl Yürütme | 15 | 30 dk |
| **Biology**<br>Biyoloji | 10 | 20 dk |
| **Chemistry**<br>Kimya | 10 | 20 dk |
| **Physics**<br>Fizik | 5 | 10 dk |
| **Toplam** | **65** | **140 dk** |

## Puanlama

| +1 | 0 | −0,25 |
|---|---|---|
| Doğru cevap | Boş bırakılan | Yanlış cevap |

Yanlış cevaplar puan kaybettirdiği için, emin olmadığınız ve hiçbir seçeneği eleyemediğiniz sorularda boş bırakmak çoğu zaman daha akıllıca bir stratejidir. İki ya da daha fazla seçeneği güvenle eleyebildiğinizde ise cevap vermek genellikle avantaj sağlar.

BAŞLARKEN

# Kitabı Nasıl Kullanmalısınız?

1. **Gerçek sınav koşullarını kurun.** Her denemeyi sessiz bir ortamda, tek oturumda ve toplam 140 dakikada çözün. Bölüm sürelerine uyun: gerçek sınavda süresi biten bölüme geri dönemezsiniz.
2. **65 sorunun tamamını bitirin.** Sınav bitmeden cevap anahtarına ya da çözümlere bakmayın. Cevaplarınızı ayrı bir kâğıda işaretleyin.
3. **Cevap anahtarıyla puanınızı hesaplayın.** Her denemenin sonundaki tabloya bölüm bölüm doğru, yanlış ve boş sayılarınızı yazın. Puan = Doğru × 1 − Yanlış × 0,25.
4. **Çözümleri okuyun.** Yalnızca yanlış yaptığınız soruların değil, doğru yaptığınız ama emin olmadığınız soruların çözümlerini de inceleyin. “Tuzak” notları, bir sonraki sınavda aynı hataya düşmemenizi sağlar.
5. **Hatalarınızı kaydedin.** Yanlış yaptığınız konuları bir listede toplayın ve bir sonraki denemeden önce bu konuları tekrar edin.
6. **İlerlemenizi izleyin.** 8 denemedeki puanlarınızı karşılaştırın. Hangi bölümde zaman kaybettiğinizi ve hangi bölümde puanınızın yükseldiğini takip edin.

**Süre ipucu.** CEnT-S’te her bölümün kendi süresi vardır. Bir soruda takılırsanız işaretleyip ilerleyin; bölümün sonunda kalan süreyle geri dönün.

İÇİNDEKİLER

# İçindekiler

**Önsöz** ..... 3

**Bu Kitap Hakkında** ..... 4

**Kitabı Nasıl Kullanmalısınız?** ..... 5

### Deneme Sınavı 1
Sorular ..... 8
Cevap anahtarı ..... 20
Çözümler ..... 21

### Deneme Sınavı 2
Sorular ..... 27
Cevap anahtarı ..... 39
Çözümler ..... 40

### Deneme Sınavı 3
Sorular ..... 46
Cevap anahtarı ..... 58
Çözümler ..... 59

### Deneme Sınavı 4
Sorular ..... 65
Cevap anahtarı ..... 76
Çözümler ..... 77

### Deneme Sınavı 5
Sorular ..... 83
Cevap anahtarı ..... 95
Çözümler ..... 96

### Deneme Sınavı 6
Sorular ..... 102
Cevap anahtarı ..... 114
Çözümler ..... 115

### Deneme Sınavı 7
Sorular ..... 121
Cevap anahtarı ..... 133
Çözümler ..... 134

### Deneme Sınavı 8
Sorular ..... 141
Cevap anahtarı ..... 153
Çözümler ..... 154

**Herand Academy ve Hizmetlerimiz** ..... 159

CENT-S · DENEME SINAVI

# 01

65 soru · 140 dakika · 6 bölüm

| Bölüm | Sorular | Soru sayısı | Süre |
|---|---|---|---|
| Reading and Comprehension<br>Okuma ve Anlama | 1–10 | 10 | 30 dk |
| Mathematics<br>Matematik | 11–25 | 15 | 30 dk |
| Reasoning on Texts and Data<br>Metin ve Veri Üzerinde Akıl Yürütme | 26–40 | 15 | 30 dk |
| Biology<br>Biyoloji | 41–50 | 10 | 20 dk |
| Chemistry<br>Kimya | 51–60 | 10 | 20 dk |
| Physics<br>Fizik | 61–65 | 5 | 10 dk |
| **Toplam** | **1–65** | **65** | **140 dk** |

## Sınav kuralları

- Sınavı tek oturumda, gerçek süreyle çözün.
- Her bölümün süresi yalnızca o bölüm için geçerlidir; süresi biten bölüme geri dönülemez.
- Doğru cevap **+1**, yanlış cevap **−0,25**, boş **0** puandır.
- Sınavı bitirmeden cevap anahtarına bakmayın.

## Süre kaydı

Başlangıç

Bitiş

Puan

SECTION 1

# Reading and Comprehension

Questions **1–10** · 10 questions · **30 min**

**TEXT 1 (NON-FICTION)**

Before the second half of the nineteenth century, every town kept its own time. Noon was the moment the sun stood highest over the local church tower, and a traveller moving east or west would find the clocks of each new town slightly ahead of or behind his own watch. For most of human history this mattered very little: a journey of a few dozen miles took most of a day, and a difference of a few minutes went unnoticed.

The railway changed this. A train could cross in an afternoon a distance that had once taken a week, and timetables had to tell passengers not only where a train would stop but exactly when. Railway companies at first solved the problem in their own way, each keeping the time of its headquarters. A large station might therefore display three or four clocks, each showing a different "correct" time, and missed connections became a common complaint.

The solution — dividing the globe into time zones an hour apart — seems obvious today, yet it met strong resistance. Some critics argued that time was a natural fact, set by the sun, and that no committee had the right to alter it. Others, more practically, objected to the cost of changing public clocks. It was not governments but the railways themselves that first imposed standard time in several countries, and many laws simply recognised, years later, a habit that had already become universal.

The episode shows how a technology can reshape something as apparently fixed as the hour of the day. People did not adopt standard time because they were convinced by an argument; they adopted it because the trains would not wait.

**1** What is the main purpose of the text?

(A) To argue that time zones should be abolished
(B) To compare the clocks used in different railway stations
(C) To explain how railways created the need for standard time and how it came to be adopted
(D) To criticise governments for ignoring the problem of local time
(E) To describe the technical design of nineteenth-century clocks

**2** According to the text, why did differences in local time matter little before the railway?

(A) Because journeys were so slow that a few minutes' difference went unnoticed
(B) Because all towns used the same church clock
(C) Because travellers did not carry watches
(D) Because governments had already fixed a national time
(E) Because most people never left their own town

**3** The phrase "many laws simply recognised, years later, a habit that had already become universal" suggests that the laws on standard time:

(A) were the main cause of the change
(B) were rejected by the railway companies
(C) were passed before the railways existed
(D) made public clocks cheaper to change
(E) confirmed a practice that was already in use

**4** The last sentence ("they adopted it because the trains would not wait") implies that standard time was accepted mainly because of:

(A) a scientific discovery about the sun
(B) practical necessity rather than persuasion
(C) pressure from church authorities
(D) the low cost of new clocks
(E) an international agreement between governments

### TEXT 2 (LITERARY)

When Margaret pushed open the gate, it gave the same thin complaint it had given forty years before, and for a moment she was almost afraid to go further, as though the sound had announced her to someone who was still waiting inside. The garden had been allowed to grow as it pleased. The pear tree her father had planted was still there, but it leaned now towards the wall like an old man who has found something to rest on.

She had expected the house to be smaller; everyone said that houses shrank when you returned to them. What she had not expected was that it would seem so indifferent. The windows looked at her without recognition. Somewhere in the years between, she had imagined, the house had been keeping her childhood for her, the way a friend keeps a letter. Now she understood that it had kept nothing. Other families had eaten in the kitchen, other children had been sent to bed early in the room under the roof, and the house had received them all with the same patient emptiness.

She stood on the step and did not ring. There was, after all, nothing to ask for. She touched the rough bark of the pear tree, as one might touch a sleeve, and went back through the gate, which complained again, more softly, as if it had decided after all to let her go.

**5** What does Margaret realise when she looks at the house?

(A) That the house is much larger than she remembered
(B) That her father still lives there
(C) That the garden has been carefully looked after
(D) That the house has not preserved her memories in any way
(E) That she has come to the wrong address

**6** The comparison of the pear tree to "an old man who has found something to rest on" mainly suggests that the tree:

(A) has grown old and now leans against the wall
(B) is about to be cut down
(C) is still producing a lot of fruit
(D) reminds Margaret of a stranger
(E) has been moved closer to the house

**7** Why does Margaret not ring the bell?

(A) Because she is afraid of the people inside
(B) Because the bell is broken
(C) Because she sees that nobody lives there
(D) Because she has forgotten why she came
(E) Because she understands the house cannot give her back anything

### TEXT 3 (JOURNALISTIC)

Last summer, as temperatures in the city centre stayed above 30°C for eleven consecutive nights, the municipal council approved a plan that sounds almost too simple: painting roofs white. The idea is not new. Light-coloured surfaces reflect a larger share of sunlight than dark ones, and a building that absorbs less heat during the day releases less of it at night, when residents most need relief.

Supporters point to pilot projects in which the indoor temperature of top-floor flats fell by two to three degrees. For elderly people living alone, they argue, such a difference can be decisive. The plan will begin with schools and public housing, where the council owns the buildings and does not need the agreement of private owners.

Not everyone is convinced. Some architects warn that reflective roofs cool the buildings under them but do little for the streets, where heat is trapped by asphalt and the lack of trees. Others note that in winter a white roof may slightly increase heating costs, although in a southern climate this effect is usually small. The most common criticism, however, is about scale: unless thousands of roofs are treated, the city as a whole will barely notice.

The council does not dispute this. Its spokesperson described the roofs as "one tool among several", to be combined with new trees and fountains. Whether residents will judge the plan by its modest first results or by its long-term ambition remains to be seen.

**8** Why will the plan begin with schools and public housing?

(A) Because these buildings have the darkest roofs
(B) Because the council owns them and needs no one else's agreement
(C) Because elderly people live mainly in schools
(D) Because private owners asked to be excluded
(E) Because these buildings are the hottest in winter

**9** According to the text, which criticism of the plan is the most frequent?

(A) White roofs increase heating costs in winter
(B) White paint is too expensive
(C) The roofs cool the streets but not the buildings
(D) The effect will be negligible unless the plan is applied on a large scale
(E) Pilot projects showed no change in indoor temperature

**10** The council's reaction to the criticism can best be described as:

(A) a complete rejection of the architects' arguments
(B) a decision to cancel the plan
(C) an acceptance of the limitation, presenting the roofs as part of a wider strategy
(D) a promise to paint every roof in the city within a year
(E) a refusal to comment

SECTION 2

## Mathematics

Questions **11–25** · 15 questions · **30 min**

**11** How many natural numbers $n$ satisfy $5 < \sqrt{n} < 7$?

(A) 1 (B) 2 (C) 23 (D) 24 (E) 25

**12** The number of students in a school increased by 25% in 2024 and then decreased by 20% in 2025. Compared to 2023, the number of students in 2025 is:

(A) the same (B) 5% higher (C) 5% lower (D) 45% higher (E) 1% lower

**13** Let $a = 2^3 \cdot 3^2 \cdot 5$ and $b = 2^2 \cdot 3^3 \cdot 5$. Which is the factorisation of $a + b$?

(A) $2^5 \cdot 3^5 \cdot 5^2$ (B) $2^2 \cdot 3^2 \cdot 5^2$ (C) $2^3 \cdot 3^3 \cdot 5$
(D) $2^5 \cdot 3^5 \cdot 5$ (E) $2^2 \cdot 3^2 \cdot 5$

**14** What is the domain of the real function $f(x) = \sqrt{(4 - x^2)} / \ln(x + 1)$?

(A) $[-2, 2]$ (B) $(-1, 2]$ (C) $(0, 2]$
(D) $(-1, 0) \cup (0, 2]$ (E) $(-1, 2)$

**15** Let $f : \mathbb{R} \to \mathbb{R}$ and $g(x) = f(x - 2) + 3$ for every $x \in \mathbb{R}$. If the point $(1, 5)$ belongs to the graph of $f$, which point surely belongs to the graph of $g$?

(A) $(-1, 8)$ (B) $(3, 2)$ (C) $(1, 8)$ (D) $(-1, 2)$ (E) $(3, 8)$

**16** Let $f(x) = (2x - 1)/3$. What is the value of $f^{-1}(3)$, where $f^{-1}$ is the inverse function of $f$?

(A) 5/3 (B) 5 (C) 1/3 (D) 3 (E) 4

**17** The set of real solutions of the equation $\log_2(x) + \log_2(x - 2) = 3$ is:

(A) $\{-2, 4\}$ (B) $\{-2\}$ (C) $\{4\}$ (D) $\{2\}$ (E) $\varnothing$

**18** The solutions of the inequality $(1/3)^{(x - 1)} > 9$ are:

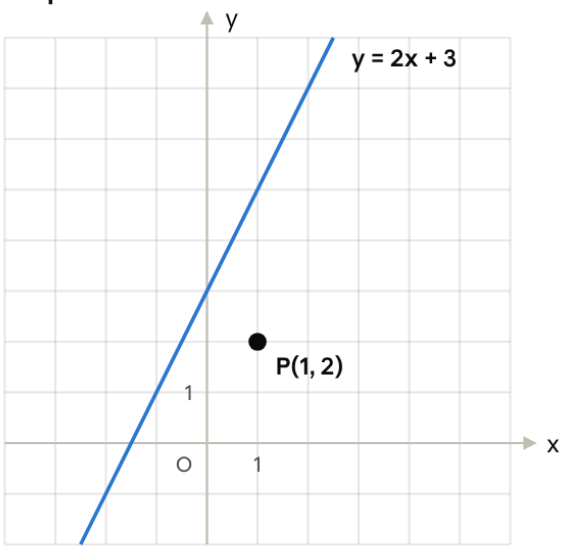
(A) $x < -1$ (B) $x > 3$ (C) $x > -1$ (D) $x < 3$ (E) $x < 1$

**19** The circle with equation $x^2 + y^2 - 6x + 4y - 12 = 0$ has:

(A) centre $(-3, 2)$ and radius 5
(B) centre $(3, -2)$ and radius 5
(C) centre $(3, -2)$ and radius $\sqrt{12}$
(D) centre $(-3, 2)$ and radius 25
(E) centre $(3, -2)$ and radius 25

**20** The straight line r passes through the point (1, 2) and is perpendicular to the line $y = 2x + 3$. At which point does r intersect the x-axis?

**The line y = 2x + 3 and the point P**




Each grid square is 1 unit

(A) (5/2, 0) (B) (−3, 0) (C) (4, 0) (D) (5, 0) (E) (0, 5/2)

**21** A committee of 3 people must be chosen from 5 boys and 4 girls. In how many ways can it be chosen if it must contain at least one girl?

(A) 84 (B) 60 (C) 40 (D) 10 (E) 74

**22** A fair coin is tossed three times and a fair six-sided die is rolled once. What is the probability of obtaining exactly two heads and a number greater than 4 on the die?

(A) 1/8 (B) 1/4 (C) 3/16 (D) 1/12 (E) 1/6

**23** The arithmetic mean of the six values 3, 7, 7, 8, 10, x is 7. Which of the following is correct?

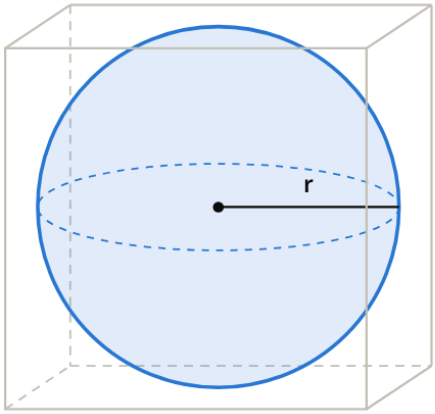
(A) The mode is greater than the mean
(B) The median is smaller than the mean
(C) Mean, median and mode are all equal
(D) The median is 7.5
(E) The mode is 8

**24** For which values of the real parameter k does the equation $x^2 + kx + 9 = 0$ have no real solutions?

(A) $k < -6$ or $k > 6$ (B) $-3 < k < 3$ (C) $k = \pm 6$
(D) $-6 < k < 6$ (E) $-9 < k < 9$

**25** A sphere is inscribed in a cube (it touches all six faces). What is the ratio between the volume of the sphere and the volume of the cube?

**A sphere inscribed in a cube**




The sphere touches all six faces

(A) π/3 (B) π/4 (C) 2π/3 (D) π/8 (E) π/6

SECTION 3

## Reasoning on Texts and Data

Questions **26–40** · 15 questions · **30 min**

**26** Consider the statement: "Every natural number whose digits add up to a multiple of 3 is divisible by 9." Which of the listed numbers is a counterexample to this statement?

(A) 18 (B) 27 (C) 12 (D) 14 (E) 81

**27** Which of the following is the negation of the statement "All the students passed at least one exam"?

(A) At least one student passed no exam
(B) No student passed any exam
(C) All the students failed at least one exam
(D) At least one student failed at least one exam
(E) Some students passed all the exams

**28** The rules of a university state: "To enrol in the English-taught course, it is necessary to have a B2 certificate." Based on this rule, which statement is certainly true?

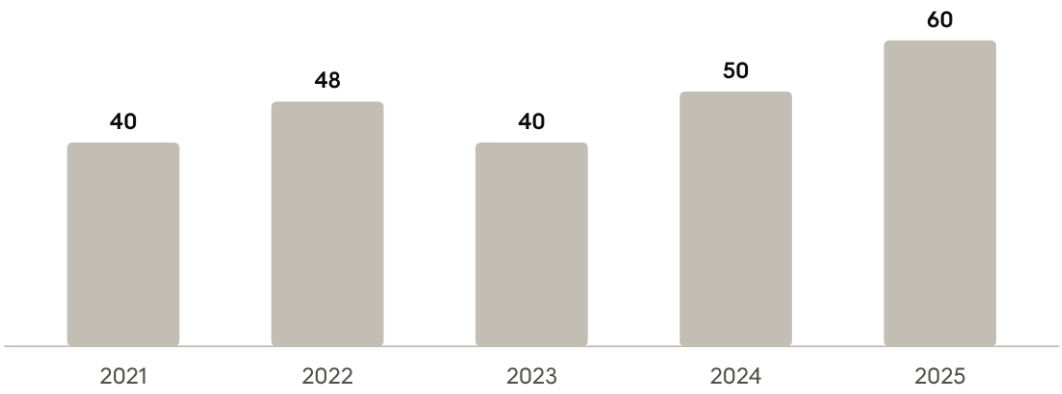
(A) Anyone with a B2 certificate can enrol in the course
(B) Anyone without a B2 certificate cannot enrol in the course
(C) A B2 certificate is sufficient to enrol in the course
(D) Anyone who has not enrolled in the course lacks a B2 certificate
(E) Some students enrolled in the course have no B2 certificate

**29** "If it rains, the match is cancelled." We know that the match was not cancelled. What can we conclude?

(A) It rained
(B) Nothing can be said about the weather
(C) The match was played indoors
(D) It did not rain
(E) It rained, but stopped before the match

**30** The chart shows the number of books (in thousands) sold by a bookshop each year.

**Books sold by the bookshop each year (thousands)**

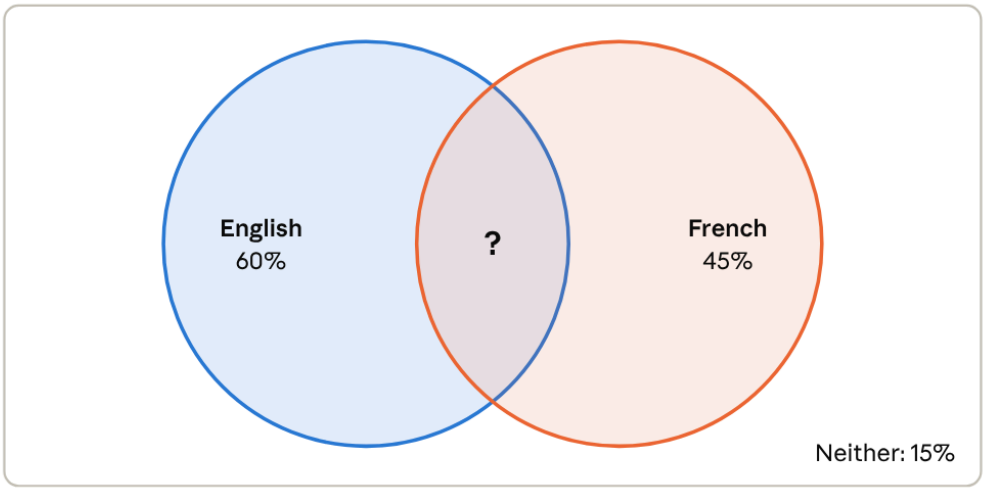



In which year was the percentage increase compared to the previous year the largest?

(A) 2022 (B) 2025 (C) 2024 and 2025 equally
(D) 2023 (E) 2024

**31** In a class of 40 students, 60% study English, 45% study French and 15% study neither language. How many students study both languages?

**Languages studied in a class of 40 students**




(A) 8 (B) 6 (C) 12 (D) 4 (E) 10

**32** A tank can be filled by tap P alone in 6 hours and by tap Q alone in 3 hours. How long does it take to fill the empty tank if both taps are open?

(A) 4.5 hours (B) 2 hours (C) 3 hours (D) 1.5 hours (E) 9 hours

**33** In a car park there are only cars and motorbikes: 30 vehicles and 100 wheels in total. How many motorbikes are there?

(A) 20 (B) 15 (C) 10 (D) 5 (E) 25

**34** Ada, Bruno and Carla each own exactly one different pet: a cat, a dog and a parrot. Ada does not own the dog. Bruno does not own the cat. Carla owns neither the cat nor the dog. Which statement is certainly true?

(A) Ada owns the dog
(B) Carla owns the cat
(C) Bruno owns the parrot
(D) The information is contradictory
(E) Ada owns the cat

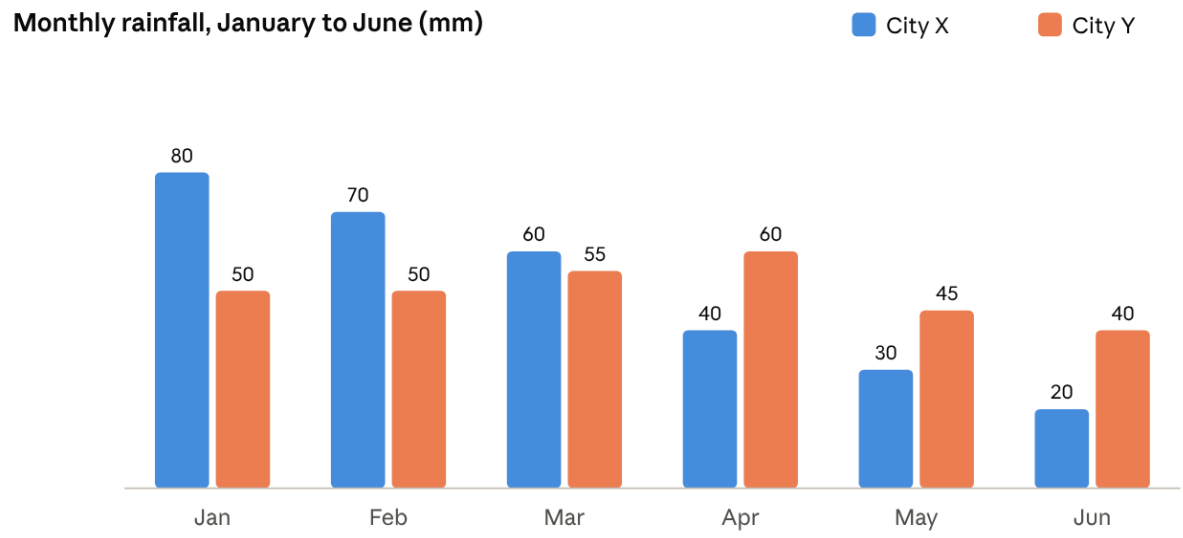
**35** In a company, all engineers speak English and some engineers speak German. No manager speaks German. Which statement is certainly true?

(A) No engineer is a manager
(B) Some engineers are managers
(C) Some people who speak English are not managers
(D) All managers speak English
(E) No manager speaks English

**36** A drawer contains 10 red, 8 blue and 5 green socks. Without looking, what is the minimum number of socks you must take to be sure of having at least 2 green socks?

(A) 3 (B) 4 (C) 12 (D) 20 (E) 19

**37** The chart shows the monthly rainfall (mm) in two cities from January to June.




Consider the statements: (1) The total rainfall over the six months is the same in both cities. (2) City X had more rain than City Y in more than half of the months. (3) The difference between the two cities was greatest in June. Which statements are true?

(A) Only 1
(B) Only 1 and 2
(C) Only 1 and 3
(D) Only 2
(E) All three

**38** A researcher knows the number of residents of each district of a city and the percentage of residents over 65 in each district. To obtain the percentage of residents over 65 in the whole city, she must:

(A) calculate the average of the district percentages
(B) add the district percentages
(C) take the percentage of the most populated district
(D) multiply each percentage by the population of its district, add the results and divide by the total population
(E) divide the total population by the number of districts

**39** After a 20% discount, a jacket costs €80. What was the original price?

(A) €96 (B) €100 (C) €64 (D) €84 (E) €120

**40** A library has the following rule: "A book can be borrowed for more than 2 weeks only if the borrower is a member and the book is not a new arrival." Which of the following situations violates the rule?

(A) A non-member borrows an old book for 1 week
(B) A member borrows a new arrival for 1 week
(C) A member borrows an old book for 4 weeks
(D) A non-member borrows a new arrival for 10 days
(E) A member borrows a new arrival for 3 weeks

SECTION 4

## Biology

Questions **41–50** · 10 questions · **20 min**

**41** Large bodies of water reduce temperature variations in coastal climates, and water helps organisms keep a stable body temperature. Which property of water is mainly responsible?

(A) The lower density of ice compared to liquid water
(B) Its high specific heat capacity
(C) Its low viscosity
(D) Its neutral pH
(E) Its high surface tension

**42** A protein has a quaternary structure only if it:

(A) contains disulphide bridges
(B) is an enzyme
(C) consists of two or more polypeptide chains
(D) contains α-helices
(E) is located in the nucleus

**43** Which of the following structures is present in both prokaryotic and eukaryotic cells?

(A) Mitochondria (B) Nucleus (C) Golgi apparatus
(D) Ribosomes (E) Endoplasmic reticulum

**44** Which of the following is found in a typical plant cell but NOT in a typical animal cell?

(A) Mitochondria
(B) Plasma membrane
(C) A cell wall and a large central vacuole
(D) Ribosomes
(E) Golgi apparatus

**45** During which phase of the cell cycle is DNA replicated?

(A) G1 (B) S (C) G2 (D) M (E) G0

**46** A human cell (2n = 46) undergoes meiosis. At the end of meiosis I, each of the two daughter cells contains:

(A) 23 chromosomes, each made of two chromatids
(B) 46 chromosomes, each made of one chromatid
(C) 23 chromosomes, each made of one chromatid
(D) 92 chromosomes
(E) 46 chromosomes, each made of two chromatids

**47** Two heterozygous plants (Aa) are crossed; allele A is completely dominant. Among the offspring showing the dominant phenotype, what fraction is expected to be heterozygous?

(A) 1/4 (B) 1/2 (C) 3/4 (D) 1/3 (E) 2/3

**48** An mRNA segment contains 303 nucleotides, from the start codon AUG up to and including the stop codon. How many amino acids does the resulting polypeptide contain?

(A) 101 (B) 303 (C) 99 (D) 100 (E) 102

**49** Mycorrhizal fungi live in close contact with plant roots: they increase the plant's absorption of water and mineral salts and receive sugars produced by photosynthesis. This relationship is an example of:

(A) mutualism
(B) parasitism
(C) commensalism
(D) predation
(E) competition

**50** Which blood vessels carry oxygen-rich blood from the lungs to the heart?

(A) Pulmonary arteries
(B) Aorta
(C) Venae cavae
(D) Coronary arteries
(E) Pulmonary veins

SECTION 5

## Chemistry

Questions **51–60** · 10 questions · **20 min**

**51** According to VSEPR theory, what is the shape of the ammonia molecule ($NH_3$)?

(A) Trigonal planar
(B) Tetrahedral
(C) Trigonal pyramidal
(D) Linear
(E) Bent

**52** What mass of $CO_2$ is produced by the complete combustion of 16 g of methane ($CH_4$)? (Ar: C = 12, H = 1, O = 16)

(A) 16 g (B) 22 g (C) 32 g (D) 44 g (E) 88 g

**53** 4 mol of $H_2$ and 3 mol of $O_2$ react to form water: $2\ H_2 + O_2 \rightarrow 2\ H_2O$. At the end of the reaction:

(A) 4 mol of $H_2O$ are formed and 1 mol of $O_2$ is left over
(B) 6 mol of $H_2O$ are formed and nothing is left over
(C) 3 mol of $H_2O$ are formed and 1 mol of $H_2$ is left over
(D) 4 mol of $H_2O$ are formed and 1 mol of $H_2$ is left over
(E) 2 mol of $H_2O$ are formed and 2 mol of $O_2$ are left over

**54** 100 $cm^3$ of a 0.010 mol $dm^{-3}$ HCl solution are diluted with water to a final volume of 1.0 $dm^3$. What is the pH of the final solution?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 7

**55** What is the oxidation number of chromium in potassium dichromate, $K_2Cr_2O_7$?

(A) +3 (B) +6 (C) +7 (D) +12 (E) +2

**56** A chemical reaction has $\Delta H < 0$ and $\Delta S > 0$. Based on the Gibbs free energy, the reaction is:

(A) never spontaneous
(B) spontaneous only at high temperature
(C) spontaneous only at low temperature
(D) at equilibrium at any temperature
(E) spontaneous at any temperature

**57** Which of the following atoms has the largest atomic radius?

(A) Na (B) Mg (C) Cl (D) Ar (E) K

**58** The compound $CH_3COOCH_2CH_3$ belongs to the class of:

(A) carboxylic acids
(B) esters
(C) ethers
(D) ketones
(E) aldehydes

**59** Acid rain is mainly caused by the emission into the atmosphere of:

(A) sulphur dioxide and nitrogen oxides
(B) carbon dioxide and methane
(C) ozone and CFCs
(D) nitrogen and oxygen
(E) carbon monoxide and hydrogen

**60** Which of the following aqueous solutions has the highest boiling point?

(A) Glucose 0.10 mol $dm^{-3}$
(B) NaCl 0.10 mol $dm^{-3}$
(C) Sucrose 0.10 mol $dm^{-3}$
(D) $CaCl_2$ 0.10 mol $dm^{-3}$
(E) NaCl 0.050 mol $dm^{-3}$

SECTION 6

## Physics

Questions **61–65** · 5 questions · **10 min**

**61** A sound wave of frequency 680 Hz travels in air at 340 m/s. What is its wavelength?

(A) 0.5 m (B) 2 m (C) $2.3 \times 10^5$ m (D) 1.5 m (E) 0.25 m

**62** A car starts from rest and accelerates uniformly at 2 $m/s^2$ for 5 s. What distance does it cover in this time?

(A) 10 m (B) 50 m (C) 25 m (D) 5 m (E) 100 m

**63** A ball is dropped from rest from a height of 20 m. Neglecting air resistance and taking g = 10 m/s², what is its speed just before it hits the ground?

(A) 10 m/s (B) 14 m/s (C) 200 m/s (D) 20 m/s (E) 40 m/s

**64** A solid object of volume 2.0 dm³ is completely submerged in water (density 1000 kg/m³). What is the buoyant force acting on it? (g = 10 m/s²)

(A) 2 N (B) 0.2 N (C) 200 N (D) 2000 N (E) 20 N

**65** Two identical 12 Ω resistors are connected in series to an ideal 6 V battery. What current flows in the circuit?

(A) 1 A (B) 0.25 A (C) 0.5 A (D) 2 A (E) 4 A

END OF THE TEST · SINAVIN SONU

DENEME SINAVI 1

# Cevap Anahtarı

Cevaplarınızı karşılaştırın, ardından aşağıdaki tabloyla bölüm bölüm puanınızı hesaplayın.

**Okuma ve Anlama** — Soru 1–10

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| C | A | E | B | D | A | E | B | D | C |

**Matematik** — Soru 11–25

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | A | B | D | E | B | C | A | B | D | E | A | C | D | E |

**Metin ve Veri Üzerinde Akıl Yürütme** — Soru 26–40

| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | A | B | D | E | A | B | C | E | C | D | A | D | B | E |

**Biyoloji** — Soru 41–50

| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|
| B | C | D | C | B | A | E | D | A | E |

**Kimya** — Soru 51–60

| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| C | D | A | C | B | E | E | B | A | D |

**Fizik** — Soru 61–65

| 61 | 62 | 63 | 64 | 65 |
|---|---|---|---|---|
| A | C | D | E | B |

| Bölüm | Soru | Doğru | Yanlış | Boş | Puan |
|---|---|---|---|---|---|
| Okuma ve Anlama | 10 | | | | |
| Matematik | 15 | | | | |
| Metin ve Veri Üzerinde Akıl Yürütme | 15 | | | | |
| Biyoloji | 10 | | | | |
| Kimya | 10 | | | | |
| Fizik | 5 | | | | |
| **Toplam** | **65** | | | | |

Puan = Doğru × 1 − Yanlış × 0,25. Boş bırakılan sorular puanı etkilemez. En yüksek puan 65'tir.

DENEME SINAVI 1

# Çözümler

## Okuma ve Anlama · Soru 1–10

**1** **Doğru cevap: C** (To explain how railways created the need for standard time and how it came to be adopted)

**Çözüm:** Metin yerel saatten demiryolunun yarattığı soruna, oradan standart saatin kabulüne uzanan bir süreci anlatıyor.

> **Tuzak:** B ve D metinde geçen ayrıntılardır, ana amaç değildir.

**2** **Doğru cevap: A** (Because journeys were so slow that a few minutes' difference went unnoticed)

**Çözüm:** Birinci paragraf: birkaç düzine millik yolculuk neredeyse bir gün sürdüğü için birkaç dakikalık fark fark edilmiyordu.

> **Tuzak:** E mantıklı görünür ama metinde söylenmez.

**3** **Doğru cevap: E** (confirmed a practice that was already in use)

**Çözüm:** Yasalar değişimi başlatmadı; zaten yaygınlaşmış bir uygulamayı yıllar sonra resmileştirdi.

> **Tuzak:** A, metnin söylediğinin tam tersidir.

**4** **Doğru cevap: B** (practical necessity rather than persuasion)

**Çözüm:** "Bir argümanla ikna oldukları için değil" ifadesi, kabulün pratik bir zorunluluktan kaynaklandığını gösterir.

**5** **Doğru cevap: D** (That the house has not preserved her memories in any way)

**Çözüm:** "Evin çocukluğunu onun için sakladığını hayal etmişti... şimdi hiçbir şey saklamadığını anladı."

> **Tuzak:** A; metin evin küçük görünmesini beklediğini söyler, büyük değil. C, bahçenin kendi haline bırakıldığı bilgisine ters düşer.

**6** **Doğru cevap: A** (has grown old and now leans against the wall)

**Çözüm:** Benzetme, ağacın yaşlandığını ve duvara yaslanır gibi eğildiğini anlatır.

**7** **Doğru cevap: E** (Because she understands the house cannot give her back anything)

**Çözüm:** "Sonuçta isteyecek hiçbir şey yoktu": ev geçmişi saklamadığına göre ondan geri alabileceği bir şey de yoktur.

> **Tuzak:** A; ilk paragraftaki kısa korku gerçek bir neden değildir.

**8** **Doğru cevap: B** (Because the council owns them and needs no one else's agreement)

**Çözüm:** İkinci paragraf: belediye bu binaların sahibidir ve özel mülk sahiplerinin onayına ihtiyaç duymaz.

**9** **Doğru cevap: D** (The effect will be negligible unless the plan is applied on a large scale)

**Çözüm:** "En yaygın eleştiri ölçekle ilgilidir": binlerce çatı boyanmazsa şehir farkı neredeyse hissetmez.

> **Tuzak:** A metinde geçer ama "küçük etki" olarak; C ise ters çevrilmiştir (binaları soğutur, sokakları değil).

**10** **Doğru cevap: C** (an acceptance of the limitation, presenting the roofs as part of a wider strategy)

**Çözüm:** "Belediye buna itiraz etmiyor" ve çatıları "birkaç araçtan biri" olarak ağaç ve çeşmelerle birlikte sunuyor.

## Matematik · Soru 11–25

**11** **Doğru cevap: C** (23)

**Çözüm:** Kare alalım: $25 < n < 49$, yani $n = 26, 27, \ldots, 48$. Sayı: $48 - 26 + 1 = 23$.

> **Tuzak:** uç değerleri (25 ve 49) dahil edip E'yi seçmek.

**12** **Doğru cevap: A** (the same)

**Çözüm:** $1{,}25 \times 0{,}80 = 1{,}00$. Değişim yok.

> **Tuzak:** yüzdeleri toplayıp $+25 - 20 = +5\%$ (B) bulmak.

**13** **Doğru cevap: B** ($2^2 \cdot 3^2 \cdot 5^2$)

**Çözüm:** Ortak çarpan $2^2 \cdot 3^2 \cdot 5$: a + b = $2^2 \cdot 3^2 \cdot 5 \cdot (2 + 3) = 2^2 \cdot 3^2 \cdot 5^2 = 900$. Kontrol: 360 + 540 = 900.

**Tuzak:** A, a·b'nin kendisidir ($2^5 \cdot 3^5 \cdot 5^2$); C ise EKOK'tur.

**14** **Doğru cevap: D** ((−1, 0) ∪ (0, 2])

**Çözüm:** Üç koşul: $4 - x^2 \geq 0 \rightarrow -2 \leq x \leq 2$; $x + 1 > 0 \rightarrow x > -1$; payda sıfır olamaz: $\ln(x + 1) \neq 0 \rightarrow x \neq 0$. Kesişim: (−1, 0) ∪ (0, 2].

**Tuzak:** paydanın sıfır olmamasını unutup B'yi seçmek.

**15** **Doğru cevap: E** ((3, 8))

**Çözüm:** g(x) = f(x − 2) + 3. x − 2 = 1 olmalı, yani x = 3; g(3) = f(1) + 3 = 8. Grafik 2 birim sağa, 3 birim yukarı kayar.

**Tuzak:** f(x − 2) kaymasını sola sanmak (A).

**16** **Doğru cevap: B** (5)

**Çözüm:** $f^{-1}(3) = x \Leftrightarrow f(x) = 3 \rightarrow (2x - 1)/3 = 3 \rightarrow 2x - 1 = 9 \rightarrow x = 5$.

**Tuzak:** f(3) = 5/3 hesaplayıp A'yı seçmek; ayrıca $1/f(3) \neq f^{-1}(3)$.

**17** **Doğru cevap: C** ({4})

**Çözüm:** Tanım kümesi: x > 2. $\log_2[x(x - 2)] = 3 \rightarrow x^2 - 2x = 8 \rightarrow (x - 4)(x + 2) = 0$. Yalnızca x = 4 tanım kümesindedir.

**Tuzak:** tanım kümesini kontrol etmeden A'yı seçmek.

**18** **Doğru cevap: A** (x < −1)

**Çözüm:** (1/3)^(x − 1) = 3^(1 − x). 3^(1 − x) > $3^2 \rightarrow 1 - x > 2 \rightarrow x < -1$.

**Tuzak:** taban 1/3 iken eşitsizliği çevirmeden x − 1 > 2 yazıp B'yi bulmak.

**19** **Doğru cevap: B** (centre (3, −2) and radius 5)

**Çözüm:** Tam kareye tamamlayın: $(x - 3)^2 + (y + 2)^2 = 12 + 9 + 4 = 25$. Merkez (3, −2), yarıçap 5.

**Tuzak:** işaretleri ters almak (A) veya $r^2$'yi yarıçap sanmak (E).

**20** **Doğru cevap: D** ((5, 0))

**Çözüm:** Dik doğrunun eğimi −1/2: y − 2 = −½(x − 1) → y = −x/2 + 5/2. y = 0 → x = 5.

**Tuzak:** E, y-ekseni ile kesişim noktasıdır.

**21** **Doğru cevap: E** (74)

**Çözüm:** Tüm seçimler C(9,3) = 84; hiç kız olmayanlar C(5,3) = 10. 84 − 10 = 74.

**Tuzak:** "en az bir" koşulunu unutup A'yı seçmek.

**22** **Doğru cevap: A** (1/8)

**Çözüm:** P(tam 2 tura) = C(3,2)/8 = 3/8. P(zar > 4) = 2/6 = 1/3. Bağımsız olaylar: 3/8 · 1/3 = 1/8.

**Tuzak:** "4'ten büyük" içine 4'ü katmak (3/6) C'ye götürür.

**23** **Doğru cevap: C** (Mean, median and mode are all equal)

**Çözüm:** Toplam 6 · 7 = 42 → x = 42 − 35 = 7. Sıralı: 3, 7, 7, 7, 8, 10. Medyan (7 + 7)/2 = 7, mod 7, ortalama 7.

**24** **Doğru cevap: D** (−6 < k < 6)

**Çözüm:** $\Delta = k^2 - 36 < 0 \rightarrow k^2 < 36 \rightarrow -6 < k < 6$.

**Tuzak:** A, iki farklı reel kök koşuludur; C çakışık kök koşuludur.

**25** **Doğru cevap: E** (π/6)

**Çözüm:** Küp kenarı = 2r. V(küre)/V(küp) = $(4/3)\pi r^3 / 8r^3 = \pi/6$.

**Tuzak:** küp kenarını r alıp (4/3)π bulmak ya da 8 yerine 4 kullanmak (A).

## Metin ve Veri Üzerinde Akıl Yürütme · Soru 26–40

**26** **Doğru cevap: C** (12)

**Çözüm:** Karşıt örnek, koşulu sağlayıp sonucu sağlamayan sayıdır. 12: rakamlar toplamı 3 (3'ün katı) ama 12, 9'a bölünmez.

**Tuzak:** D (14) koşulu sağlamadığı için karşıt örnek olamaz; A, B, E ise ifadeyi doğrular.

**27** **Doğru cevap: A** (At least one student passed no exam)

**Çözüm:** "Her x için P(x)" ifadesinin olumsuzu "en az bir x için P(x) değil"dir. "En az bir sınavı geçti"nin olumsuzu "hiçbir sınavı geçmedi"dir.

**Tuzak:** B çok güçlü bir ifadedir (karşıt ifade, olumsuz değil).

**28** **Doğru cevap: B** (Anyone without a B2 certificate cannot enrol in the course)

**Çözüm:** "Kayıt → B2" demektir. Karşıt tersi: "B2 yok → kayıt yok".

> **Tuzak:** gerekli koşulu yeterli koşul sanmak (A, C) veya önermeyi ters çevirmek (D).

**29** **Doğru cevap: D** (It did not rain)

**Çözüm:** Modus tollens: P → Q ve Q değil ise P değil. Maç iptal edilmediyse yağmur yağmamıştır.

> **Tuzak:** B; sonucun yanlış olması nedenin yanlış olduğunu kesin olarak gösterir.

**30** **Doğru cevap: E** (2024)

**Çözüm:** 2022: 8/40 = %20. 2023: düşüş. 2024: 10/40 = %25. 2025: 10/50 = %20. En büyük artış 2024.

> **Tuzak:** 2024 ve 2025'teki mutlak artış aynı (10 bin) olduğu için C'yi seçmek; yüzde artış önceki yıla göre hesaplanır.

**31** **Doğru cevap: A** (8)

**Çözüm:** İngilizce 24, Fransızca 18, en az birini çalışan %85 = 34. İkisi birden: 24 + 18 − 34 = 8.

**32** **Doğru cevap: B** (2 hours)

**Çözüm:** Saatlik doluluk: 1/6 + 1/3 = 1/2 → 2 saat.

> **Tuzak:** sürelerin ortalamasını (A) almak; birlikte çalışma süresi en hızlı musluktan bile kısa olmalıdır.

**33** **Doğru cevap: C** (10)

**Çözüm:** c + m = 30, 4c + 2m = 100. İkinciden 2·(birinci) çıkarılırsa 2c = 40 → c = 20, m = 10.

> **Tuzak:** A, araba sayısıdır.

**34** **Doğru cevap: E** (Ada owns the cat)

**Çözüm:** Carla papağana sahiptir. Kalan kedi ve köpek Ada ile Bruno'nundur; Ada köpeğe sahip olmadığına göre Ada → kedi, Bruno → köpek. Bilgiler çelişkili değildir.

**35** **Doğru cevap: C** (Some people who speak English are not managers)

**Çözüm:** Almanca konuşan mühendisler İngilizce de konuşur ve yönetici olamaz (yöneticiler Almanca konuşmaz). Demek ki İngilizce konuşup yönetici olmayan kişiler vardır.

> **Tuzak:** A; yalnızca Almanca konuşan mühendislerin yönetici olmadığı kesindir, diğer mühendisler yönetici olabilir.

**36** **Doğru cevap: D** (20)

**Çözüm:** En kötü durum: önce tüm kırmızı ve maviler (18) gelir, sonra 2 yeşil gerekir: 18 + 2 = 20.

> **Tuzak:** B (4), "aynı renkten 2 çorap" sorusunun cevabıdır.

**37** **Doğru cevap: A** (Only 1)

**Çözüm:** (1) X: 300 mm, Y: 300 mm → doğru. (2) X yalnızca Ocak, Şubat, Mart'ta fazla: 6 ayın 3'ü, yarısından fazla değil → yanlış. (3) Farklar 30, 20, 5, 20, 15, 20; en büyük Ocak'ta → yanlış.

> **Tuzak:** (2)'de "yarısından fazla" ile "yarısı"nı karıştırmak.

**38** **Doğru cevap: D** (multiply each percentage by the population of its district, add the results and divide by the total population)

**Çözüm:** Gerekli olan ağırlıklı ortalamadır: her ilçedeki 65 yaş üstü kişi sayısı bulunur, toplanır ve toplam nüfusa bölünür.

> **Tuzak:** A, ilçe nüfusları eşit olmadıkça yanlış sonuç verir.

**39** **Doğru cevap: B** (€100)

**Çözüm:** 0,80 · x = 80 → x = 100.

> **Tuzak:** 80'e %20 ekleyip 96 (A) bulmak; indirim orijinal fiyat üzerinden yapılır.

**40** **Doğru cevap: E** (A member borrows a new arrival for 3 weeks)

**Çözüm:** "2 haftadan uzun → (üye VE yeni gelen değil)". 3 hafta > 2 hafta ama kitap yeni gelen: kural ihlal edilir. A, B, D'de süre 2 haftayı aşmaz; C'de iki koşul da sağlanır.

## Biyoloji · Soru 41–50

**41** **Doğru cevap: B** (Its high specific heat capacity)

**Çözüm:** Hidrojen bağları nedeniyle suyun ısınması için çok enerji gerekir (yüksek özısı). Bu yüzden sıcaklık değişimlerini tamponlar.

> **Tuzak:** A, buzun yüzmesini açıklar; E, kılcallık ve yüzey olaylarını açıklar.

**42** **Doğru cevap: C** (consists of two or more polypeptide chains)

**Çözüm:** Kuaterner yapı, birden fazla polipeptit zincirinin (alt birimin) bir araya gelmesidir; örnek hemoglobin (4 zincir).

**Tuzak:** A; disülfit köprüleri tek zincirde de olabilir ve üçüncül yapıya katkı yapar. D, ikincil yapıdır.

**43** **Doğru cevap: D** (Ribosomes)

**Çözüm:** Ribozomlar tüm hücrelerde bulunur (prokaryotlarda 70S, ökaryotlarda 80S). Diğerleri zarlı organeldir ve yalnızca ökaryotlarda bulunur.

**44** **Doğru cevap: C** (A cell wall and a large central vacuole)

**Çözüm:** Selüloz hücre duvarı ve büyük merkezi koful bitki hücresine özgüdür.

**Tuzak:** A; bitki hücrelerinde de mitokondri vardır, kloroplast onlara ek olarak bulunur.

**45** **Doğru cevap: B** (S)

**Çözüm:** S (sentez) evresinde DNA kopyalanır ve her kromozom iki kardeş kromatitten oluşur hale gelir.

**46** **Doğru cevap: A** (23 chromosomes, each made of two chromatids)

**Çözüm:** Mayoz I'de homolog kromozomlar ayrılır: kromozom sayısı yarıya iner (n = 23) ama kardeş kromatitler henüz ayrılmamıştır. Kromatitler mayoz II'de ayrılır.

**Tuzak:** C, mayoz II sonundaki durumdur.

**47** **Doğru cevap: E** (2/3)

**Çözüm:** Aa × Aa → 1 AA : 2 Aa : 1 aa. Baskın fenotipliler AA + Aa = 3 pay; bunların 2'si heterozigot → 2/3.

**Tuzak:** tüm yavrular içindeki heterozigot oranını (1/2, B) vermek.

**48** **Doğru cevap: D** (100)

**Çözüm:** 303/3 = 101 kodon. Stop kodonu amino asit kodlamaz: 101 − 1 = 100. AUG metiyonin kodlar ve sayıya dahildir.

**Tuzak:** stop kodonunu da sayarak A'yı seçmek.

**49** **Doğru cevap: A** (mutualism)

**Çözüm:** İki tür de fayda görür (+/+): mutualizm.

**Tuzak:** C (kommensalizm) +/0 ilişkidir; B (parazitlik) +/− ilişkidir.

**50** **Doğru cevap: E** (Pulmonary veins)

**Çözüm:** Akciğer toplardamarları (pulmoner venler) oksijence zengin kanı sol kulakçığa taşır.

**Tuzak:** "atardamar = oksijenli kan" ezberi. Damarları kanın yönü belirler: kalpten çıkan atardamar, kalbe gelen toplardamardır; pulmoner arter oksijence fakir kan taşır.

## Kimya · Soru 51–60

**51** **Doğru cevap: C** (Trigonal pyramidal)

**Çözüm:** N'nin çevresinde 4 elektron bölgesi vardır (3 bağ + 1 ortaklanmamış çift). Elektron geometrisi düzgün dörtyüzlü, molekül geometrisi üçgen piramittir.

**Tuzak:** ortaklanmamış çifti saymayıp A'yı, ya da elektron geometrisini molekül geometrisi sanmak B'yi seçtirir.

**52** **Doğru cevap: D** (44 g)

**Çözüm:** $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$. 16 g $CH_4$ = 1 mol → 1 mol $CO_2$ = 44 g.

**Tuzak:** kütlenin korunmasını yanlış uygulayıp 16 g (A) demek.

**53** **Doğru cevap: A** (4 mol of $H_2O$ are formed and 1 mol of $O_2$ is left over)

**Çözüm:** 4 mol $H_2$ için 2 mol $O_2$ gerekir; $H_2$ sınırlayıcıdır. 4 mol $H_2O$ oluşur, 3 − 2 = 1 mol $O_2$ artar.

**Tuzak:** mol sayılarını toplayıp B'yi seçmek.

**54** **Doğru cevap: C** (3)

**Çözüm:** n(HCl) = 0,100 × 0,010 = $1{,}0\times10^{-3}$ mol. Yeni derişim $1{,}0\times10^{-3}$ mol $dm^{-3}$. HCl kuvvetli asit: $[H^+] = 10^{-3}$ → pH = 3.

**Tuzak:** seyreltmeden önceki pH'ı (2, B) vermek.

**55** **Doğru cevap: B** (+6)

**Çözüm:** 2(+1) + 2x + 7(−2) = 0 → 2x = 12 → x = +6.

**Tuzak:** iki Cr atomunun toplamını (+12, D) tek atomun değeri sanmak.

**56** **Doğru cevap: E** (spontaneous at any temperature)

**Çözüm:** ΔG = ΔH − TΔS. ΔH negatif, −TΔS de negatif olduğu için ΔG her sıcaklıkta < 0'dır.

**Tuzak:** C, ΔH < 0 ve ΔS < 0 durumudur.

**57** **Doğru cevap: E** (K)

**Çözüm:** Atom yarıçapı grupta aşağı inildikçe artar, periyotta sağa gidildikçe azalır. K, 4. periyot 1. gruptadır; Na'dan bir kabuk fazladır.

**Tuzak:** yalnızca 3. periyodu düşünüp A'yı seçmek.

**58** **Doğru cevap: B** (esters)

**Çözüm:** –COO– grubu iki karbon zincirini bağlıyor: ester (etil asetat / etil etanoat).

**Tuzak:** COO görüp karboksilik asit (A) sanmak; asitte –COOH, yani O'ya bağlı H olur.

**59** **Doğru cevap: A** (sulphur dioxide and nitrogen oxides)

**Çözüm:** $SO_2$ ve $NO_x$ su ile $H_2SO_4$ ve $HNO_3$ oluşturur.

**Tuzak:** B, sera etkisine neden olan gazlardır; C, ozon tabakasının incelmesiyle ilgilidir.

**60** **Doğru cevap: D** ($CaCl_2$ 0.10 mol $dm^{-3}$)

**Çözüm:** Kaynama noktası yükselmesi çözünmüş tanecik sayısıyla orantılıdır. $CaCl_2$ → 3 iyon: 0,30; NaCl → 0,20; glikoz ve sakaroz → 0,10.

**Tuzak:** tüm 0,10'luk çözeltileri eşit sanmak; elektrolitler iyonlarına ayrışır.

## Fizik · Soru 61–65

**61** **Doğru cevap: A** (0.5 m)

**Çözüm:** λ = v/f = 340/680 = 0,5 m.

**Tuzak:** f/v oranını alıp 2 m (B) ya da v·f çarpımını alıp C'yi bulmak.

**62** **Doğru cevap: C** (25 m)

**Çözüm:** $s = ½·a·t^2 = ½ · 2 · 25 = 25$ m.

**Tuzak:** ½ katsayısını unutup 50 m (B) bulmak; A ise son hızdır (10 m/s).

**63** **Doğru cevap: D** (20 m/s)

**Çözüm:** Mekanik enerji korunur: $mgh = ½mv^2$ → $v = \sqrt{(2gh)} = \sqrt{400} = 20$ m/s. Kütleden bağımsızdır.

**Tuzak:** 2 çarpanını unutup √200 ≈ 14 m/s (B) bulmak.

**64** **Doğru cevap: E** (20 N)

**Çözüm:** Arşimet: $F = ρ·V·g = 1000 · 0{,}0020 · 10 = 20$ N.

**Tuzak:** 2 $dm^3$'ü yanlışlıkla 0,2 $m^3$ almak D'ye (2000 N), 0,02 $m^3$ almak C'ye (200 N) götürür; doğrusu 1 $dm^3 = 10^{-3}$ $m^3$.

**65** **Doğru cevap: B** (0.25 A)

**Çözüm:** Seri bağlamada R = 12 + 12 = 24 Ω. I = V/R = 6/24 = 0,25 A.

**Tuzak:** tek dirençle hesaplayıp 0,5 A (C), ya da paralel sanarak (6 Ω) 1 A (A) bulmak.

CENT-S · DENEME SINAVI

# 02

65 soru · 140 dakika · 6 bölüm

| Bölüm | Sorular | Soru sayısı | Süre |
|---|---|---|---|
| Reading and Comprehension<br>Okuma ve Anlama | 1–10 | 10 | 30 dk |
| Mathematics<br>Matematik | 11–25 | 15 | 30 dk |
| Reasoning on Texts and Data<br>Metin ve Veri Üzerinde Akıl Yürütme | 26–40 | 15 | 30 dk |
| Biology<br>Biyoloji | 41–50 | 10 | 20 dk |
| Chemistry<br>Kimya | 51–60 | 10 | 20 dk |
| Physics<br>Fizik | 61–65 | 5 | 10 dk |
| **Toplam** | **1–65** | **65** | **140 dk** |

## Sınav kuralları

- Sınavı tek oturumda, gerçek süreyle çözün.
- Her bölümün süresi yalnızca o bölüm için geçerlidir; süresi biten bölüme geri dönülemez.
- Doğru cevap **+1**, yanlış cevap **−0,25**, boş **0** puandır.
- Sınavı bitirmeden cevap anahtarına bakmayın.

## Süre kaydı

Başlangıç

Bitiş

Puan

SECTION 1

# Reading and Comprehension

Questions **1–10** · 10 questions · **30 min**

**TEXT 1 (NON-FICTION)**

We tend to regard forgetting as a failure of the mind, a leak in a container that ought to be sealed. A student who cannot recall a date, an adult who loses a name at a party — both feel that something has gone wrong. Yet a growing number of psychologists argue that this view is, at best, half true.

Consider what a perfect memory would mean. Every face seen on a crowded train, every word on every advertisement, every trivial conversation would remain equally available. The few known cases of people with extraordinarily detailed memories suggest that such a condition is less a gift than a burden: those who have it often describe difficulty in generalising, in seeing the forest rather than each separate tree. To think, after all, is partly to ignore. We form the idea of "dog" only by forgetting the particular features of the hundreds of dogs we have met.

Forgetting also protects us from the past. Memories that are not used gradually lose their sharpness, and this fading allows old disappointments to lose their power over present decisions. Without it, every mistake would remain as vivid as on the day it was made.

None of this means that all forgetting is useful. Diseases that destroy memory are tragic precisely because they remove what a person needs, not what he can do without. The point is rather that the brain seems to be selecting, not simply losing. What it keeps, on the whole, is what it has reason to believe it will need again.

**1** Which of the following best expresses the main idea of the text?

(A) Forgetting is often a useful, selective process rather than simply a failure
(B) People with detailed memories are more intelligent than others
(C) Memory diseases are caused by forgetting too much
(D) Students forget dates because they do not study enough
(E) A perfect memory is the goal of modern psychology

**2** Why does the author mention people with extraordinarily detailed memories?

(A) To prove that memory can be trained
(B) To show that such people are very rare
(C) To explain how diseases destroy memory
(D) To suggest that a perfect memory can make it harder to generalise
(E) To describe how people remember faces on trains

**3** In the sentence "To think, after all, is partly to ignore", the author means that:

(A) intelligent people pay little attention to others
(B) forming general ideas requires setting aside particular details
(C) thinking is less important than remembering
(D) people should ignore their mistakes
(E) memory works best when we are distracted

**4** Which of the following statements would the author most probably agree with?

(A) All forms of forgetting should be avoided
(B) Old disappointments should always be remembered clearly
(C) The brain loses information in a random way
(D) Diseases of memory are not a serious problem
(E) The brain tends to keep information it expects to need again

**TEXT 2 (LITERARY)**

The train was twenty minutes late, which was exactly the kind of mercy his father did not know what to do with. They had said goodbye properly at the house, in front of his mother, with a handshake that had lasted a second too long. Now, on the cold platform, there was nothing left to say and too much time to say it in.

His father studied the timetable as though it might change if he read it carefully enough. Then he bought a newspaper he would not read and folded it twice, very neatly, into a shape that fitted his coat pocket. "You'll write," he said. It was not a question, and Daniel did not answer it as one.

When the train finally came, rolling in with that tired breath of brakes, his father picked up the heavier of the two suitcases before Daniel could reach it and carried it to the door of the carriage. He lifted it in, set it down, and stepped back onto the platform. For a moment it seemed he would say something more. Instead he raised one hand, not quite a wave, as if he were testing the air for rain.

Daniel watched him through the dirty window as the train pulled away, a small, upright figure who did not move until the curve of the track took him out of sight.

**5** The phrase "exactly the kind of mercy his father did not know what to do with" suggests that the father:

(A) was angry with the railway company
(B) wanted Daniel to miss the train
(C) found the extra time uncomfortable rather than welcome
(D) was grateful for the chance to talk at length
(E) did not notice that the train was late

**6** The father's behaviour on the platform (studying the timetable, buying a newspaper he will not read) mainly suggests that he:

(A) is interested in the news of the day
(B) is worried that the train will not arrive
(C) wants to show Daniel how to travel
(D) is impatient to go back home
(E) keeps himself busy to avoid showing his feelings

**7** "'You'll write,' he said. It was not a question." This means that the father:

(A) did not want Daniel to write
(B) expressed an expectation rather than asking for information
(C) was not sure that Daniel could write
(D) asked Daniel for his new address
(E) was angry because Daniel never wrote

**TEXT 3 (JOURNALISTIC)**

When the public library in a small northern town began lending drills, sewing machines and camping tents alongside its books, some residents thought it was a joke. Two years later, the "library of things" has a waiting list. Its most popular items are not the expensive ones but those people need once or twice a year: a ladder, a carpet cleaner, a pasta machine.

The idea has spread to dozens of towns, encouraged by concerns about waste and the cost of living. A household drill, one organiser points out, is used on average for only a few minutes in its entire life. Sharing it among a hundred families saves money and, in theory, reduces the number of objects that are produced and thrown away.

Librarians, however, describe a less expected benefit. Borrowers who come for a tool often stay to ask how to use it, and volunteers have begun to offer short repair workshops on Saturday mornings. "People arrive with a problem and leave with a skill," says the head librarian. Several borrowers, she adds, had not entered the building for years.

There are difficulties. Tools break more often than books, and insurance is expensive. Some shop owners complain that the library competes unfairly with local businesses. The organisers reply that most borrowers would not have bought the items anyway — they would simply have done without.

**8** According to the text, which items are borrowed most often?

(A) The most expensive ones
(B) Books about repairs
(C) Camping tents
(D) Items that people need only occasionally
(E) Items sold in local shops

**9** What is the "less expected benefit" described by the librarians?

(A) The library has become a place where people learn skills, and some come back after years
(B) The library saves money on insurance
(C) Tools last longer than books
(D) Shops sell more tools than before
(E) Fewer people borrow books

**10** How do the organisers answer the shop owners' complaint?

(A) They agree to stop lending tools
(B) They offer shop owners free workshops
(C) They argue that most borrowers would not have bought the items anyway
(D) They say that the library pays for its own insurance
(E) They claim that tools break less often than books

SECTION 2

# Mathematics

Questions **11–25** · 15 questions · **30 min**

**11** Which of the following numbers is the largest?

(A) $2^{30}$ (B) $3^{20}$ (C) $5^{12}$ (D) $10^{9}$ (E) $6^{12}$

**12** When the natural number n is divided by 6, the remainder is 5. What is the remainder when 2n + 3 is divided by 6?

(A) 1 (B) 3 (C) 5 (D) 13 (E) 0

**13** The number 27^(2/3) · 16^(−1/4) is equal to:

(A) 18 (B) 6 (C) 9/2 (D) 3/2 (E) 9/4

**14** For $x \neq -3$, the expression $(x^2 - 9)/(x^2 + 6x + 9)$ is equal to:

(A) $(x + 3)/(x - 3)$ (B) $-1$ (C) $x - 3$
(D) $(x - 3)/(x + 3)$ (E) $1/(x + 3)$

**15** The solutions of the inequality $(x - 1)/(x + 2) \leq 0$ are:

(A) $-2 \leq x \leq 1$ (B) $-2 < x \leq 1$ (C) $x \leq 1$
(D) $x < -2$ or $x \geq 1$ (E) $-2 < x < 1$

**16** For which value of the real parameter k does the system { x + ky = 1 ; 2x + 4y = 3 } have no solutions?

(A) k = 2 (B) k = −2 (C) k = 4
(D) For every k ≠ 2 (E) For no value of k

**17** Let $f(x) = x^2 - 1$ and $g(x) = 2x + 1$. What is the value of f(g(1))?

(A) 1 (B) 3 (C) 8 (D) 9 (E) 0

**18** The value of $\log_3 54 - \log_3 2$ is:

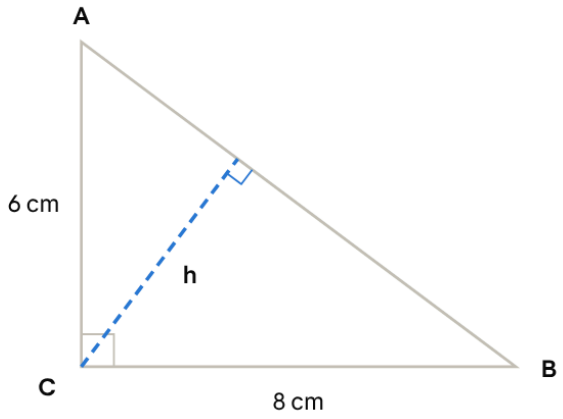
(A) 27 (B) $\log_3 52$ (C) 2 (D) 9 (E) 3

**19** What is the sum of the real solutions of the equation $|2x - 3| = 5$?

(A) 4 (B) 3 (C) 5 (D) −1 (E) 8

**20** A right-angled triangle has legs of 6 cm and 8 cm. What is the length of the height (altitude) drawn to the hypotenuse?

**Right triangle with legs 6 cm and 8 cm**



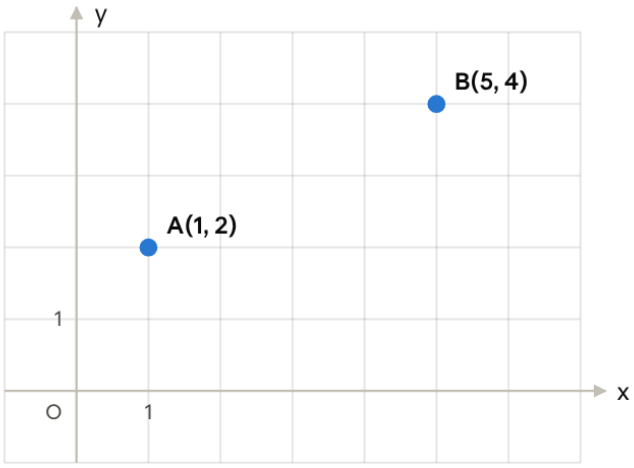

(A) 4.8 cm (B) 5 cm (C) 7 cm (D) 2.4 cm (E) 4 cm

**21** Two triangles are similar, and the ratio of their perimeters is 2 : 3. If the area of the larger triangle is 45 cm², what is the area of the smaller one?

(A) 30 cm² (B) 15 cm² (C) 10 cm² (D) 20 cm² (E) 25 cm²

**22** Which point P on the x-axis is equidistant from A(1, 2) and B(5, 4)?

**Points A and B; P lies on the x-axis**




Each grid square is 1 unit

(A) (3, 0) (B) (4, 0) (C) (6, 0) (D) (2.5, 0) (E) (4.5, 0)

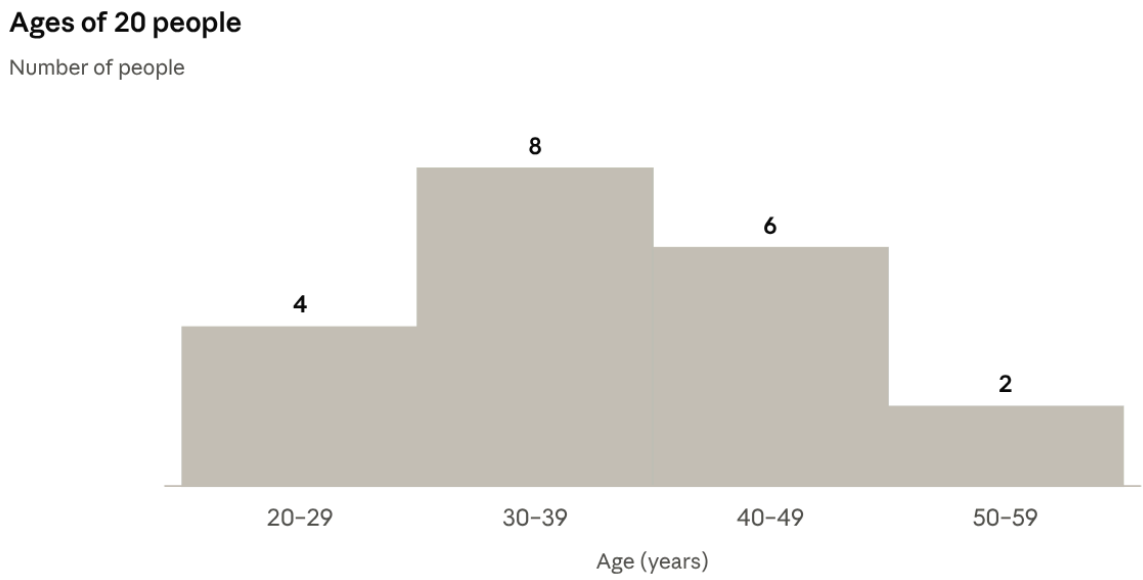
**23** An urn contains 3 red balls and 2 blue balls. Two balls are drawn at random without replacement. What is the probability that they are the same colour?

(A) 13/25 (B) 3/10 (C) 2/5 (D) 1/10 (E) 3/5

**24** How many different words (even without meaning) can be formed using all the letters of the word LEVEL?

(A) 120 (B) 60 (C) 20 (D) 30 (E) 15

**25** The histogram shows the ages of 20 people, grouped in classes.




What is the relative frequency of the people aged 40 or more?

(A) 30% (B) 8% (C) 60% (D) 20% (E) 40%

SECTION 3

## Reasoning on Texts and Data

Questions **26–40** · 15 questions · **30 min**

**26** Consider the true statement: "If a natural number is divisible by 6, then it is even." Which of the following is correct?

(A) Being even is a sufficient condition for being divisible by 6
(B) Being divisible by 6 is a sufficient but not necessary condition for being even
(C) Being divisible by 6 is a necessary condition for being even
(D) Being even is a necessary and sufficient condition for being divisible by 6
(E) None of the other statements is correct

**27** The statement "If Marta studies, she passes the exam" is logically equivalent to:

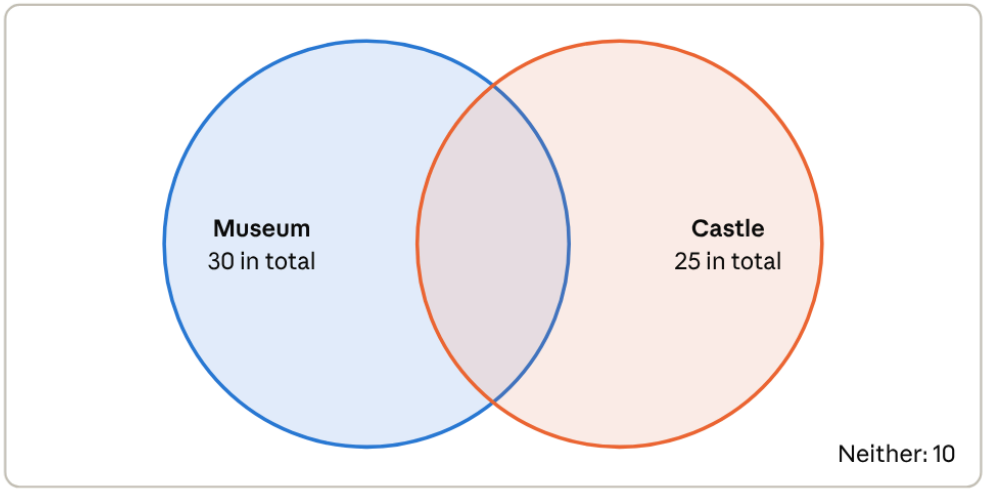
(A) If Marta passes the exam, she has studied
(B) If Marta does not study, she does not pass the exam
(C) Marta studies and passes the exam
(D) If Marta does not pass the exam, she has not studied
(E) Marta passes the exam only if she studies

**28** Which is the negation of the statement "Luca is in Rome and he is at work"?

(A) Luca is not in Rome and he is not at work
(B) Luca is not in Rome or he is not at work
(C) Luca is in Rome but he is not at work
(D) Luca is at work but he is not in Rome
(E) Luca is neither in Rome nor at work

**29** In a group of 50 tourists, 30 visited the museum, 25 visited the castle and 10 visited neither. How many tourists visited only the castle?

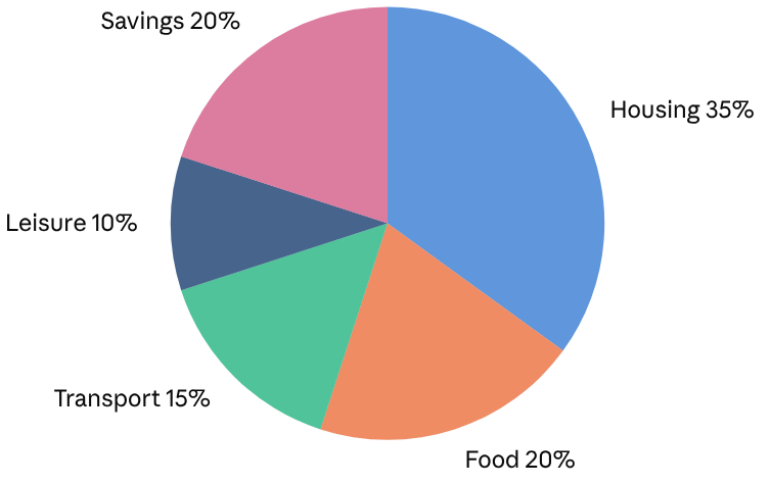
**A group of 50 tourists**




(A) 15 (B) 25 (C) 5 (D) 10 (E) 20

**30** A family has a monthly budget of €2400, distributed as follows: housing 35%, food 20%, transport 15%, leisure 10%, savings 20%. Housing costs increase by €120; the other expenses stay the same in euros and the savings decrease by €120. What percentage of the budget now goes to savings?

**Monthly family budget: €2400**




(A) 15% (B) 5% (C) 18% (D) 20% (E) 10%

**31** A father is four times as old as his son. In 20 years, he will be twice as old as his son. How old is the son now?

(A) 5 (B) 15 (C) 10 (D) 20 (E) 40

**32** A car consumes 6 litres of petrol every 100 km, and petrol costs €1.80 per litre. How much does the petrol for a 350 km trip cost?

(A) €37.80 (B) €21.00 (C) €63.00 (D) €35.00 (E) €10.80

**33** Five students are ranked by the average of their Maths and Physics marks; if two students have the same average, the one with the higher Maths mark comes first.

| Student | Anna | Ben | Cris | Dora | Elio |
|---|---|---|---|---|---|
| Maths | 8 | 6 | 9 | 7 | 5 |
| Physics | 6 | 8 | 4 | 7 | 10 |

Who is in second place?

(A) Elio (B) Dora (C) Ben (D) Cris (E) Anna

**34** A vase was broken by exactly one of three friends: Ali, Bora and Cem. Exactly one of them is telling the truth. Ali says: "Bora broke the vase." Bora says: "I did not break it." Cem says: "I did not break it." Who broke the vase?

(A) Ali (B) Bora (C) Cem
(D) It cannot be determined (E) None of them

**35** No reptile is warm-blooded. All birds are warm-blooded. Some pets are reptiles. Which statement is certainly true?

(A) No pet is a bird
(B) Some pets are not birds
(C) All pets are warm-blooded
(D) Some birds are reptiles
(E) Some reptiles are not pets

**36** The table shows part of a train timetable.

| Station | Train 1 | Train 2 | Train 3 |
|---|---|---|---|
| Alba (dep.) | 07:10 | 08:25 | 09:40 |
| Borgo | 07:45 | 09:05 | 10:10 |
| Cima (arr.) | 08:30 | 09:55 | 10:50 |

Paola must arrive in Cima before 10:00 and wants the shortest possible journey from Alba. Which train should she take?

(A) Train 1
(B) Train 2
(C) Train 3
(D) Train 1 or Train 2, equally
(E) None of them

**37** In a town, 40% of the inhabitants are under 30. Of these, 25% are university students. University students under 30 represent what percentage of the inhabitants of the town?

(A) 65% (B) 15% (C) 10% (D) 25% (E) 4%

**38** The cost C (in euros) of printing n copies of a leaflet is given by C = 50 + 0.2n. Which statement is correct?

(A) Each copy costs €50.20
(B) Printing 0 copies costs nothing
(C) Doubling the number of copies doubles the cost
(D) The average cost per copy decreases as n increases
(E) Printing 100 copies costs €20

**39** The arithmetic mean of five numbers is 12. One of the numbers is removed, and the mean of the remaining four is 10. Which number was removed?

(A) 2 (B) 10 (C) 12 (D) 22 (E) 20

**40** A lift can carry at most 450 kg. A group of 40 people, each weighing 75 kg, must go up using only this lift. What is the minimum number of trips needed?

(A) 6 (B) 6.67 (C) 8 (D) 5 (E) 7

SECTION 4

## Biology

Questions **41–50** · 10 questions · **20 min**

**41** Glycogen is:

(A) a structural polysaccharide of the plant cell wall
(B) a storage polysaccharide of animal cells
(C) a disaccharide formed by glucose and fructose
(D) a lipid found in cell membranes
(E) the main storage polysaccharide of plants

**42** Phospholipids spontaneously form bilayers in water because they:

(A) are completely hydrophobic
(B) are completely hydrophilic
(C) have a hydrophilic head and two hydrophobic tails
(D) contain peptide bonds
(E) are polymers of glucose

**43** In a double-stranded DNA molecule, 30% of the nitrogenous bases are adenine. What percentage are cytosine?

(A) 30% (B) 20% (C) 40% (D) 70% (E) 10%

**44** Which is the correct pathway followed by a protein that is secreted out of the cell?

(A) Golgi apparatus → rough ER → lysosome → plasma membrane
(B) Nucleus → smooth ER → lysosome
(C) Rough ER → Golgi apparatus → secretory vesicles → plasma membrane
(D) Mitochondria → Golgi apparatus → plasma membrane
(E) Free ribosomes → nucleus → plasma membrane

**45** In which part of the mitochondrion does the Krebs cycle take place?

(A) Cytoplasm (B) Outer membrane (C) Intermembrane space
(D) Matrix (E) Inner membrane

**46** Which cells regulate the opening and closing of the stomata in leaves?

(A) Guard cells (B) Root hair cells (C) Xylem vessels
(D) Palisade cells (E) Companion cells

**47** In a food chain, the producers fix 50 000 kJ of energy. Assuming that about 10% of the energy passes from each trophic level to the next, how much energy is available to the fifth trophic level?

(A) 5000 kJ (B) 500 kJ (C) 50 kJ (D) 5 kJ (E) 0.5 kJ

**48** Which type of tissue is characterised by cells scattered in an abundant extracellular matrix?

(A) Epithelial tissue (B) Muscle tissue (C) Nervous tissue
(D) Glandular epithelium (E) Connective tissue

**49** In which organ are most of the products of digestion absorbed into the blood?

(A) Small intestine (B) Stomach (C) Large intestine
(D) Oesophagus (E) Liver

**50** What is the structural and functional unit of the kidney?

(A) Alveolus (B) Neuron (C) Villus (D) Sarcomere (E) Nephron

SECTION 5

## Chemistry

Questions **51–60** · 10 questions · **20 min**

**51** An element has the ground-state electron configuration $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$. Where is it located in the periodic table?

(A) Group 14, period 3 (B) Group 16, period 3 (C) Group 4, period 3
(D) Group 16, period 4 (E) Group 6, period 2

**52** The isotopes $^{12}C$ and $^{14}C$ differ in their number of:

(A) protons (B) electrons (C) neutrons
(D) atomic number (E) chemical properties

**53** Which of the following substances contains ionic bonds?

(A) $CH_4$ (B) $H_2O$ (C) MgO (D) $CO_2$ (E) $Cl_2$

**54** Water ($H_2O$) boils at 100 °C, while hydrogen sulphide ($H_2S$), which has a larger molar mass, boils at about −60 °C. What explains this difference?

(A) The larger molar mass of water (B) Hydrogen bonds between water molecules
(C) Ionic bonds in water (D) The linear shape of the water molecule
(E) Metallic bonds in water

**55** A gas is contained in a rigid 10 L vessel at 27 °C and 2.0 atm. It is heated to 327 °C. What is the new pressure?

(A) 24.2 atm (B) 1.0 atm (C) 2.2 atm (D) 4.0 atm (E) 12 atm

**56** Consider the equilibrium $N_2(g) + 3\ H_2(g) \rightleftharpoons 2\ NH_3(g)$, with $\Delta H < 0$. Which change increases the equilibrium yield of $NH_3$?

(A) Increasing the temperature
(B) Decreasing the pressure
(C) Adding a catalyst
(D) Increasing the pressure
(E) Removing some $N_2$

**57** At a given moment, the reaction quotient Q of a reaction is smaller than its equilibrium constant K ($Q < K$). Which statement is correct?

(A) The reaction proceeds in the forward direction, towards the products
(B) The system is at equilibrium
(C) The reaction proceeds towards the reactants
(D) The value of K decreases until it equals Q
(E) The reaction stops

**58** What is the conjugate base of the dihydrogen phosphate ion, $H_2PO_4^-$?

(A) $H_3PO_4$ (B) $PO_4^{3-}$ (C) $H_2O$ (D) $H_3O^+$ (E) $HPO_4^{2-}$

**59** The label of a bottle of mineral water reports "Calcium: 120 mg/L". How much calcium is contained in a 1.5 L bottle?

(A) 180 mg (B) 120 mg (C) 80 mg (D) 1.8 g (E) 18 mg

**60** In the balanced equation for the complete combustion of propane, $C_3H_8 + x\ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$, what is the value of x?

(A) 3 (B) 4 (C) 7 (D) 10 (E) 5

SECTION 6

## Physics

Questions **61–65** · 5 questions · **10 min**

**61** Two forces of 3 N and 4 N act on the same point and are perpendicular to each other. What is the magnitude of their resultant?

(A) 7 N (B) 1 N (C) 5 N (D) 12 N (E) 25 N

**62** A train moves at 20 m/s with respect to the ground. A passenger walks towards the front of the train at 1.5 m/s with respect to the train. What is the passenger's speed with respect to the ground?

(A) 18.5 m/s (B) 21.5 m/s (C) 20 m/s (D) 1.5 m/s (E) 30 m/s

**63** A point on a wheel completes 120 revolutions per minute in uniform circular motion. What is the period of its motion?

(A) 0.5 s (B) 2 s (C) 120 s (D) 0.25 s (E) 60 s

**64** An ideal gas absorbs 500 J of heat and, at the same time, does 200 J of work on its surroundings. What is the change in its internal energy?

(A) +700 J (B) −300 J (C) +200 J (D) +500 J (E) +300 J

**65** Two point charges exert an electrostatic force F on each other. If the distance between them is tripled, the force becomes:

(A) F/3 (B) 3F (C) 9F
(D) F/9 (E) F (unchanged)

END OF THE TEST · SINAVIN SONU

DENEME SINAVI 2

# Cevap Anahtarı

Cevaplarınızı karşılaştırın, ardından aşağıdaki tabloyla bölüm bölüm puanınızı hesaplayın.

**Okuma ve Anlama** — Soru 1–10

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| A | D | B | E | C | E | B | D | A | C |

**Matematik** — Soru 11–25

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B | A | C | D | B | A | C | E | B | A | D | E | C | D | E |

**Metin ve Veri Üzerinde Akıl Yürütme** — Soru 26–40

| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B | D | B | D | A | C | A | E | C | B | A | C | D | E | E |

**Biyoloji** — Soru 41–50

| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|
| B | C | B | C | D | A | D | E | A | E |

**Kimya** — Soru 51–60

| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| B | C | C | B | D | D | A | E | A | E |

**Fizik** — Soru 61–65

| 61 | 62 | 63 | 64 | 65 |
|---|---|---|---|---|
| C | B | A | E | D |

| Bölüm | Soru | Doğru | Yanlış | Boş | Puan |
|---|---|---|---|---|---|
| Okuma ve Anlama | 10 | | | | |
| Matematik | 15 | | | | |
| Metin ve Veri Üzerinde Akıl Yürütme | 15 | | | | |
| Biyoloji | 10 | | | | |
| Kimya | 10 | | | | |
| Fizik | 5 | | | | |
| **Toplam** | **65** | | | | |

Puan = Doğru × 1 − Yanlış × 0,25. Boş bırakılan sorular puanı etkilemez. En yüksek puan 65'tir.

DENEME SINAVI 2

# Çözümler

## Okuma ve Anlama · Soru 1–10

**1** **Doğru cevap: A** (Forgetting is often a useful, selective process rather than simply a failure)

**Çözüm:** Metin unutmanın "yarı yarıya" bir başarısızlık olduğunu, beynin seçim yaptığını savunuyor.

> **Tuzak:** E, metnin tersini söyler; C metinde geçen bir örneği çarpıtır.

**2** **Doğru cevap: D** (To suggest that a perfect memory can make it harder to generalise)

**Çözüm:** Bu kişiler genelleme yapmakta zorlandıklarını anlatır; örnek, mükemmel belleğin bir yük olabileceğini göstermek içindir.

> **Tuzak:** B doğru bir bilgi olabilir ama yazarın amacı bu değildir.

**3** **Doğru cevap: B** (forming general ideas requires setting aside particular details)

**Çözüm:** Hemen ardından gelen "köpek" örneği: genel kavram, tek tek köpeklerin ayrıntıları unutularak oluşur.

**4** **Doğru cevap: E** (The brain tends to keep information it expects to need again)

**Çözüm:** Son cümle: beyin, yeniden ihtiyaç duyacağına inandığı bilgileri saklar.

> **Tuzak:** C; yazar "yalnızca kaybetmiyor, seçiyor" der, yani rastgele değildir.

**5** **Doğru cevap: C** (found the extra time uncomfortable rather than welcome)

**Çözüm:** Gecikme normalde bir "lütuf" sayılabilir ama baba ne yapacağını bilemez: "söylenecek bir şey kalmamıştı, söylemek için fazla zaman vardı".

> **Tuzak:** D, ifadenin ironisini kaçırır.

**6** **Doğru cevap: E** (keeps himself busy to avoid showing his feelings)

**Çözüm:** Okumayacağı gazete ve tarifeyi incelemesi anlamsız uğraşlardır; duygularını göstermemek için meşgul görünür.

> **Tuzak:** A; metin gazeteyi "okumayacağı" der.

**7** **Doğru cevap: B** (expressed an expectation rather than asking for information)

**Çözüm:** Cümle soru değil, bir beklenti ya da ricadır; Daniel de onu böyle anlar ve cevap vermez.

**8** **Doğru cevap: D** (Items that people need only occasionally)

**Çözüm:** "En popüler eşyalar pahalı olanlar değil, yılda bir iki kez gereken eşyalardır."

> **Tuzak:** A, metnin açıkça reddettiği seçenektir.

**9** **Doğru cevap: A** (The library has become a place where people learn skills, and some come back after years)

**Çözüm:** Ödünç alanlar nasıl kullanılacağını sorar, onarım atölyeleri düzenlenir ve yıllardır gelmeyenler kütüphaneye döner.

> **Tuzak:** B ve C, metnin "zorluklar" kısmıyla çelişir.

**10** **Doğru cevap: C** (They argue that most borrowers would not have bought the items anyway)

**Çözüm:** Son cümle: ödünç alanların çoğu bu eşyaları zaten satın almayacaktı; onlarsız idare edeceklerdi.

> **Tuzak:** E, metindeki bilginin tersidir.

## Matematik · Soru 11–25

**11** **Doğru cevap: B** ($3^{20}$)

**Çözüm:** $2^{30} = 8^{10}$ ve $3^{20} = 9^{10}$, yani $3^{20} > 2^{30} \approx 1{,}07\cdot10^{9} > 10^{9}$. $3^{20} \approx 3{,}5\cdot10^{9}$; $6^{12} \approx 2{,}2\cdot10^{9}$; $5^{12} \approx 2{,}4\cdot10^{8}$.

> **Tuzak:** üssü en büyük olanı (A) en büyük sanmak.

**12** **Doğru cevap: A** (1)

**Çözüm:** $n = 6k + 5 \rightarrow 2n + 3 = 12k + 13 = 6(2k + 2) + 1$. Kalan 1.

> **Tuzak:** 13 (D) kalan olamaz, çünkü kalan bölenden küçük olmalıdır.

**13** **Doğru cevap: C** (9/2)

**Çözüm:** 27^(2/3) = (∛27)² = 9. 16^(−1/4) = 1/⁴√16 = 1/2. Çarpım 9/2.

> **Tuzak:** negatif üssü görmezden gelip 9 · 2 = 18 (A) bulmak.

**14** **Doğru cevap: D** ((x − 3)/(x + 3))

**Çözüm:** Pay (x − 3)(x + 3), payda (x + 3)². Sadeleştirince (x − 3)/(x + 3).

> **Tuzak:** terimleri tek tek "sadeleştirip" (x²'leri ve 6x'i atıp) −9/9 = −1 (B) bulmak; toplamda sadeleştirme yapılmaz.

**15** **Doğru cevap: B** (−2 < x ≤ 1)

**Çözüm:** Pay ve payda zıt işaretli olmalı ya da pay sıfır olmalı. İşaret tablosu: −2 < x < 1 aralığında negatif; x = 1'de sıfır (dahil); x = −2'de tanımsız (hariç).

> **Tuzak:** x = −2'yi dahil etmek (A).

**16** **Doğru cevap: A** (k = 2)

**Çözüm:** İkinci denklem x + 2y = 3/2. k = 2 ise birinci denklem x + 2y = 1 olur: aynı sol taraf, farklı sağ taraf → paralel doğrular, çözüm yok. k ≠ 2 için tek çözüm vardır.

> **Tuzak:** D, tek çözümlü durumdur.

**17** **Doğru cevap: C** (8)

**Çözüm:** g(1) = 3, f(3) = 9 − 1 = 8.

> **Tuzak:** sırayı ters çevirip g(f(1)) = g(0) = 1 (A) bulmak.

**18** **Doğru cevap: E** (3)

**Çözüm:** $\log_3 54 - \log_3 2 = \log_3 (54/2) = \log_3 27 = 3$.

> **Tuzak:** logaritmaların farkını sayıların farkının logaritması sanmak (B).

**19** **Doğru cevap: B** (3)

**Çözüm:** 2x − 3 = 5 → x = 4; 2x − 3 = −5 → x = −1. Toplam 4 + (−1) = 3.

> **Tuzak:** yalnızca pozitif durumu çözüp A'yı seçmek.

**20** **Doğru cevap: A** (4.8 cm)

**Çözüm:** Hipotenüs 10 cm. Alan iki yoldan: (6·8)/2 = (10·h)/2 → h = 4,8 cm.

> **Tuzak:** B, hipotenüse çizilen kenarortaydır (10/2).

**21** **Doğru cevap: D** (20 cm²)

**Çözüm:** Alanlar oranı benzerlik oranının karesidir: (2/3)² = 4/9. 45 · 4/9 = 20 cm².

> **Tuzak:** oranı kare almadan uygulayıp 30 cm² (A) bulmak.

**22** **Doğru cevap: E** ((4.5, 0))

**Çözüm:** P(x, 0): (x − 1)² + 4 = (x − 5)² + 16 → −2x + 5 = −10x + 41 → 8x = 36 → x = 4,5.

> **Tuzak:** AB'nin orta noktasının apsisini (3, A) almak; orta nokta x-ekseninde değildir.

**23** **Doğru cevap: C** (2/5)

**Çözüm:** Tüm çiftler C(5,2) = 10. İki kırmızı C(3,2) = 3, iki mavi C(2,2) = 1. Olasılık 4/10 = 2/5.

> **Tuzak:** iadeli çekiliş gibi hesaplayıp (9 + 4)/25 = 13/25 (A) bulmak.

**24** **Doğru cevap: D** (30)

**Çözüm:** 5 harf; L ve E ikişer kez tekrar ediyor: 5!/(2!·2!) = 120/4 = 30.

> **Tuzak:** yalnızca bir tekrarı dikkate alıp 60 (B) bulmak.

**25** **Doğru cevap: E** (40%)

**Çözüm:** 40 ve üzeri: 6 + 2 = 8 kişi. 8/20 = 0,40 = %40.

> **Tuzak:** mutlak frekansı (8) yüzde sanmak (B) veya yalnızca 40–49 sınıfını almak (A).

## Metin ve Veri Üzerinde Akıl Yürütme · Soru 26–40

**26** **Doğru cevap: B** (Being divisible by 6 is a sufficient but not necessary condition for being even)

**Çözüm:** P → Q'da P yeterli, Q gerekli koşuldur. 6'ya bölünmek çift olmak için yeterlidir ama gerekli değildir (4 çifttir, 6'ya bölünmez).

> **Tuzak:** gerekli ile yeterliyi karıştırmak (A, C).

**27** **Doğru cevap: D** (If Marta does not pass the exam, she has not studied)

**Çözüm:** P → Q, karşıt tersi olan ¬Q → ¬P ile denktir.

> **Tuzak:** A (tersi) ve B (olumsuzu) denk değildir. E, "geçerse çalışmıştır" demektir; bu da A ile aynıdır.

**28** **Doğru cevap: B** (Luca is not in Rome or he is not at work)

**Çözüm:** De Morgan: ¬(P ∧ Q) = ¬P ∨ ¬Q.

**Tuzak:** A ve E aynı ifadedir ve çok güçlüdür; C ve D olumsuzun yalnızca bir durumudur.

**29** **Doğru cevap: D** (10)

**Çözüm:** En az birini ziyaret eden 50 − 10 = 40. İkisini birden: 30 + 25 − 40 = 15. Yalnızca kale: 25 − 15 = 10.

**Tuzak:** A, ikisini birden ziyaret edenlerin sayısıdır.

**30** **Doğru cevap: A** (15%)

**Çözüm:** Birikim: 0,20 · 2400 = 480 €. 480 − 120 = 360 €. 360/2400 = %15.

**Tuzak:** B (%5), birikimin kaç puan azaldığıdır (120 € bütçenin %5'i), yeni payı değil; D (%20), değişikliği hesaba katmamaktır. Doğrusu %20 − %5 = %15.

**31** **Doğru cevap: C** (10)

**Çözüm:** B = 4o; 4o + 20 = 2(o + 20) → 4o + 20 = 2o + 40 → o = 10. Kontrol: baba 40, 20 yıl sonra 60 ve 30.

**Tuzak:** E, babanın yaşıdır.

**32** **Doğru cevap: A** (€37.80)

**Çözüm:** Yakıt: 350 · 6/100 = 21 L. Maliyet: 21 · 1,80 = 37,80 €.

**Tuzak:** B litre sayısıdır; E ise 100 km'lik maliyettir.

**33** **Doğru cevap: E** (Anna)

**Çözüm:** Ortalamalar: Anna 7, Ben 7, Cris 6,5, Dora 7, Elio 7,5. Birinci Elio. 7 ortalamalılar Matematik notuna göre: Anna (8) > Dora (7) > Ben (6). İkinci Anna.

**Tuzak:** A, birinci sıradaki öğrencidir; en yüksek Matematik notu (Cris) eşitlik bozma dışında belirleyici değildir.

**34** **Doğru cevap: C** (Cem)

**Çözüm:** Her olası suçluyu deneyin ve doğru ifade sayısını sayın. Ali kırdıysa: Ali yanlış, Bora doğru, Cem doğru → 2 doğru ×. Bora kırdıysa: Ali doğru, Bora yanlış, Cem doğru → 2 doğru ×. Cem kırdıysa: Ali yanlış, Bora doğru, Cem yanlış → 1 doğru ✔. Vazoyu Cem kırmıştır.

**Tuzak:** "tam olarak biri doğru söylüyor" koşulunu "biri yalan söylüyor" gibi okuyup Ali'nin sözüne güvenmek (B).

**35** **Doğru cevap: B** (Some pets are not birds)

**Çözüm:** Sürüngen olan evcil hayvanlar sıcakkanlı değildir, dolayısıyla kuş olamaz. Yani bazı evcil hayvanlar kuş değildir.

**Tuzak:** A; papağan gibi kuş olan evcil hayvanlar olabilir. E kesin değildir; tüm sürüngenler evcil olabilir (bilgi bunu dışlamaz).

**36** **Doğru cevap: A** (Train 1)

**Çözüm:** Yolculuk süreleri: T1 80 dk, T2 90 dk, T3 70 dk. T3 10:50'de vardığı için geçersiz. Geçerli olanların en kısası T1.

**Tuzak:** zaman koşulunu unutup en hızlı tren olan T3'ü (C) seçmek.

**37** **Doğru cevap: C** (10%)

**Çözüm:** 0,40 · 0,25 = 0,10 = %10.

**Tuzak:** yüzdeleri toplamak (A) ya da çıkarmak (B).

**38** **Doğru cevap: D** (The average cost per copy decreases as n increases)

**Çözüm:** Kopya başı ortalama maliyet C/n = 50/n + 0,2; n arttıkça 50/n azalır.

**Tuzak:** C; sabit maliyet (50 €) olduğu için maliyet n ile doğru orantılı değildir. E'de 100 kopya 70 € tutar.

**39** **Doğru cevap: E** (20)

**Çözüm:** Toplamlar: 5 · 12 = 60 ve 4 · 10 = 40. Çıkarılan sayı: 60 − 40 = 20.

**Tuzak:** ortalamaların farkını (2, A) almak.

**40** **Doğru cevap: E** (7)

**Çözüm:** Her seferde en fazla 450/75 = 6 kişi. 40/6 = 6,67 sefer; sefer sayısı tam sayı olmalı ve herkes taşınmalı, bu yüzden yukarı yuvarlanır: 7.

**Tuzak:** B gerçek bir problemde geçersiz bir sonuçtur; A ise 4 kişiyi aşağıda bırakır.

## Biyoloji · Soru 41–50

**41** **Doğru cevap: B** (a storage polysaccharide of animal cells)

**Çözüm:** Glikojen, hayvanlarda (özellikle karaciğer ve kasta) glikozun depo biçimidir.

**Tuzak:** A selüloz, C sakaroz, E nişastadır.

**42** **Doğru cevap: C** (have a hydrophilic head and two hydrophobic tails)

**Çözüm:** Fosfolipitler amfipatiktir: polar fosfat başı suya, apolar yağ asidi kuyrukları içe döner ve çift katman oluşur.

**43** **Doğru cevap: B** (20%)

**Çözüm:** Chargaff kuralı: A = T = %30 → A + T = %60. G + C = %40, G = C = %20.

**Tuzak:** G + C toplamını (%40, C) vermek.

**44** **Doğru cevap: C** (Rough ER → Golgi apparatus → secretory vesicles → plasma membrane)

**Çözüm:** Salgı proteinleri granüllü ER üzerindeki ribozomlarda sentezlenir, Golgi'de işlenip paketlenir ve veziküllerle ekzositoz yoluyla dışarı atılır.

**Tuzak:** A, sırayı ters çevirir.

**45** **Doğru cevap: D** (Matrix)

**Çözüm:** Krebs döngüsü mitokondri matriksinde gerçekleşir.

**Tuzak:** E; elektron taşıma zinciri ve ATP sentaz iç zardadır. A, glikoliz yeridir.

**46** **Doğru cevap: A** (Guard cells)

**Çözüm:** Bekçi hücreleri turgor değişimiyle stoma açıklığını ayarlar; böylece gaz alışverişi ve terleme kontrol edilir.

**Tuzak:** E, floemde kalbur borularına eşlik eden hücrelerdir.

**47** **Doğru cevap: D** (5 kJ)

**Çözüm:** 1. düzey (üreticiler) 50 000 → 2. düzey 5000 → 3. düzey 500 → 4. düzey 50 → 5. düzey 5 kJ. Beşinci düzeye ulaşmak için 4 aktarım gerekir.

**Tuzak:** beş aktarım sayarak E'yi seçmek.

**48** **Doğru cevap: E** (Connective tissue)

**Çözüm:** Bağ dokusunda (kemik, kıkırdak, kan, gevşek bağ dokusu) hücreler bol hücreler arası madde (matriks) içinde dağınıktır.

**Tuzak:** epitel hücreleri birbirine sıkıca bitişiktir, matriks çok azdır.

**49** **Doğru cevap: A** (Small intestine)

**Çözüm:** İnce bağırsağın villus ve mikrovillus yapıları emilim yüzeyini büyük ölçüde artırır.

**Tuzak:** C; kalın bağırsakta esas olarak su ve tuz emilir.

**50** **Doğru cevap: E** (Nephron)

**Çözüm:** Nefron (glomerül, Bowman kapsülü ve tübüller) kanı süzer ve idrarı oluşturur.

**Tuzak:** alveol akciğerin, nöron sinir sisteminin, sarkomer kasın birimidir.

## Kimya · Soru 51–60

**51** **Doğru cevap: B** (Group 16, period 3)

**Çözüm:** En dış kabuk n = 3 → 3. periyot. Değerlik elektronu 2 + 4 = 6 → 16. grup (kükürt, Z = 16).

**Tuzak:** yalnızca p elektronlarını sayıp 14. grup (A) demek.

**52** **Doğru cevap: C** (neutrons)

**Çözüm:** İzotopların proton sayısı (atom numarası) aynıdır; kütle numarası farklıdır. $^{12}C$: 6 nötron, $^{14}C$: 8 nötron. Kimyasal özellikleri pratikte aynıdır.

**53** **Doğru cevap: C** (MgO)

**Çözüm:** Mg bir metal, O bir ametaldir; elektronegatiflik farkı büyüktür ve $Mg^{2+}$ ile $O^{2-}$ iyonları oluşur. Diğerleri ametal–ametal kovalent bağlardır.

**54** **Doğru cevap: B** (Hydrogen bonds between water molecules)

**Çözüm:** O çok elektronegatiftir; su molekülleri arasında güçlü hidrojen bağları oluşur. S'nin elektronegatifliği düşüktür, $H_2S$'de hidrojen bağı yoktur.

**Tuzak:** A, metindeki bilgiyle çelişir; D yanlıştır, su molekülü açısal (bükük) yapıdadır.

**55** **Doğru cevap: D** (4.0 atm)

**Çözüm:** Sabit hacimde P/T sabittir; T kelvin olmalıdır: 300 K → 600 K. P iki katına çıkar: 4,0 atm.

**Tuzak:** Celsius kullanarak 2 · 327/27 ≈ 24,2 atm (A) bulmak.

**56** **Doğru cevap: D** (Increasing the pressure)

**Çözüm:** Le Chatelier: soldaki 4 mol gaz sağda 2 mol gaza dönüşür; basınç artınca denge daha az gaz olan tarafa, ürünlere kayar.

**Tuzak:** C; katalizör dengeye daha hızlı ulaşmayı sağlar ama verimi değiştirmez. A, ekzotermik tepkimede dengeyi sola kaydırır.

**57** **Doğru cevap: A** (The reaction proceeds in the forward direction, towards the products)

**Çözüm:** Q < K ise ürünler dengeye göre azdır; tepkime Q = K olana kadar ileri yönde ilerler.

**Tuzak:** D; K yalnızca sıcaklıkla değişir, değişen Q'dur.

**58** **Doğru cevap: E** ($HPO_4^{2-}$)

**Çözüm:** Konjuge baz, asitten bir $H^+$ çıkarılarak bulunur: $H_2PO_4^- - H^+ = HPO_4^{2-}$.

**Tuzak:** A, $H_2PO_4^-$'nin konjuge asididir; B iki proton kaybını gösterir.

**59** **Doğru cevap: A** (180 mg)

**Çözüm:** 120 mg/L × 1,5 L = 180 mg.

**Tuzak:** bölme yapıp 120/1,5 = 80 mg (C) bulmak ya da birim dönüşümünde hata yapmak (D, E).

**60** **Doğru cevap: E** (5)

**Çözüm:** Sağdaki O atomları: 3·2 + 4·1 = 10. 10/2 = 5 $O_2$.

**Tuzak:** O atomu sayısını (10, D) $O_2$ molekülü sayısı sanmak.

## Fizik · Soru 61–65

**61** **Doğru cevap: C** (5 N)

**Çözüm:** Dik vektörlerde Pisagor: $\sqrt{(3^2 + 4^2)} = 5$ N.

**Tuzak:** büyüklükleri toplamak (A, aynı yönlü durum) ya da çıkarmak (B, zıt yönlü durum).

**62** **Doğru cevap: B** (21.5 m/s)

**Çözüm:** Galileo dönüşümü: v(yere göre) = v(trene göre) + v(tren) = 1,5 + 20 = 21,5 m/s (aynı yön).

**Tuzak:** A, yolcu trenin arkasına doğru yürüseydi doğru olurdu.

**63** **Doğru cevap: A** (0.5 s)

**Çözüm:** f = 120/60 = 2 Hz → T = 1/f = 0,5 s.

**Tuzak:** frekansı periyot sanmak (B).

**64** **Doğru cevap: E** (+300 J)

**Çözüm:** Termodinamiğin birinci yasası: ΔU = Q − W = 500 − 200 = +300 J (W, gazın yaptığı iş).

**Tuzak:** işin işaretini karıştırıp 700 J (A) bulmak.

**65** **Doğru cevap: D** (F/9)

**Çözüm:** Coulomb yasası: $F \propto 1/r^2$. r → 3r ise F → F/9.

**Tuzak:** ters orantıyı kare almadan uygulayıp F/3 (A) bulmak.

CENT-S · DENEME SINAVI

# 03

65 soru · 140 dakika · 6 bölüm

| Bölüm | Sorular | Soru sayısı | Süre |
|---|---|---|---|
| Reading and Comprehension<br>Okuma ve Anlama | 1–10 | 10 | 30 dk |
| Mathematics<br>Matematik | 11–25 | 15 | 30 dk |
| Reasoning on Texts and Data<br>Metin ve Veri Üzerinde Akıl Yürütme | 26–40 | 15 | 30 dk |
| Biology<br>Biyoloji | 41–50 | 10 | 20 dk |
| Chemistry<br>Kimya | 51–60 | 10 | 20 dk |
| Physics<br>Fizik | 61–65 | 5 | 10 dk |
| **Toplam** | **1–65** | **65** | **140 dk** |

## Sınav kuralları

- Sınavı tek oturumda, gerçek süreyle çözün.
- Her bölümün süresi yalnızca o bölüm için geçerlidir; süresi biten bölüme geri dönülemez.
- Doğru cevap **+1**, yanlış cevap **−0,25**, boş **0** puandır.
- Sınavı bitirmeden cevap anahtarına bakmayın.

## Süre kaydı

Başlangıç

Bitiş

Puan

SECTION 1

# Reading and Comprehension

Questions **1–10** · 10 questions · **30 min**

**TEXT 1 (NON-FICTION)**

Many songbirds that are active during the day undertake their long seasonal journeys at night. For a long time this seemed puzzling: a bird that hunts by sight and sleeps after sunset would appear poorly suited to flying for hours in the dark. Observers in the nineteenth century, who could count only the birds they saw, greatly underestimated the scale of these movements, since most of the traffic passed unseen above their heads.

Several advantages of night travel are now generally accepted. The air is usually cooler and calmer after sunset, so a bird loses less water and spends less energy in turbulent winds. Predators that hunt by day, such as falcons, are mostly inactive. Above all, flying at night leaves the daylight hours free for feeding. A small bird may burn a large part of its fat reserves in a single night and must replace them before it can continue; if it travelled by day, it would arrive at each stopping place hungry and in the dark, unable to find food.

How birds find their way in the dark is a more difficult question. Experiments suggest that they use several systems at once: the position of the stars, the Earth's magnetic field and, near sunset, the pattern of light in the sky. No single system seems to be essential, which may explain why migrating birds so rarely get completely lost. When one source of information fails — on a cloudy night, for instance — another can take its place.

**1** What is the main purpose of the text?

(A) To describe the diet of songbirds
(B) To explain why many songbirds migrate at night and how they find their way
(C) To criticise nineteenth-century observers
(D) To compare falcons and songbirds
(E) To argue that migrating birds often get lost

**2** According to the text, why did nineteenth-century observers underestimate bird migration?

(A) Because migration was less common at that time
(B) Because they did not know that birds sleep at night
(C) Because falcons killed most migrating birds
(D) Because they used inaccurate instruments
(E) Because most of the birds flew at night, unseen

**3** According to the text, the most important advantage of travelling at night is that:

(A) the air is cooler and calmer
(B) falcons are inactive
(C) the daylight hours remain free for feeding
(D) the stars are visible
(E) birds lose more fat at night

**4** What does the author suggest with the sentence "No single system seems to be essential"?

(A) Birds use several navigation systems, so the failure of one does not leave them lost
(B) Birds do not need any navigation system
(C) The magnetic field is more important than the stars
(D) Birds cannot migrate on cloudy nights
(E) Scientists have not found any navigation system

**TEXT 2 (LITERARY)**

Mr Halloran's shop was so narrow that two customers could not stand in it without one of them apologising. Clocks covered every wall, and none of them agreed. When Tom first came in to collect his grandfather's watch, the noise had seemed to him like rain on a roof; after a few visits he stopped hearing it at all, the way one stops hearing the sea.

"People think I sell time," the old man said once, holding a tiny spring up to the light with tweezers. "I don't. Time looks after itself. I sell the illusion that it can be kept in order." He laughed, a short dry sound, and bent again over his bench.

Tom did not understand this, and said so. Mr Halloran seemed pleased. "Good," he said. "A boy who understood that would be very tiresome."

The watch was ready on the third Saturday. It ran, Mr Halloran warned, two minutes slow each week, and nothing could be done about it; it was too old to be made perfect. Tom took it home and wound it every morning, and every Sunday he set it right again, and he found, to his surprise, that he liked this small weekly correction more than he would have liked a watch that needed none.

**5** The comparison of the clocks' noise to "rain on a roof" and to the sea suggests that:

(A) the shop was close to the sea
(B) Tom found the noise unbearable
(C) the clocks were broken
(D) after a while the sound became so familiar that Tom no longer noticed it
(E) it was always raining when Tom visited

**6** What does Mr Halloran mean when he says "I sell the illusion that it can be kept in order"?

(A) His clocks are of poor quality
(B) Clocks give people the feeling of controlling something that cannot really be controlled
(C) He sells clocks at very high prices
(D) Time can be stopped by a good watchmaker
(E) He prefers repairing clocks to selling them

**7** At the end of the text, Tom:

(A) comes to enjoy correcting the imperfect watch every week
(B) takes the watch back to have it made perfect
(C) stops using his grandfather's watch
(D) buys a new watch that needs no correction
(E) is disappointed with Mr Halloran's work

**TEXT 3 (JOURNALISTIC)**

From this September, pupils at secondary schools in the region will hand in their mobile phones at the school gate and collect them only when lessons end. The measure, announced in the spring, follows a two-year trial in twelve schools, where teachers reported calmer breaks and fewer conflicts between pupils.

The results of the trial were not entirely clear-cut. Average marks rose slightly in most of the participating schools, but researchers who analysed the data cautioned that the same period also saw the introduction of a new mathematics programme, which makes it difficult to say which change produced which effect. What did change unmistakably was behaviour in the playground: staff recorded a sharp drop in incidents of online bullying that began during the school day.

Parents' associations are divided. Some welcome the rule as a relief from a battle they were losing at home. Others worry about emergencies and about the practical difficulty of storing hundreds of devices every morning. A few schools have already asked for extra funding to buy lockers.

Head teachers, for their part, stress that the ban is not intended as a punishment. "We are not against technology," one of them said. "Pupils will still use computers in class. We simply want the hours between the bells to belong to the people in the room."

**8** Why do the researchers say that the effect of the ban on marks is uncertain?

(A) Because marks fell in most schools
(B) Because only twelve pupils took part
(C) Because the trial lasted only a few weeks
(D) Because teachers did not record the marks
(E) Because a new mathematics programme was introduced in the same period

**9** According to the text, what was the clearest result of the trial?

(A) A large improvement in marks
(B) An increase in the use of computers
(C) A sharp fall in online bullying that began during the school day
(D) More conflicts between parents and teachers
(E) Lower spending on lockers

**10** In the sentence "We simply want the hours between the bells to belong to the people in the room", the head teacher means that:

(A) pupils should be allowed to leave school earlier
(B) technology must be removed from all lessons
(C) teachers should decide how long lessons last
(D) the school day should be devoted to direct interaction among the people present
(E) parents should be allowed into classrooms

SECTION 2

# Mathematics

Questions **11–25** · 15 questions · **30 min**

**11** Which of the following values is the best estimate of $(0.0021 \cdot 4.9 \cdot 10^6) / (7.1 \cdot 10^2)$?

(A) about 1.5 (B) about 15 (C) about 150 (D) about 0.15 (E) about 1500

**12** Two buses leave the same terminal at 8:00. The first leaves again every 12 minutes, the second every 18 minutes. How many times do they leave together between 8:00 and 11:00, both included?

(A) 6 (B) 5 (C) 15 (D) 4 (E) 3

**13** The value of $(2^{10} + 2^{10}) / 4^5$ is:

(A) 1 (B) 4 (C) $2^5$ (D) 1/2 (E) 2

**14** The polynomial $P(x) = x^3 - 2x^2 + kx + 6$ is divisible by $(x - 3)$. What is the value of k?

(A) 5 (B) −3 (C) −5 (D) 3 (E) −15

**15** The solutions of the inequality $x^2 - 5x + 6 > 0$ are:

(A) $2 < x < 3$ (B) $x < 2$ or $x > 3$ (C) $x > 3$
(D) $x < -3$ or $x > -2$ (E) every real number x

**16** Consider the function $f(x) = |x - 2| - 1$. Which statement is correct?

(A) Its minimum value is 1, reached at $x = -2$
(B) Its minimum value is 0, reached at $x = 2$
(C) Its minimum value is −2, reached at $x = 1$
(D) Its minimum value is −1, reached at $x = 2$
(E) It has no minimum value

**17** The real solutions of the equation $4^x - 3 \cdot 2^x - 4 = 0$ are:

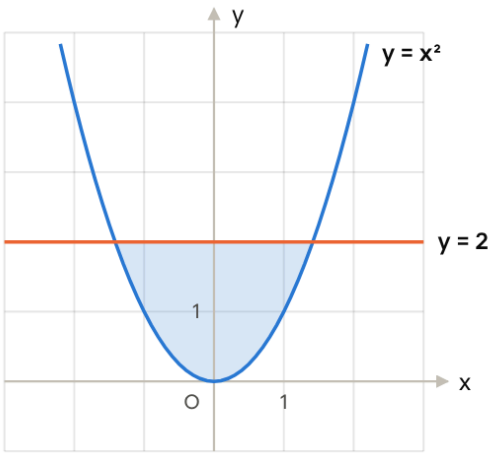
(A) $x = 2$ only (B) $x = 2$ and $x = 0$
(C) $x = -1$ only (D) $x = 4$ only
(E) there are no real solutions

**18** Let $a = \log_2 5$, $b = \log_3 5$ and $c = 2$. Which is the correct order?

(A) $a < b < c$ (B) $b < c < a$ (C) $c < b < a$ (D) $b < a < c$ (E) $c < a < b$

**19** Which of the following points satisfies the system { $y \geq x^2$ ; $y \leq 2$ }?

**The shaded region: $y \geqslant x^2$ and $y \leqslant 2$**

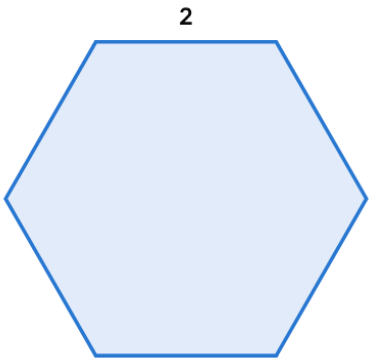



Each grid square is 1 unit

(A) (2, 3) (B) (−1, 3) (C) (0, −1) (D) (1.5, 2) (E) (1, 1)

**20** What is the area of a regular hexagon with side length 2?

**A regular hexagon with side 2**



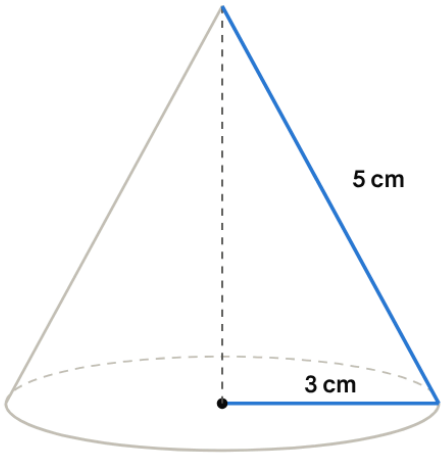

(A) 6√3 (B) 12 (C) 3√3 (D) 12√3 (E) 6

**21** What is the equation of the straight line passing through the points (−1, 4) and (3, −4)?

(A) $y = 2x + 2$ (B) $y = -2x - 2$ (C) $y = -2x + 2$
(D) $y = -x/2 + 7/2$ (E) $y = -2x + 6$

**22** A right circular cone has base radius 3 cm and slant height 5 cm. What is its volume?

**A cone with radius 3 cm and slant height 5 cm**




(A) $15\pi\ \text{cm}^3$ (B) $36\pi\ \text{cm}^3$ (C) $12\pi\ \text{cm}^3$ (D) $45\pi\ \text{cm}^3$ (E) $4\pi\ \text{cm}^3$

**23** A basketball player scores each free throw with probability 1/2, independently of the other throws. What is the probability that she scores at least once in 3 throws?

(A) 3/8 (B) 1/2 (C) 1/8 (D) 7/8 (E) 3/4

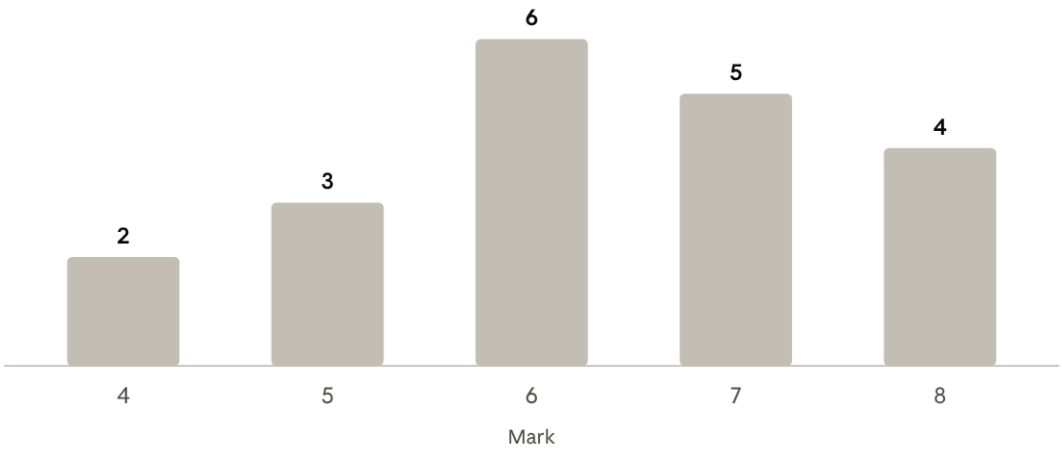
**24** How many diagonals does a convex polygon with 10 sides have?

(A) 45 (B) 70 (C) 10 (D) 90 (E) 35

**25** The chart shows the marks obtained by 20 students in a test.

**Marks obtained by 20 students**

Number of students




Which statement is correct?

(A) The median is 6.5
(B) The mean is smaller than the median
(C) The mode is greater than the mean
(D) The mode is equal to the median, and both are smaller than the mean
(E) The median is equal to the mean

SECTION 3

# Reasoning on Texts and Data

Questions **26–40** · 15 questions · **30 min**

**26** For a real number x, the condition $x^2 > 4$, with respect to the condition $x > 2$, is:

(A) necessary but not sufficient
(B) sufficient but not necessary
(C) necessary and sufficient
(D) neither necessary nor sufficient
(E) necessary or sufficient depending on the value of x

**27** Which of the listed numbers n is a counterexample to the statement "If n is a prime number, then n + 2 is also a prime number"?

(A) 3 (B) 5 (C) 11 (D) 7 (E) 17

**28** Which is the negation of the statement "Every day, at least one train is late"?

(A) Every day, no train is late
(B) There is a day on which no train is late
(C) There is a day on which at least one train is on time
(D) Every day, all the trains are on time
(E) Some trains are never late

**29** All members of the chess club are students. Some students play the piano. Paolo is a member of the chess club. Which statement is certainly true?

(A) Paolo plays the piano
(B) All students are members of the chess club
(C) Paolo does not play the piano
(D) Some members of the chess club play the piano
(E) Paolo is a student

**30** In a survey, 200 students indicated how they travel to school: bus 70, bicycle 30, car 50, on foot 50. The data are shown in a pie chart. What is the angle of the sector for "bus"?

(A) 70° (B) 126° (C) 35° (D) 140° (E) 100°

**31** The perimeter of a rectangle is 30 cm, and its length is twice its width. What is its area?

(A) 50 cm² (B) 200 cm² (C) 45 cm² (D) 30 cm² (E) 75 cm²

**32** Marco and Luca share €360 in the ratio 4 : 5. How much does Luca receive?

(A) €160 (B) €180 (C) €200 (D) €225 (E) €288

**33** A phone company offers two monthly plans. Plan X: fixed fee €10 plus €0.05 per minute. Plan Y: fixed fee €4 plus €0.10 per minute. For which monthly use is Plan X cheaper than Plan Y?

(A) Fewer than 120 minutes
(B) Exactly 120 minutes
(C) More than 120 minutes
(D) More than 60 minutes
(E) For any number of minutes

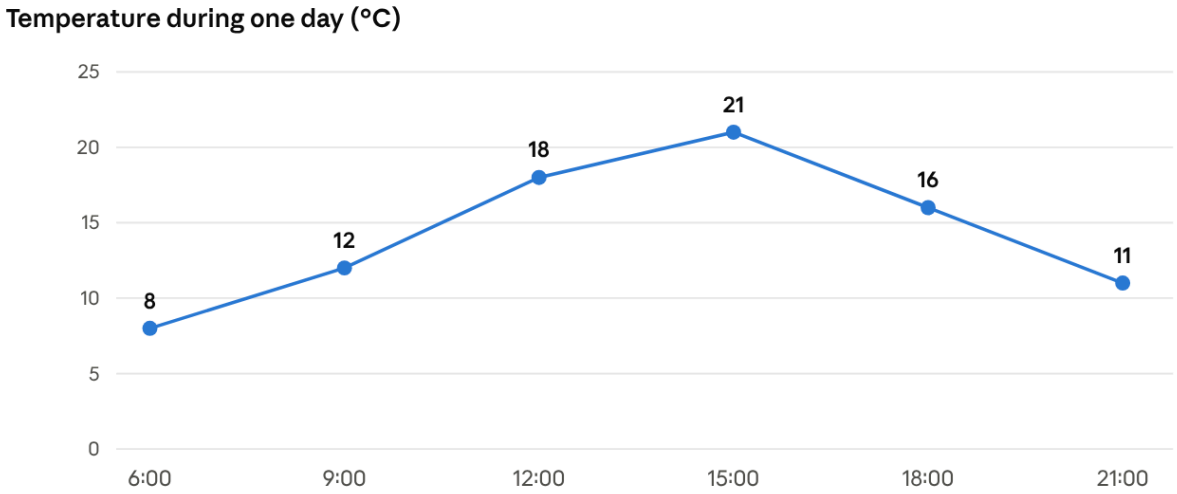
**34** Four friends A, B, C and D sit in a row of four seats numbered 1 to 4 from left to right. A is not in an end seat. B sits immediately to the right of A. B is not in seat 4. C is not in seat 4. Who sits in seat 4?

(A) A (B) B (C) C
(D) D (E) It cannot be determined

**35** In a survey of 100 people, 45 read newspaper N, 35 read magazine M and 20 read both. How many people read neither?

(A) 20 (B) 40 (C) 0 (D) 60 (E) 25

**36** The graph shows the temperature recorded in a town during one day.




In which 3-hour interval did the temperature change the most, in absolute value?

(A) 12:00–15:00 (B) 15:00–18:00 (C) 6:00–9:00 (D) 18:00–21:00 (E) 9:00–12:00

**37** Anna cycles 12 km at 18 km/h and then walks 2 km at 4 km/h. What is her average speed over the whole journey?

(A) 11 km/h (B) 14 km/h (C) 10 km/h (D) 12 km/h (E) 16 km/h

**38** The table shows the population and the area of five cities.

| City | P | Q | R | S | T |
|---|---|---|---|---|---|
| Population | 200 000 | 90 000 | 300 000 | 120 000 | 70 000 |
| Area (km²) | 50 | 30 | 60 | 20 | 35 |

If the cities are sorted by population density, from highest to lowest, which city is third?

(A) P (B) Q (C) R (D) S (E) T

**39** The fuel consumption of a car is given in litres per 100 km, and the price of fuel in euros per litre. To find the fuel cost per kilometre, one must:

(A) divide the price by the consumption
(B) multiply the consumption by 100 and divide by the price
(C) multiply the consumption by the price and divide by 100
(D) add the consumption and the price
(E) divide 100 by the consumption

**40** "Only those who have paid the fee can take part in the trip. Some of the people taking part in the trip are teachers." Which statement is certainly true?

(A) All teachers have paid the fee
(B) Everyone who has paid the fee takes part in the trip
(C) No teacher has paid the fee
(D) Some of those who have paid the fee are not teachers
(E) Some teachers have paid the fee

SECTION 4

## Biology

Questions **41–50** · 10 questions · **20 min**

**41** Which of the following statements about enzymes is correct?

(A) They are consumed during the reaction they catalyse
(B) They are always lipids
(C) They change the equilibrium constant of the reaction
(D) They lower the activation energy of the reaction
(E) They work equally well at any temperature

**42** Which feature is typical of prokaryotic cells?

(A) Circular DNA located in a nucleoid, with no nuclear membrane
(B) Presence of mitochondria
(C) 80S ribosomes
(D) Linear chromosomes enclosed in a nucleus
(E) A well-developed endoplasmic reticulum

**43** What is the main function of lysosomes?

(A) ATP synthesis
(B) Photosynthesis
(C) Protein synthesis
(D) Lipid synthesis
(E) Intracellular digestion by means of hydrolytic enzymes

**44** A DNA template strand has the sequence 3′-TACGGA-5′. What is the sequence of the mRNA transcribed from it?

(A) 5′-ATGCCT-3′ (B) 5′-AUGCCU-3′ (C) 5′-UACGGA-3′
(D) 5′-TACGGA-3′ (E) 5′-UCCGUA-3′

**45** During mitosis, in which phase do the sister chromatids separate and move towards opposite poles of the cell?

(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase (E) Interphase

**46** A woman with blood group A (genotype $I^Ai$) and a man with blood group B (genotype $I^Bi$) have a child. What is the probability that the child has blood group O?

(A) 0 (B) 1/2 (C) 1/4 (D) 3/4 (E) 1/8

**47** In photosynthesis, the oxygen ($O_2$) released into the atmosphere comes from:

(A) water (B) carbon dioxide (C) glucose
(D) chlorophyll (E) ATP

**48** What is the main function of the myelin sheath around many axons?

(A) Producing neurotransmitters
(B) Storing calcium
(C) Connecting muscle fibres
(D) Increasing the speed of nerve impulse conduction
(E) Protecting the neuron from viruses

**49** Where does the exchange of gases between air and blood take place in the human respiratory system?

(A) Trachea (B) Bronchi (C) Larynx (D) Pleura (E) Alveoli

**50** Which statement about transport tissues in plants is correct?

(A) Xylem carries sugars from the leaves down to the roots
(B) Phloem carries the products of photosynthesis to the rest of the plant
(C) Xylem vessels are made of living cells at maturity
(D) Phloem carries only water
(E) Roots carry out most of the plant's photosynthesis

SECTION 5

## Chemistry

Questions **51–60** · 10 questions · **20 min**

**51** A mixture contains sand, water and dissolved table salt. Which sequence of methods allows you to recover the sand and the solid salt?

(A) Distillation, then chromatography
(B) Decanting, then magnetic separation
(C) Chromatography, then filtration
(D) Centrifugation only
(E) Filtration, then evaporation of the water

**52** 6 g of carbon react completely with oxygen, producing 22 g of carbon dioxide and nothing else. What mass of oxygen was consumed?

(A) 16 g (B) 22 g (C) 28 g (D) 32 g (E) 8 g

**53** In the Lewis structure of the water molecule, how many lone pairs are on the oxygen atom?

(A) 0 (B) 1 (C) 3 (D) 2 (E) 4

**54** Which of the following bonds is the most polar?

(A) H–H (B) H–F (C) C–H (D) H–Cl (E) Cl–Cl

**55** How many molecules are contained in 9.0 g of water? ($Mr(H_2O) = 18$; $N_a = 6.02 \cdot 10^{23}$ mol$^{-1}$)

(A) $6.02 \cdot 10^{23}$ (B) $1.2 \cdot 10^{24}$ (C) $3.01 \cdot 10^{23}$ (D) $5.4 \cdot 10^{24}$ (E) $1.5 \cdot 10^{23}$

**56** 4.0 g of NaOH (Mr = 40) are dissolved in water to obtain 500 cm$^3$ of solution. What is the molar concentration of the solution?

(A) 0.20 mol dm$^{-3}$ (B) 0.10 mol dm$^{-3}$ (C) 8.0 mol dm$^{-3}$
(D) 2.0 mol dm$^{-3}$ (E) 0.020 mol dm$^{-3}$

**57** When ammonium nitrate dissolves in water, the solution becomes noticeably colder. This dissolution process is:

(A) exothermic, with $\Delta H < 0$ (B) exothermic, with $\Delta H > 0$
(C) a process with no energy exchange (D) endothermic, with $\Delta H < 0$
(E) endothermic, with $\Delta H > 0$

**58** Which of the following changes does NOT increase the rate of a reaction?

(A) Increasing the temperature
(B) Adding a suitable catalyst
(C) Decreasing the concentration of the reactants
(D) Grinding a solid reactant into a fine powder
(E) Increasing the pressure of gaseous reactants

**59** An aqueous solution of sodium acetate ($CH_3COONa$) is:

(A) strongly acidic
(B) neutral
(C) slightly acidic
(D) basic
(E) impossible to classify without measuring it

**60** How many structural isomers have the molecular formula $C_4H_{10}$?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

## SECTION 6
# Physics

Questions **61–65** · 5 questions · **10 min**

**61** Which of the following is a fundamental (base) quantity of the International System of Units (SI)?

(A) Force (B) Energy (C) Speed
(D) Electric current (E) Pressure

**62** A car travels at a constant 15 m/s for 20 s, then decelerates uniformly and stops in 10 s. What is the total distance travelled?

(A) 300 m (B) 450 m (C) 225 m (D) 150 m (E) 375 m

**63** A motor lifts a 50 kg load at constant speed through a height of 10 m in 20 s. What is the average power delivered? ($g = 10$ m/s$^2$)

(A) 500 W (B) 250 W (C) 100 W (D) 5000 W (E) 25 W

**64** The atmospheric pressure at the surface of a lake is $1.0 \cdot 10^5$ Pa. What is the total pressure at a depth of 10 m? (water density 1000 kg/m³, g = 10 m/s²)

(A) $2.0 \cdot 10^5$ Pa (B) $1.0 \cdot 10^5$ Pa (C) $1.0 \cdot 10^6$ Pa
(D) $1.1 \cdot 10^5$ Pa (E) $1.0 \cdot 10^4$ Pa

**65** Which of the following electromagnetic waves has the longest wavelength?

(A) X-rays (B) Ultraviolet rays (C) Radio waves
(D) Visible light (E) Gamma rays

END OF THE TEST · SINAVIN SONU

DENEME SINAVI 3

# Cevap Anahtarı

Cevaplarınızı karşılaştırın, ardından aşağıdaki tabloyla bölüm bölüm puanınızı hesaplayın.

### Okuma ve Anlama

Soru 1–10

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| B | E | C | A | D | B | A | E | C | D |

### Matematik

Soru 11–25

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B | A | E | C | B | D | A | B | E | A | C | C | D | E | D |

### Metin ve Veri Üzerinde Akıl Yürütme

Soru 26–40

| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | D | B | E | B | A | C | C | D | B | E | D | A | C | E |

### Biyoloji

Soru 41–50

| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|
| D | A | E | B | C | C | A | D | E | B |

### Kimya

Soru 51–60

| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| E | A | D | B | C | A | E | C | D | B |

### Fizik

Soru 61–65

| 61 | 62 | 63 | 64 | 65 |
|---|---|---|---|---|
| D | E | B | A | C |

| Bölüm | Soru | Doğru | Yanlış | Boş | Puan |
|---|---|---|---|---|---|
| Okuma ve Anlama | 10 | | | | |
| Matematik | 15 | | | | |
| Metin ve Veri Üzerinde Akıl Yürütme | 15 | | | | |
| Biyoloji | 10 | | | | |
| Kimya | 10 | | | | |
| Fizik | 5 | | | | |
| **Toplam** | **65** | | | | |

Puan = Doğru × 1 − Yanlış × 0,25. Boş bırakılan sorular puanı etkilemez. En yüksek puan 65'tir.

DENEME SINAVI 3

# Çözümler

## Okuma ve Anlama · Soru 1–10

**1** **Doğru cevap: B** (To explain why many songbirds migrate at night and how they find their way)

**Çözüm:** Metin iki soruya cevap verir: gece göçünün avantajları ve karanlıkta yön bulma.

> **Tuzak:** E, metnin söylediğinin tersidir ("nadiren tamamen kaybolurlar").

**2** **Doğru cevap: E** (Because most of the birds flew at night, unseen)

**Çözüm:** Yalnızca gördükleri kuşları sayabiliyorlardı; trafiğin çoğu başlarının üstünden görülmeden geçiyordu.

**3** **Doğru cevap: C** (the daylight hours remain free for feeding)

**Çözüm:** "Above all" (her şeyden önce) ifadesi en önemli avantajı işaret eder: gündüz beslenmeye kalır.

> **Tuzak:** A ve B de metinde geçen avantajlardır, ama "en önemli" olan değildir.

**4** **Doğru cevap: A** (Birds use several navigation systems, so the failure of one does not leave them lost)

**Çözüm:** Biri başarısız olduğunda diğeri onun yerini alır; sistemler birbirini yedekler.

> **Tuzak:** D, son cümleyle çelişir.

**5** **Doğru cevap: D** (after a while the sound became so familiar that Tom no longer noticed it)

**Çözüm:** "Denizin sesini duymamaya başlamak gibi": sürekli ses alışkanlıkla fark edilmez hale gelir.

> **Tuzak:** A ve E, benzetmeyi gerçek anlamında okumaktır.

**6** **Doğru cevap: B** (Clocks give people the feeling of controlling something that cannot really be controlled)

**Çözüm:** "Zaman kendi başının çaresine bakar"; saatler yalnızca onu düzene sokabildiğimiz yanılsamasını verir.

> **Tuzak:** D, yanılsamanın kendisini gerçek sanmaktır.

**7** **Doğru cevap: A** (comes to enjoy correcting the imperfect watch every week)

**Çözüm:** Son cümle: haftalık küçük düzeltmeyi, hiç düzeltme gerektirmeyen bir saatten daha çok sevdiğini şaşırarak fark eder.

**8** **Doğru cevap: E** (Because a new mathematics programme was introduced in the same period)

**Çözüm:** Aynı dönemde yeni bir matematik programı da başladığı için hangi değişikliğin hangi etkiyi yarattığını ayırmak zordur.

> **Tuzak:** A; notlar düşmedi, hafifçe yükseldi. B; 12 öğrenci değil, 12 okul.

**9** **Doğru cevap: C** (A sharp fall in online bullying that began during the school day)

**Çözüm:** "Kesin olarak değişen" ifadesi okul gününde başlayan çevrim içi zorbalık vakalarındaki keskin düşüşe işaret eder.

**10** **Doğru cevap: D** (the school day should be devoted to direct interaction among the people present)

**Çözüm:** Telefonsuz saatler, sınıfta bulunan insanlar arasındaki yüz yüze iletişime ayrılmalıdır.

> **Tuzak:** B; müdür öğrencilerin derste bilgisayar kullanmaya devam edeceğini söyler.

## Matematik · Soru 11–25

**11** **Doğru cevap: B** (about 15)

**Çözüm:** Bilimsel gösterim: $(2{,}1\cdot10^{-3}\cdot 4{,}9\cdot10^{6})/(7{,}1\cdot10^{2}) \approx (2\cdot 5/7)\cdot10^{1} \approx 1{,}4\cdot10 \approx 15$.

> **Tuzak:** 10'un kuvvetlerinde hata yapıp bir basamak kaymak (A, C).

**12** **Doğru cevap: A** (6)

**Çözüm:** EKOK(12, 18) = 36 dk. 180 dk içinde 180/36 = 5 aralık, yani 6 an: 8:00, 8:36, 9:12, 9:48, 10:24, 11:00.

> **Tuzak:** aralık sayısını (5, B) an sayısı sanmak.

**13** **Doğru cevap: E** (2)

**Çözüm:** $2^{10} + 2^{10} = 2 \cdot 2^{10} = 2^{11}$. $4^5 = (2^2)^5 = 2^{10}$. Oran $2^{11}/2^{10} = 2$.

**Tuzak:** $2^{10} + 2^{10} = 2^{20}$ yazmak; üsler yalnızca aynı tabanlı sayılar çarpılırken toplanır.

**14** **Doğru cevap: C** (−5)

**Çözüm:** Kalan teoremi: $P(3) = 0 \rightarrow 27 - 18 + 3k + 6 = 0 \rightarrow 3k = -15 \rightarrow k = -5$.

**Tuzak:** E, 3k'nin değeridir.

**15** **Doğru cevap: B** ($x < 2$ or $x > 3$)

**Çözüm:** Kökler 2 ve 3; parabol yukarı açıktır, köklerin dışında pozitiftir.

**Tuzak:** A, $< 0$ eşitsizliğinin çözümüdür; D, köklerin işaretini ters almaktır.

**16** **Doğru cevap: D** (Its minimum value is −1, reached at $x = 2$)

**Çözüm:** $|x|$ grafiği 2 birim sağa, 1 birim aşağı kayar. $|x - 2| \geq 0$ olduğundan en küçük değer −1'dir ve $x = 2$'de alınır.

**Tuzak:** kaymaları ters yönde almak (sola ve yukarı) A'ya götürür.

**17** **Doğru cevap: A** ($x = 2$ only)

**Çözüm:** $t = 2^x > 0$: $t^2 - 3t - 4 = 0 \rightarrow t = 4$ veya $t = -1$. $2^x = -1$ imkansızdır; $2^x = 4 \rightarrow x = 2$.

**Tuzak:** t'nin değerlerini x sanmak (C, D).

**18** **Doğru cevap: B** ($b < c < a$)

**Çözüm:** $2^2 = 4 < 5 < 8 = 2^3 \rightarrow 2 < a < 3$. $3^1 = 3 < 5 < 9 = 3^2 \rightarrow 1 < b < 2$. Dolayısıyla $b < c < a$.

**Tuzak:** taban büyüdükçe logaritmanın da büyüdüğünü sanmak.

**19** **Doğru cevap: E** ((1, 1))

**Çözüm:** (1, 1): $1 \geq 1$ ve $1 \leq 2$ ✔. (2, 3) ve (−1, 3): $y > 2$ ×. (0, −1): $-1 < 0$ ×. (1,5; 2): $2 < 2{,}25$ ×.

**Tuzak:** eşitlik durumunu (≥) dışlayıp E'yi elemek.

**20** **Doğru cevap: A** ($6\sqrt{3}$)

**Çözüm:** Düzgün altıgen 6 eşkenar üçgene ayrılır. Her birinin alanı $(\sqrt{3}/4) \cdot 2^2 = \sqrt{3}$. Toplam $6\sqrt{3}$.

**Tuzak:** eşkenar üçgen alanını $(\sqrt{3}/2)s^2$ alıp D'yi bulmak.

**21** **Doğru cevap: C** ($y = -2x + 2$)

**Çözüm:** Eğim $m = (-4 - 4)/(3 - (-1)) = -2$. $4 = -2 \cdot (-1) + q \rightarrow q = 2$. Kontrol: $x = 3 \rightarrow y = -4$ ✔.

**Tuzak:** eğimi $\Delta x/\Delta y$ olarak hesaplayıp D'yi bulmak.

**22** **Doğru cevap: C** ($12\pi$ cm³)

**Çözüm:** Yükseklik $h = \sqrt{(5^2 - 3^2)} = 4$. $V = (1/3)\pi r^2 h = (1/3)\pi \cdot 9 \cdot 4 = 12\pi$.

**Tuzak:** ana doğruyu yükseklik sanmak (A) ya da 1/3'ü unutmak (B).

**23** **Doğru cevap: D** (7/8)

**Çözüm:** Tümleyen olay: hiç atışı sokamamak, $(1/2)^3 = 1/8$. $1 - 1/8 = 7/8$.

**Tuzak:** "tam bir kez" olasılığını (3/8, A) hesaplamak.

**24** **Doğru cevap: E** (35)

**Çözüm:** $n(n - 3)/2 = 10 \cdot 7/2 = 35$. Ya da $C(10,2) - 10 = 45 - 10 = 35$.

**Tuzak:** kenarları çıkarmayı unutup 45 (A) bulmak.

**25** **Doğru cevap: D** (The mode is equal to the median, and both are smaller than the mean)

**Çözüm:** Mod 6 (6 öğrenci). Medyan: 10. ve 11. değerlerin ortalaması; kümülatif 2, 5, 11 → ikisi de 6, medyan 6. Ortalama $(8 + 15 + 36 + 35 + 32)/20 = 126/20 = 6{,}3$. Mod = medyan = $6 < 6{,}3$.

**Tuzak:** 10. ve 11. değerlerin yerini yanlış sayıp 6 ile 7'nin ortalamasını (6,5, A) almak; ortalamayı medyanla karıştırmak ise B veya E'ye götürür.

## Metin ve Veri Üzerinde Akıl Yürütme · Soru 26–40

**26** **Doğru cevap: A** (necessary but not sufficient)

**Çözüm:** $x > 2 \rightarrow x^2 > 4$ her zaman doğrudur, yani $x^2 > 4$ gereklidir. Ama $x = -3$ için $x^2 > 4$ olup $x > 2$ değildir; yeterli değildir.

**Tuzak:** negatif sayıları unutup C'yi seçmek.

**27** **Doğru cevap: D** (7)

**Çözüm:** 7 asal, $7 + 2 = 9 = 3^2$ asal değil. Diğerleri: 5, 7, 13, 19 — hepsi asal, ifadeyi doğrular.

**28** **Doğru cevap: B** (There is a day on which no train is late)

**Çözüm:** "Her gün P" → "bir gün P değil". "En az bir tren gecikir"in olumsuzu "hiçbir tren gecikmez".

> **Tuzak:** C, ilk ifadeyle birlikte doğru olabilir; A ve D çok güçlüdür.

**29** **Doğru cevap: E** (Paolo is a student)

**Çözüm:** Kulüp üyesi → öğrenci; Paolo üye → Paolo öğrenci. Piyano çalan öğrencilerin kulüp üyesi olup olmadığı bilinmez, bu yüzden A, C, D kesin değildir.

**30** **Doğru cevap: B** (126°)

**Çözüm:** 70/200 = 0,35; 0,35 · 360° = 126°.

> **Tuzak:** yüzdeyi (%35) açı sanmak (C).

**31** **Doğru cevap: A** (50 cm²)

**Çözüm:** 2(w + 2w) = 30 → w = 5, uzunluk 10. Alan 50 cm².

**32** **Doğru cevap: C** (€200)

**Çözüm:** 4 + 5 = 9 pay; bir pay 40 €. Luca 5 · 40 = 200 €.

> **Tuzak:** A, Marco'nun payıdır.

**33** **Doğru cevap: C** (More than 120 minutes)

**Çözüm:** 10 + 0,05m < 4 + 0,10m → 6 < 0,05m → m > 120. 120 dakikada iki plan eşittir (16 €).

> **Tuzak:** eşitlik noktasını doğru bulup yönü ters çevirmek (A).

**34** **Doğru cevap: D** (D)

**Çözüm:** A, 2 veya 3'te. B, A'nın hemen sağında ve 4'te değil → A = 2, B = 3. Kalan koltuklar 1 ve 4; C 4'te olamaz → C = 1, D = 4.

**35** **Doğru cevap: B** (40)

**Çözüm:** En az birini okuyan: 45 + 35 − 20 = 60. Hiçbirini okumayan: 100 − 60 = 40.

> **Tuzak:** kesişimi çıkarmayı unutup 100 − 80 = 20 (A) bulmak.

**36** **Doğru cevap: E** (9:00–12:00)

**Çözüm:** Değişimler: +4, +6, +3, −5, −5. En büyük mutlak değer 6, yani 9:00–12:00.

> **Tuzak:** en yüksek sıcaklığın olduğu aralığı (A) seçmek.

**37** **Doğru cevap: D** (12 km/h)

**Çözüm:** Süre: 12/18 = 2/3 sa + 2/4 = 1/2 sa = 7/6 sa. Ortalama hız = 14 km / (7/6 sa) = 12 km/h.

> **Tuzak:** hızların ortalamasını ((18 + 4)/2 = 11, A) almak.

**38** **Doğru cevap: A** (P)

**Çözüm:** Yoğunluklar (kişi/km²): P 4000, Q 3000, R 5000, S 6000, T 2000. Sıra: S, R, P, Q, T. Üçüncü P.

> **Tuzak:** nüfusa göre sıralayıp üçüncü olarak S'yi (D) seçmek.

**39** **Doğru cevap: C** (multiply the consumption by the price and divide by 100)

**Çözüm:** (L/100 km) · (€/L) = €/100 km; 100'e bölünce €/km elde edilir. Birim analizi doğru işlemi gösterir.

**40** **Doğru cevap: E** (Some teachers have paid the fee)

**Çözüm:** Geziye katılan → ücreti ödemiş. Katılanların bazıları öğretmen → bu öğretmenler ücreti ödemiştir.

> **Tuzak:** B, "yalnızca" ifadesini ters çevirir; D kesin değildir, ödeyenlerin hepsi öğretmen olabilir.

## Biyoloji · Soru 41–50

**41** **Doğru cevap: D** (They lower the activation energy of the reaction)

**Çözüm:** Enzimler biyolojik katalizörlerdir: aktivasyon enerjisini düşürür, tepkimeden değişmeden çıkar ve dengenin yerini değiştirmez. Çoğu proteindir ve optimum sıcaklık/pH'a sahiptir.

> **Tuzak:** C; katalizörler dengeye ulaşma hızını artırır, K'yi değil.

**42** **Doğru cevap: A** (Circular DNA located in a nucleoid, with no nuclear membrane)

**Çözüm:** Prokaryotlarda çekirdek zarı yoktur; genellikle tek, halkasal bir kromozom nukleoid bölgesinde bulunur. Ribozomları 70S'tir.

> **Tuzak:** B, C, D, E ökaryot özellikleridir.

**43** **Doğru cevap: E** (Intracellular digestion by means of hydrolytic enzymes)

**Çözüm:** Lizozomlar asidik ortamda çalışan hidrolitik enzimler içerir; eskimiş organelleri ve fagositozla alınan maddeleri sindirir.

**Tuzak:** A mitokondri, C ribozom, D düz ER görevidir.

**44** **Doğru cevap: B** (5′-AUGCCU-3′)

**Çözüm:** mRNA kalıpla tamamlayıcı ve antiparaleldir; T yerine U kullanılır: T→A, A→U, C→G, G→C. 3′-TACGGA-5′ → 5′-AUGCCU-3′ (AUG başlangıç kodonu).

**Tuzak:** A'da RNA'da bulunmayan T vardır.

**45** **Doğru cevap: C** (Anaphase)

**Çözüm:** Anafazda sentromerler ayrılır ve iğ iplikleri kromatitleri kutuplara çeker.

**Tuzak:** B; metafazda kromozomlar ekvatorda dizilir, henüz ayrılmaz.

**46** **Doğru cevap: C** (1/4)

**Çözüm:** Her ebeveynden i alelinin gelme olasılığı 1/2. ii: 1/2 · 1/2 = 1/4. Olası gruplar: AB, A, B, O — her biri 1/4.

**Tuzak:** iki ebeveyn de O olmadığı için 0 (A) demek.

**47** **Doğru cevap: A** (water)

**Çözüm:** Işığa bağlı tepkimelerde su parçalanır (fotoliz) ve $O_2$ açığa çıkar. $CO_2$'nin oksijeni glikoza ve suya geçer.

**Tuzak:** $CO_2$'deki O'nun dışarı verildiğini sanmak (B).

**48** **Doğru cevap: D** (Increasing the speed of nerve impulse conduction)

**Çözüm:** Miyelin elektriksel yalıtkandır; uyarı Ranvier boğumları arasında atlayarak (saltatorik iletim) çok daha hızlı ilerler.

**49** **Doğru cevap: E** (Alveoli)

**Çözüm:** Alveollerin ince duvarı ve çevresindeki kılcal damarlar arasında $O_2$ ve $CO_2$ difüzyonla yer değiştirir.

**Tuzak:** soluk borusu ve bronşlar yalnızca havayı iletir; plevra akciğeri saran zardır.

**50** **Doğru cevap: B** (Phloem carries the products of photosynthesis to the rest of the plant)

**Çözüm:** Floem, yapraklarda üretilen şekerleri (özellikle sakaroz) bitkinin diğer bölümlerine taşır. Ksilem su ve mineralleri kökten yukarı taşır ve olgunlukta ölü hücrelerden oluşur.

**Tuzak:** A, ksilem ile floemi karıştırır.

## Kimya · Soru 51–60

**51** **Doğru cevap: E** (Filtration, then evaporation of the water)

**Çözüm:** Kum çözünmez; süzme ile ayrılır. Tuz çözünmüştür; süzüntüdeki su buharlaştırılınca katı tuz kalır.

**Tuzak:** D; santrifüj kumu çökertir ama tuzu sudan ayırmaz.

**52** **Doğru cevap: A** (16 g)

**Çözüm:** Lavoisier (kütlenin korunumu): $m(O_2) = 22 - 6 = 16$ g.

**Tuzak:** 1 mol C için gereken 32 g'ı (D) kullanmak; burada yalnızca 0,5 mol C vardır.

**53** **Doğru cevap: D** (2)

**Çözüm:** O'nun 6 değerlik elektronu var; 2'si iki O–H bağında kullanılır, kalan 4 elektron 2 ortaklanmamış çift oluşturur. Bu çiftler molekülü açısal yapar (~104,5°).

**54** **Doğru cevap: B** (H–F)

**Çözüm:** Polarlık, elektronegatiflik farkıyla artar. F en elektronegatif elementtir: H–F'de fark en büyüktür. A ve E apolardır.

**Tuzak:** Cl daha büyük atom olduğu için D'yi seçmek.

**55** **Doğru cevap: C** ($3.01 \cdot 10^{23}$)

**Çözüm:** $n = 9{,}0/18 = 0{,}50$ mol. $N = 0{,}50 \cdot 6{,}02 \cdot 10^{23} = 3{,}01 \cdot 10^{23}$.

**Tuzak:** kütleyi doğrudan $N_a$ ile çarpmak (D).

**56** **Doğru cevap: A** ($0.20$ mol $dm^{-3}$)

**Çözüm:** $n = 4{,}0/40 = 0{,}10$ mol; $V = 0{,}500$ $dm^3$. $c = 0{,}10/0{,}500 = 0{,}20$ mol $dm^{-3}$.

**Tuzak:** hacmi 1 $dm^3$ sanmak (B).

**57** **Doğru cevap: E** (endothermic, with $\Delta H > 0$)

**Çözüm:** Çözelti soğur, çünkü süreç çevreden ısı soğurur: endotermik, $\Delta H > 0$. Bu ilke soğuk kompreslerde kullanılır.

**Tuzak:** B ve D işaretle tanımı karıştırır.

**58** **Doğru cevap: C** (Decreasing the concentration of the reactants)

**Çözüm:** Derişim azalınca tanecik çarpışma sıklığı azalır, hız düşer. Diğer tüm seçenekler etkin çarpışmaları artırır veya aktivasyon enerjisini düşürür.

**59** **Doğru cevap: D** (basic)

**Çözüm:** Zayıf asit (asetik asit) ile kuvvetli bazın (NaOH) tuzu. $CH_3COO^- + H_2O \rightleftharpoons CH_3COOH + OH^-$ hidrolizi $OH^-$ üretir, pH > 7.

> **Tuzak:** her tuzun nötr olduğunu sanmak (B).

**60** **Doğru cevap: B** (2)

**Çözüm:** Bütan (düz zincir) ve 2-metilpropan (izobütan).

> **Tuzak:** aynı zinciri farklı çizerek fazladan izomer saymak (C).

## Fizik · Soru 61–65

**61** **Doğru cevap: D** (Electric current)

**Çözüm:** SI temel büyüklükleri: uzunluk (m), kütle (kg), zaman (s), elektrik akımı (A), sıcaklık (K), madde miktarı (mol), ışık şiddeti (cd). Kuvvet (N), enerji (J), hız (m/s), basınç (Pa) türetilmiştir.

**62** **Doğru cevap: E** (375 m)

**Çözüm:** v–t grafiğinin altındaki alan: dikdörtgen 15 · 20 = 300 m + üçgen ½ · 10 · 15 = 75 m. Toplam 375 m.

> **Tuzak:** yavaşlama kısmını unutmak (A) ya da üçgeni dikdörtgen gibi hesaplamak (B).

**63** **Doğru cevap: B** (250 W)

**Çözüm:** W = mgh = 50 · 10 · 10 = 5000 J. P = W/t = 5000/20 = 250 W.

> **Tuzak:** D, işin kendisidir (J), güç değil.

**64** **Doğru cevap: A** ($2.0 \cdot 10^5$ Pa)

**Çözüm:** Stevin yasası: $p = p_o + \rho gh = 1{,}0 \cdot 10^5 + 1000 \cdot 10 \cdot 10 = 2{,}0 \cdot 10^5$ Pa. Her 10 m su yaklaşık 1 atm ekler.

> **Tuzak:** yalnızca su sütununun basıncını (B) vermek ve atmosfer basıncını unutmak.

**65** **Doğru cevap: C** (Radio waves)

**Çözüm:** Dalga boyu azalan sıra: radyo > mikrodalga > kızılötesi > görünür > morgötesi > X > gama. Tümü boşlukta aynı hızla (c) yayılır; frekans dalga boyuyla ters orantılıdır.

CENT-S · DENEME SINAVI

# 04

65 soru · 140 dakika · 6 bölüm

| Bölüm | Sorular | Soru sayısı | Süre |
|---|---|---|---|
| Reading and Comprehension<br>Okuma ve Anlama | 1–10 | 10 | 30 dk |
| Mathematics<br>Matematik | 11–25 | 15 | 30 dk |
| Reasoning on Texts and Data<br>Metin ve Veri Üzerinde Akıl Yürütme | 26–40 | 15 | 30 dk |
| Biology<br>Biyoloji | 41–50 | 10 | 20 dk |
| Chemistry<br>Kimya | 51–60 | 10 | 20 dk |
| Physics<br>Fizik | 61–65 | 5 | 10 dk |
| **Toplam** | **1–65** | **65** | **140 dk** |

## Sınav kuralları

- Sınavı tek oturumda, gerçek süreyle çözün.
- Her bölümün süresi yalnızca o bölüm için geçerlidir; süresi biten bölüme geri dönülemez.
- Doğru cevap **+1**, yanlış cevap **−0,25**, boş **0** puandır.
- Sınavı bitirmeden cevap anahtarına bakmayın.

## Süre kaydı

Başlangıç

Bitiş

Puan

SECTION 1

# Reading and Comprehension

Questions **1–10** · 10 questions · **30 min**

**TEXT 1 (NON-FICTION)**

Few substances have shaped human history as quietly as salt. Today it is so cheap that we scatter it on icy roads by the tonne, but for most of the past it was precious enough to be taxed, fought over and, in some places, used in place of money. The reason is simple: before refrigeration, salt was the most reliable way to preserve food. Meat, fish and vegetables packed in salt could be stored through the winter or carried on long voyages, and a community without access to it was at the mercy of the seasons.

Because salt was found only in particular places — near the sea, in dry lake beds, or in deep underground deposits — those who controlled its sources gained enormous power. Roads were built to carry it, and towns grew up along them. Governments quickly recognised that a product everyone needed and no one could easily do without was an ideal object of taxation. Salt taxes were among the most hated in history precisely because they fell on the poor as heavily as on the rich.

The decline of salt's importance came not from a new source of salt but from new ways of keeping food: canning, and later refrigeration, made salting unnecessary for most purposes. Once its main function disappeared, salt lost its value with remarkable speed. Its story is a reminder that the worth of a thing depends less on its nature than on the needs it satisfies.

**1** Which of the following best summarises the text?

(A) Salt is still one of the most expensive products in the world
(B) Salt taxes were introduced to help the poor
(C) Salt was valuable because it was found everywhere
(D) Salt was precious because it preserved food, and lost its value when that need disappeared
(E) Roads were built mainly to carry soldiers

**2** According to the text, why were salt taxes so hated?

(A) Because they weighed on the poor as heavily as on the rich
(B) Because they were collected by foreign governments
(C) Because salt was a luxury product
(D) Because they were used to build roads
(E) Because they changed every season

**3** The expression "a community without access to it was at the mercy of the seasons" means that such a community:

(A) could not travel during the winter
(B) had to pay higher taxes in summer
(C) depended on the sea for its food
(D) was attacked more often by its neighbours
(E) could not store food for the periods when it was scarce

**4** According to the text, what caused salt to lose its importance?

(A) The discovery of new salt mines
(B) The abolition of salt taxes
(C) New methods of preserving food, such as canning and refrigeration
(D) A decline in the population of coastal towns
(E) A change in people's taste

**TEXT 2 (LITERARY)**

Her grandmother never measured anything. Flour went into the bowl until it "looked right", water until the dough "stopped arguing", and salt in a quantity that seemed to depend on the weather. When Lena, who was twelve and liked rules, asked for exact amounts, the old woman only laughed and pushed the bowl across the table.

"Your hands will tell you," she said.

Lena's hands told her nothing at first except that dough was sticky and that it got under her fingernails. Her first loaf came out of the oven flat and pale, like something that had given up. Her grandmother broke it open, smelled it, and ate a piece with great seriousness, as if it were a document she had to sign.

"Too much water," she said. "And you were in a hurry. Bread knows when you are in a hurry."

It took a whole summer. By August Lena could feel, without thinking about it, the moment when the dough changed under her palms from a wet, resisting mass into something smooth and alive. She never did learn the amounts. Years later, when she tried to write the recipe down for her own daughter, she found that she could not: the only honest instruction she could give was the one she had been given herself.

**5** The expression "until the dough 'stopped arguing'" suggests that water was added until:

(A) the grandmother stopped talking
(B) the dough reached the right consistency and no longer resisted
(C) Lena stopped asking questions
(D) the bowl was completely full
(E) the dough became liquid

**6** Why does the grandmother eat a piece of the failed loaf "with great seriousness"?

(A) Because she is very hungry
(B) Because she wants to hide her disappointment
(C) Because she wants Lena to throw the bread away
(D) Because the bread tastes better than it looks
(E) Because she treats Lena's attempt as something worth examining carefully

**7** At the end of the text, why can Lena not write the recipe down for her daughter?

(A) Because she has forgotten how to make bread
(B) Because her daughter does not like bread
(C) Because the grandmother asked her to keep it secret
(D) Because the skill can only be learnt through practice, not through exact rules
(E) Because she lost the original recipe

### TEXT 3 (JOURNALISTIC)

After decades of decline, overnight trains are making a cautious comeback across Europe. Several routes that closed in the 2000s, when cheap flights made them seem old-fashioned, have reopened in recent years, and operators report that sleeper cabins on popular lines are often sold out weeks in advance.

The revival owes much to concerns about climate change. A journey by rail produces a small fraction of the emissions of the same journey by plane, and a growing number of travellers say they are willing to spend more time travelling in order to reduce their impact. Night trains have an additional appeal: by travelling while they sleep, passengers "save" the time they would otherwise lose, and arrive in the city centre rather than at a distant airport.

Yet the economics remain difficult. A sleeper carriage carries far fewer passengers than a normal one, it is used only once every twenty-four hours, and staff must work through the night. Track access fees, which vary greatly from one country to another, add to the cost of international routes. As a result, tickets are frequently more expensive than flights to the same destination.

Supporters argue that governments should help, as they already do for roads and airports. Critics answer that public money would be better spent on faster daytime services, which carry many more people. For now, the future of the night train depends on whether its passengers' enthusiasm can be turned into a business that pays for itself.

**8** According to the text, why did many night train routes close in the 2000s?

(A) Because cheap flights made them seem old-fashioned
(B) Because of concerns about climate change
(C) Because track access fees were abolished
(D) Because the trains always arrived late
(E) Because governments stopped building airports

**9** Which of the following is NOT mentioned as a reason why night trains are expensive to run?

(A) A sleeper carriage carries few passengers
(B) The high price of electricity
(C) Each carriage is used only once a day
(D) Staff must work during the night
(E) Track access fees on international routes

**10** What is the critics' position on public support for night trains?

(A) Night trains should be closed immediately
(B) Governments should help night trains as they help airports
(C) Public money would be better spent on faster daytime trains that carry more people
(D) Ticket prices should be lower than flight prices by law
(E) Track access fees should be the same in every country

SECTION 2

## Mathematics

Questions **11–25** · 15 questions · **30 min**

**11** Which of the following numbers lies between 2/3 and 3/4?

(A) 5/8 (B) 4/5 (C) 3/5 (D) 7/10 (E) 13/16

**12** A population of bacteria grows by 10% every hour. By what percentage has it increased after 2 hours?

(A) 20% (B) 10% (C) 11% (D) 2.1% (E) 21%

**13** The expression $\sqrt{18} + \sqrt{50} - \sqrt{8}$ is equal to:

(A) $6\sqrt{2}$ (B) $\sqrt{60}$ (C) $8\sqrt{2}$ (D) $10\sqrt{2}$ (E) 6

**14** For all real $a$ and $b$, the expression $(a + b)^2 - (a - b)^2$ is equal to:

(A) $2a^2 + 2b^2$ (B) $4ab$ (C) $0$ (D) $2ab$ (E) $-4ab$

**15** The set of real solutions of the equation $(x - 2)(x + 3) = 2x - 4$ is:

(A) $\{2\}$ (B) $\{-3, 2\}$ (C) $\{-1, 2\}$ (D) $\{-1\}$ (E) $\{1, -2\}$

**16** How many integers $x$ satisfy the inequality $|x - 1| < 3$?

(A) 7 (B) 6 (C) 3 (D) 4 (E) 5

**17** Let $f(x) = 2^x + 1$. Which is the inverse function $f^{-1}(x)$, for $x > 1$?

(A) $\log_2 x - 1$ (B) $\log_2 (x + 1)$ (C) 2^(x − 1)
(D) $\log_2 (x - 1)$ (E) $1/(2^x + 1)$

**18** The graph of the function $g(x) = f(-x)$ is obtained from the graph of $f$ by:

(A) a reflection in the x-axis
(B) a horizontal translation
(C) a reflection in the y-axis
(D) a rotation of 90° about the origin
(E) a reflection through the origin

**19** What is the solution of the equation $\log_{10} x + \log_{10} 4 = 2$?

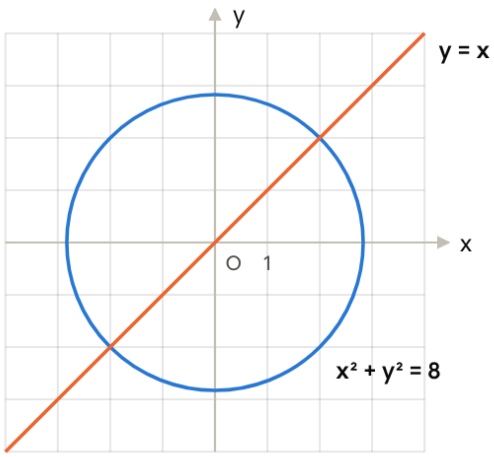
(A) 25 (B) 96 (C) 50 (D) 1/2 (E) 2.5

**20** Consider the function $f(x) = (1/2)^x$. Which statement is correct?

(A) f is increasing
(B) $f(x) > 0$ for every real x, and $f(0) = 1$
(C) $f(-1) = -2$
(D) f has a zero at $x = 1$
(E) $f(2) = 1$

**21** The straight line $y = x$ intersects the circle $x^2 + y^2 = 8$ at two points. What is the distance between them?

**The circle $x^2 + y^2 = 8$ and the line $y = x$**

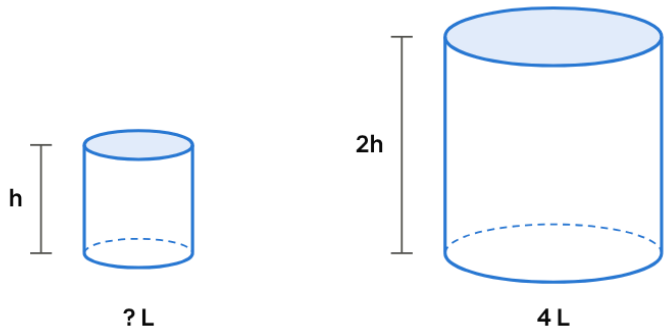



Each grid square is 1 unit

(A) 4 (B) $2\sqrt{2}$ (C) 8 (D) 2 (E) $4\sqrt{2}$

**22** Two cylindrical containers are similar, and the ratio of their heights is 1 : 2. The larger one holds 4 litres. How much does the smaller one hold?

**Two similar cylindrical containers**




(A) 2 L (B) 1 L (C) 1.33 L (D) 0.5 L (E) 0.25 L

**23** How many three-digit numbers with all different digits can be written using only the digits 1, 2, 3, 4, 5?

(A) 60 (B) 125 (C) 10 (D) 120 (E) 15

**24** Two fair dice are rolled. What is the probability that the sum of the two numbers is 7 or 11?

(A) 1/6 (B) 1/18 (C) 2/9 (D) 1/3 (E) 7/36

**25** Which of the following variables is measured on an ordinal scale?

(A) Body temperature in °C
(B) Level of satisfaction (low, medium, high)
(C) Eye colour
(D) Height in cm
(E) Number of siblings

SECTION 3

## Reasoning on Texts and Data

Questions **26–40** · 15 questions · **30 min**

**26** Consider the statement: "If the light is on, then someone is at home." In which of the following situations is the statement FALSE?

(A) The light is off and nobody is at home
(B) The light is off and someone is at home
(C) The light is on and someone is at home
(D) The statement can never be false
(E) The light is on and nobody is at home

**27** The statement "Not all athletes are professionals" means that:

(A) no athlete is a professional
(B) every athlete is an amateur
(C) at least one athlete is not a professional
(D) some professionals are not athletes
(E) most athletes are amateurs

**28** "Only students with an average mark above 27 can apply for the scholarship." Giulia has applied for the scholarship. Which statement is certainly true?

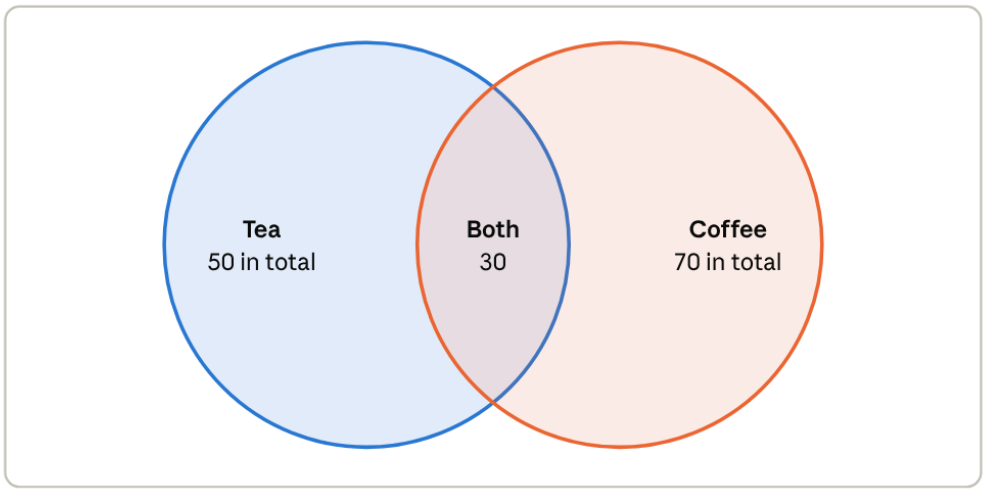
(A) Giulia's average mark is above 27
(B) Giulia will obtain the scholarship
(C) All students with an average above 27 have applied
(D) Giulia's average mark is exactly 27
(E) Nothing can be concluded about Giulia's average

**29** Which pair of statements can NOT both be true, but CAN both be false?

(A) "All the doors are closed" / "At least one door is open"
(B) "All the doors are closed" / "All the doors are open"
(C) "Some doors are closed" / "Some doors are open"
(D) "No door is open" / "All the doors are closed"
(E) "At least one door is closed" / "Not all the doors are open"

**30** In a survey of 120 people, 50 like tea, 70 like coffee and 30 like both. How many people like exactly one of the two drinks?

**Survey of 120 people**




(A) 90 (B) 30 (C) 120 (D) 60 (E) 40

**31** The table shows the sales and the market share of company X.

| Year | Sales of X (€ million) | Market share of X |
|---|---|---|
| 2023 | 40 | 20% |
| 2024 | 44 | 16% |

By what percentage did the total market grow from 2023 to 2024?

(A) 10% (B) 4% (C) 20% (D) 25% (E) 37.5%

**32** Six workers build a wall in 10 days. Working at the same rate, how many days would four workers need?

(A) 6.7 (B) 15 (C) 12 (D) 20 (E) 8

**33** The sum of three consecutive even numbers is 78. What is the largest of the three?

(A) 28 (B) 26 (C) 24 (D) 30 (E) 32

**34** What is the next number in the sequence 2, 6, 12, 20, 30, ...?

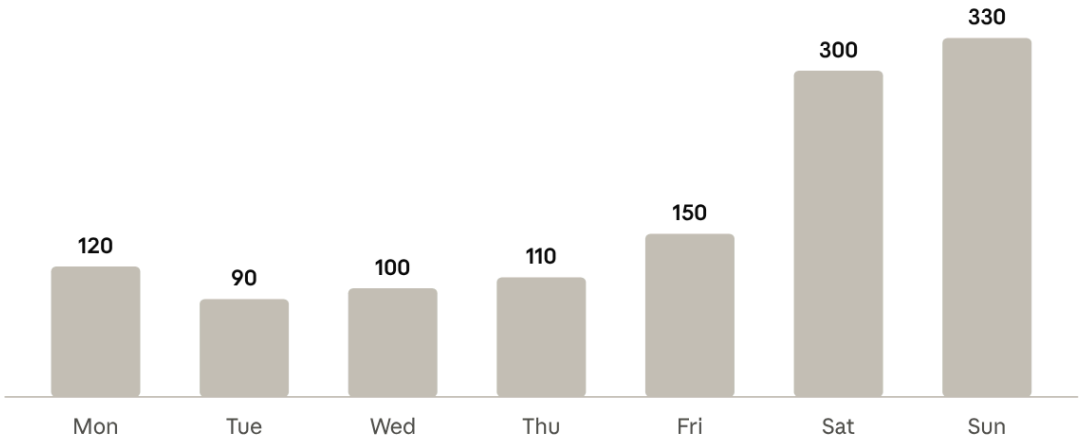
(A) 40 (B) 36 (C) 42 (D) 44 (E) 56

**35** In a course, the written test counts for 60% of the final mark and the oral test for 40%. A student got 7 in the written test. What is the minimum oral mark she needs to obtain a final mark of at least 8?

(A) 9 (B) 8 (C) 10 (D) 9.5 (E) 8.5

**36** The chart shows the number of visitors to a museum on each day of one week.

**Museum visitors on each day of one week**




Which statement is correct?

(A) The museum had 1100 visitors in the week
(B) Monday had the fewest visitors
(C) The average number of visitors per day was 150
(D) Sunday had four times as many visitors as Tuesday
(E) More than half of the week's visitors came on Saturday and Sunday

**37** The exchange rate is €1 = $1.10. A jacket costs $132. What is its price in euros?

(A) €120 (B) €145.20 (C) €132 (D) €110 (E) €121

**38** In a company, every employee who works on Saturdays receives a bonus. Nobody who receives a bonus is in the trainee programme. Lisa is in the trainee programme. Which statement is certainly true?

(A) Lisa receives a bonus
(B) Lisa works on Saturdays
(C) Lisa does not work on Saturdays
(D) Lisa will soon leave the trainee programme
(E) All employees receive a bonus

**39** A flight leaves Rome at 22:40 local time and lands in New York after 9 hours and 15 minutes. New York is 6 hours behind Rome. What is the local time in New York when the plane lands?

(A) 07:55 (B) 13:55 (C) 03:55 (D) 01:55 (E) 02:15

**40** The number of people N in a queue t minutes after a ticket office opens is modelled by $N = 40 - 3t$. Which statement correctly interprets the model?

(A) The queue is empty after 13 minutes
(B) The queue is empty after about 13.3 minutes; for larger t the model gives negative values, which have no meaning
(C) The queue is empty after 40 minutes
(D) The queue is never empty
(E) The queue is empty after 3 minutes

SECTION 4

# Biology

Questions **41–50** · 10 questions · **20 min**

**41** Which of the following substances is hydrophobic?

(A) Glucose (B) Sodium chloride (C) Triglycerides (fats)
(D) The amino acid glycine (E) Urea

**42** A nucleotide of DNA is made of:

(A) ribose, a phosphate group and a nitrogenous base
(B) deoxyribose, an amino acid and a nitrogenous base
(C) glucose, a phosphate group and a nitrogenous base
(D) deoxyribose, a fatty acid and a phosphate group
(E) deoxyribose, a phosphate group and a nitrogenous base

**43** Which component of the cytoskeleton forms the mitotic spindle?

(A) Microtubules (B) Actin microfilaments (C) Intermediate filaments
(D) The cell wall (E) Ribosomes

**44** Which of the following transport processes requires ATP?

(A) Diffusion of $O_2$ across the membrane
(B) Osmosis
(C) Facilitated diffusion of glucose through a carrier protein
(D) The sodium–potassium pump
(E) Diffusion of $CO_2$ out of the cell

**45** In which part of the chloroplast does the Calvin cycle (carbon fixation) take place?

(A) Thylakoid membrane (B) Stroma (C) Cytoplasm
(D) Mitochondrial matrix (E) Nucleus

**46** Crossing-over between homologous chromosomes takes place during:

(A) anaphase of mitosis (B) prophase of mitosis (C) metaphase II of meiosis
(D) telophase I of meiosis (E) prophase I of meiosis

**47** Red–green colour blindness is an X-linked recessive trait. A carrier woman and a man with normal vision have a son. What is the probability that the son is colour-blind?

(A) 0 (B) 1/4 (C) 1/2 (D) 1 (E) 3/4

**48** What is the role of decomposers in an ecosystem?

(A) They produce organic matter by photosynthesis
(B) They break down dead organic matter and return mineral nutrients to the soil
(C) They are always tertiary consumers
(D) They fix atmospheric oxygen
(E) They live only in aquatic environments

**49** During the contraction of a skeletal muscle fibre:

(A) myosin filaments become shorter
(B) actin filaments dissolve
(C) sarcomeres become longer
(D) actin filaments slide over myosin filaments, and the sarcomeres shorten
(E) no ATP is required

**50** Which chamber of the heart pumps blood into the aorta?

(A) Left ventricle (B) Right ventricle (C) Left atrium
(D) Right atrium (E) Pulmonary vein

## SECTION 5
# Chemistry

Questions **51–60** · 10 questions · **20 min**

**51** In water, hydrogen and oxygen are always combined in the mass ratio 1 : 8 (law of definite proportions). What mass of hydrogen is obtained from the complete decomposition of 36 g of water?

(A) 4 g (B) 2 g (C) 32 g (D) 18 g (E) 8 g

**52** What is the maximum number of electrons that the shell with principal quantum number n = 3 can contain?

(A) 8 (B) 6 (C) 32 (D) 18 (E) 9

**53** Which of the following elements has the highest first ionisation energy?

(A) Na (B) Ne (C) K (D) Mg (E) Ar

**54** What is the hybridisation of the carbon atom in carbon dioxide ($CO_2$)?

(A) $sp^3$ (B) $sp^2$ (C) $sp^3d$
(D) No hybridisation (E) sp

**55** What is the traditional name of the compound $H_2SO_3$?

(A) Sulphuric acid (B) Hydrogen sulphide (C) Sulphurous acid
(D) Thiosulphuric acid (E) Sulphate

**56** Consider the reaction $Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$. Which species acts as the oxidising agent?

(A) Zn (B) $Cu^{2+}$
(C) $Zn^{2+}$ (D) Cu
(E) None: it is not a redox reaction

**57** What is the pH of a 0.010 mol $dm^{-3}$ NaOH solution at 25 °C?

(A) 2 (B) 10 (C) 13 (D) 12 (E) 1

**58** A gas mixture contains 2 mol of $N_2$ and 3 mol of $O_2$ at a total pressure of 10 atm. What is the partial pressure of $O_2$?

(A) 6 atm (B) 4 atm (C) 3 atm (D) 10 atm (E) 5 atm

**59** Which pair of gases both contribute to the greenhouse effect?

(A) $N_2$ and $O_2$ (B) $O_2$ and Ar (C) $N_2$ and Ar (D) $H_2$ and He (E) $CO_2$ and $CH_4$

**60** Which structural feature characterises ketones?

(A) An –OH group bonded to a carbon atom
(B) A –COOH group
(C) A carbonyl group (C=O) bonded to two carbon atoms
(D) A –CHO group at the end of the chain
(E) An oxygen atom bonded between two carbon atoms (C–O–C)

SECTION 6

## Physics

Questions **61–65** · 5 questions · **10 min**

**61** Consider the vectors a = (1, 2, 3) and b = (2, 0, −1). What is the scalar (dot) product a · b?

(A) 1 (B) −1 (C) 5 (D) (2, 0, −3) (E) 0

**62** A stone is dropped from rest from a height of 45 m. Neglecting air resistance (g = 10 m/s²), how long does it take to reach the ground?

(A) 3 s (B) 4.5 s (C) 9 s (D) 2 s (E) 1.5 s

**63** Two blocks of mass 2 kg and 3 kg lie on a frictionless horizontal surface and are connected by an ideal string. A horizontal force of 20 N pulls the 3 kg block. What is the tension in the string?

(A) 20 N (B) 12 N (C) 4 N (D) 10 N (E) 8 N

**64** An ideal fluid flows in a horizontal pipe whose cross-section decreases from 4 cm² to 1 cm². In the wide section the speed is 2 m/s. What is the speed in the narrow section?

(A) 0.5 m/s (B) 2 m/s (C) 8 m/s (D) 4 m/s (E) 16 m/s

**65** Which statement about the magnetic field lines of a bar magnet is correct?

(A) Outside the magnet, they go from the south pole to the north pole
(B) Two field lines can cross each other
(C) They are denser far away from the magnet
(D) Outside the magnet, they go from the north pole to the south pole
(E) A magnet broken in two gives one isolated north pole and one isolated south pole

END OF THE TEST · SINAVIN SONU

DENEME SINAVI 4

# Cevap Anahtarı

Cevaplarınızı karşılaştırın, ardından aşağıdaki tabloyla bölüm bölüm puanınızı hesaplayın.

### Okuma ve Anlama

Soru 1–10

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| D | A | E | C | B | E | D | A | B | C |

### Matematik

Soru 11–25

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | E | A | B | C | E | D | C | A | B | E | D | A | C | B |

### Metin ve Veri Üzerinde Akıl Yürütme

Soru 26–40

| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | C | A | B | D | E | B | A | C | D | E | A | C | D | B |

### Biyoloji

Soru 41–50

| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|
| C | E | A | D | B | E | C | B | D | A |

### Kimya

Soru 51–60

| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| A | D | B | E | C | B | D | A | E | C |

### Fizik

Soru 61–65

| 61 | 62 | 63 | 64 | 65 |
|---|---|---|---|---|
| B | A | E | C | D |

| Bölüm | Soru | Doğru | Yanlış | Boş | Puan |
|---|---|---|---|---|---|
| Okuma ve Anlama | 10 | | | | |
| Matematik | 15 | | | | |
| Metin ve Veri Üzerinde Akıl Yürütme | 15 | | | | |
| Biyoloji | 10 | | | | |
| Kimya | 10 | | | | |
| Fizik | 5 | | | | |
| **Toplam** | **65** | | | | |

Puan = Doğru × 1 − Yanlış × 0,25. Boş bırakılan sorular puanı etkilemez. En yüksek puan 65'tir.

DENEME SINAVI 4

# Çözümler

## Okuma ve Anlama · Soru 1–10

**1** **Doğru cevap: D** (Salt was precious because it preserved food, and lost its value when that need disappeared)

**Çözüm:** Metin tuzun değerinin gıdayı korumasından geldiğini ve bu işlev ortadan kalkınca değerini kaybettiğini anlatır.

> **Tuzak:** C, metnin söylediğinin tersidir ("yalnızca belirli yerlerde bulunurdu").

**2** **Doğru cevap: A** (Because they weighed on the poor as heavily as on the rich)

**Çözüm:** "Tam da yoksullara zenginler kadar ağır geldikleri için" en nefret edilen vergiler arasındaydı.

> **Tuzak:** C; metin tuzun herkesin ihtiyaç duyduğu bir ürün olduğunu söyler.

**3** **Doğru cevap: E** (could not store food for the periods when it was scarce)

**Çözüm:** Tuz olmadan yiyecek kışın saklanamazdı; topluluk mevsimlerin getirdiği bolluk ve kıtlığa bağımlı kalırdı.

**4** **Doğru cevap: C** (New methods of preserving food, such as canning and refrigeration)

**Çözüm:** "Düşüş yeni bir tuz kaynağından değil, gıda saklamanın yeni yollarından geldi."

> **Tuzak:** A, metnin açıkça reddettiği açıklamadır.

**5** **Doğru cevap: B** (the dough reached the right consistency and no longer resisted)

**Çözüm:** Hamur kişileştirilir: "tartışmayı bırakmak" direnmeyi bırakıp doğru kıvama gelmek demektir. Son paragraftaki "ıslak, dirençli kütle" ifadesi bunu destekler.

**6** **Doğru cevap: E** (Because she treats Lena's attempt as something worth examining carefully)

**Çözüm:** "İmzalaması gereken bir belgeymiş gibi" benzetmesi dikkatli bir inceleme ve ciddiyet anlatır; ardından hatanın nedenini söyler.

> **Tuzak:** D; ekmek "pes etmiş bir şey gibi" yassı ve solgundur.

**7** **Doğru cevap: D** (Because the skill can only be learnt through practice, not through exact rules)

**Çözüm:** Verebileceği tek dürüst talimat kendisine verilenle aynıdır: "Ellerin sana söyleyecek." Beceri miktarlarla değil, deneyimle öğrenilir.

> **Tuzak:** E; yazılı bir tarif hiç olmamıştır.

**8** **Doğru cevap: A** (Because cheap flights made them seem old-fashioned)

**Çözüm:** İlk paragraf: ucuz uçuşlar onları eski moda gösterdiğinde kapandılar.

> **Tuzak:** B, yeniden canlanmanın nedenidir.

**9** **Doğru cevap: B** (The high price of electricity)

**Çözüm:** Üçüncü paragrafta A, C, D ve E sayılır; elektrik fiyatından söz edilmez.

> **Tuzak:** "NOT" sözcüğünü gözden kaçırıp metinde geçen bir nedeni seçmek.

**10** **Doğru cevap: C** (Public money would be better spent on faster daytime trains that carry more people)

**Çözüm:** Son paragraf: eleştirmenlere göre kamu parası çok daha fazla yolcu taşıyan hızlı gündüz seferlerine harcanmalıdır.

> **Tuzak:** B, destekçilerin görüşüdür.

## Matematik · Soru 11–25

**11** **Doğru cevap: D** (7/10)

**Çözüm:** 2/3 ≈ 0,667 ve 3/4 = 0,75. 7/10 = 0,70 aralıktadır. 5/8 = 0,625; 3/5 = 0,6; 4/5 = 0,8; 13/16 ≈ 0,81.

**12** **Doğru cevap: E** (21%)

**Çözüm:** 1,1 · 1,1 = 1,21 → %21 artış.

> **Tuzak:** bileşik artışı basit toplama gibi alıp %20 (A) demek.

**13** **Doğru cevap: A** ($6\sqrt{2}$)

**Çözüm:** $\sqrt{18} = 3\sqrt{2}$, $\sqrt{50} = 5\sqrt{2}$, $\sqrt{8} = 2\sqrt{2}$. $3 + 5 - 2 = 6 \rightarrow 6\sqrt{2}$.

**Tuzak:** kök içlerini toplayıp $\sqrt{(18 + 50 - 8)} = \sqrt{60}$ (B) yazmak.

**14** **Doğru cevap: B** ($4ab$)

**Çözüm:** $(a^2 + 2ab + b^2) - (a^2 - 2ab + b^2) = 4ab$.

**Tuzak:** A, iki ifadenin toplamıdır.

**15** **Doğru cevap: C** ($\{-1, 2\}$)

**Çözüm:** $2x - 4 = 2(x - 2)$. $(x - 2)(x + 3) - 2(x - 2) = 0 \rightarrow (x - 2)(x + 1) = 0 \rightarrow x = 2$ veya $x = -1$.

**Tuzak:** iki tarafı $(x - 2)$'ye bölüp $x = 2$ çözümünü kaybetmek (D).

**16** **Doğru cevap: E** (5)

**Çözüm:** $-3 < x - 1 < 3 \rightarrow -2 < x < 4$. Tam sayılar: $-1$, 0, 1, 2, 3 → 5 tane.

**Tuzak:** uçları ($-2$ ve 4) dahil edip 7 (A) bulmak.

**17** **Doğru cevap: D** ($\log_2 (x - 1)$)

**Çözüm:** $y = 2^x + 1 \rightarrow 2^x = y - 1 \rightarrow x = \log_2(y - 1)$. Değişkenleri değiştirince $f^{-1}(x) = \log_2(x - 1)$.

**Tuzak:** E, $1/f(x)$'tir; ters fonksiyon değildir.

**18** **Doğru cevap: C** (a reflection in the y-axis)

**Çözüm:** (a, b) f'nin grafiğindeyse $(-a, b)$ g'nin grafiğindedir: y-eksenine göre simetri.

**Tuzak:** A, $-f(x)$ dönüşümüdür; E, $-f(-x)$'tir.

**19** **Doğru cevap: A** (25)

**Çözüm:** $\log(4x) = 2 \rightarrow 4x = 10^2 = 100 \rightarrow x = 25$.

**Tuzak:** $\log x = 2 - \log 4$ işlemini $10^2 - 4 = 96$ (B) sanmak.

**20** **Doğru cevap: B** ($f(x) > 0$ for every real x, and $f(0) = 1$)

**Çözüm:** Taban 0 ile 1 arasında: fonksiyon azalan, her zaman pozitif, $f(0) = 1$. $f(-1) = 2$, $f(2) = 1/4$; sıfırı yoktur.

**Tuzak:** C, negatif üssü negatif sonuç sanmaktır.

**21** **Doğru cevap: E** ($4\sqrt{2}$)

**Çözüm:** $2x^2 = 8 \rightarrow x = \pm 2$. Noktalar (2, 2) ve $(-2, -2)$. Uzaklık $\sqrt{(4^2 + 4^2)} = 4\sqrt{2}$. Doğru merkezden geçtiği için bu, çapın kendisidir ($r = 2\sqrt{2}$).

**Tuzak:** B, yarıçaptır.

**22** **Doğru cevap: D** (0.5 L)

**Çözüm:** Benzer cisimlerde hacim oranı benzerlik oranının küpüdür: $(1/2)^3 = 1/8$. 4/8 = 0,5 L.

**Tuzak:** oranı doğrudan (A) ya da karesini (B) kullanmak.

**23** **Doğru cevap: A** (60)

**Çözüm:** Sıra önemli ve tekrar yok: $5 \cdot 4 \cdot 3 = 60$.

**Tuzak:** B tekrara izin verir ($5^3$); C sırayı önemsemez (C(5,3)).

**24** **Doğru cevap: C** (2/9)

**Çözüm:** Toplam 7: 6 durum; toplam 11: (5,6), (6,5) = 2 durum. Olaylar ayrıktır: $(6 + 2)/36 = 8/36 = 2/9$.

**Tuzak:** yalnızca 7'yi saymak (A).

**25** **Doğru cevap: B** (Level of satisfaction (low, medium, high))

**Çözüm:** Sıralamalı (ordinal) ölçekte kategoriler sıralanabilir ama aralarındaki farklar ölçülemez. A aralık, C nominal, D ve E oran ölçeğidir.

**Tuzak:** göz rengini (C) sıralanabilir sanmak.

## Metin ve Veri Üzerinde Akıl Yürütme · Soru 26–40

**26** **Doğru cevap: E** (The light is on and nobody is at home)

**Çözüm:** $P \rightarrow Q$ yalnızca P doğru ve Q yanlış olduğunda yanlıştır. Işık yanıyor ama evde kimse yok.

**Tuzak:** B; ışık kapalıyken ifade hiçbir şey iddia etmez, dolayısıyla yanlış olmaz.

**27** **Doğru cevap: C** (at least one athlete is not a professional)

**Çözüm:** $\neg$(her x için P) = en az bir x için $\neg$P.

**Tuzak:** A ve B "hepsi değil" ile "hiçbiri"yi karıştırır; E sayısal bir iddiadır ve ifadeden çıkmaz.

**28** **Doğru cevap: A** (Giulia's average mark is above 27)

**Çözüm:** "Yalnızca X başvurabilir" = başvuru → X. Giulia başvurduğuna göre ortalaması 27'nin üzerindedir.

> **Tuzak:** B; başvurmak bursu almak demek değildir. C, koşulu ters çevirir.

**29** **Doğru cevap: B** ("All the doors are closed" / "All the doors are open")

**Çözüm:** B'deki ifadeler birlikte doğru olamaz; ama bazı kapılar açık bazıları kapalıysa ikisi de yanlıştır (karşıt ifadeler). A'dakiler çelişiktir: biri doğruysa diğeri kesin yanlıştır, ikisi birden yanlış olamaz. C ikisi birden doğru olabilir; D ve E denk ifadelerdir.

**30** **Doğru cevap: D** (60)

**Çözüm:** Yalnızca çay: 50 − 30 = 20. Yalnızca kahve: 70 − 30 = 40. Toplam 60.

> **Tuzak:** A, en az birini sevenlerin sayısıdır (50 + 70 − 30).

**31** **Doğru cevap: E** (37.5%)

**Çözüm:** Toplam pazar: 2023'te 40/0,20 = 200; 2024'te 44/0,16 = 275 milyon €. Artış 75/200 = %37,5.

> **Tuzak:** X'in satış artışını (%10, A) ya da pay düşüşünü (4 puan, B) pazarın büyümesi sanmak.

**32** **Doğru cevap: B** (15)

**Çözüm:** Toplam iş 6 · 10 = 60 işçi-gün. 60/4 = 15 gün (ters orantı).

> **Tuzak:** doğru orantı kurup 10 · 4/6 ≈ 6,7 (A) bulmak.

**33** **Doğru cevap: A** (28)

**Çözüm:** n + (n + 2) + (n + 4) = 78 → 3n = 72 → n = 24. Sayılar 24, 26, 28.

> **Tuzak:** C en küçük, B ortanca sayıdır.

**34** **Doğru cevap: C** (42)

**Çözüm:** Farklar 4, 6, 8, 10 → sonraki fark 12: 30 + 12 = 42. Ya da n(n + 1): 1·2, 2·3, ..., 6·7 = 42.

**35** **Doğru cevap: D** (9.5)

**Çözüm:** 0,6 · 7 + 0,4x ≥ 8 → 4,2 + 0,4x ≥ 8 → x ≥ 9,5.

> **Tuzak:** ağırlıkları yok sayıp (7 + x)/2 ≥ 8 → x ≥ 9 (A) bulmak.

**36** **Doğru cevap: E** (More than half of the week's visitors came on Saturday and Sunday)

**Çözüm:** Toplam 1200 (A yanlış). En az Salı (B yanlış). Ortalama 1200/7 ≈ 171 (C yanlış). 4 · 90 = 360 ≠ 330 (D yanlış). Hafta sonu 630 > 600 (E doğru).

**37** **Doğru cevap: A** (€120)

**Çözüm:** 132 / 1,10 = 120 €.

> **Tuzak:** çarpma yapıp 145,20 (B) bulmak; doları avroya çevirirken bölünür.

**38** **Doğru cevap: C** (Lisa does not work on Saturdays)

**Çözüm:** Stajyer → bonus yok (ikinci kuralın karşıt tersi). Bonus yok → cumartesi çalışmıyor (birinci kuralın karşıt tersi). Lisa cumartesi çalışmaz.

**39** **Doğru cevap: D** (01:55)

**Çözüm:** Roma saatiyle varış 22:40 + 9:15 = 07:55 (ertesi gün). New York 6 saat geride: 01:55.

> **Tuzak:** A, Roma saatidir; B, saat farkını eklemektir.

**40** **Doğru cevap: B** (The queue is empty after about 13.3 minutes; for larger t the model gives negative values, which have no meaning)

**Çözüm:** N = 0 → t = 40/3 ≈ 13,3 dk. t = 13'te hâlâ 1 kişi vardır (A yanlış). t > 13,3 için model negatif kişi sayısı verir; model bu aralıkta geçerli değildir.

> **Tuzak:** E, dakikada ayrılan kişi sayısıdır.

## Biyoloji · Soru 41–50

**41** **Doğru cevap: C** (Triglycerides (fats))

**Çözüm:** Trigliseritler gliserol ve üç uzun apolar yağ asidinden oluşur; suyla hidrojen bağı kuramaz. Glikoz, üre ve glisin polar gruplar içerir; NaCl iyoniktir ve suda çözünür.

**42** **Doğru cevap: E** (deoxyribose, a phosphate group and a nitrogenous base)

**Çözüm:** DNA nükleotidi: 5 karbonlu deoksiriboz şekeri + fosfat + baz (A, T, G, C).

> **Tuzak:** A, RNA nükleotididir.

**43** **Doğru cevap: A** (Microtubules)

**Çözüm:** İğ iplikleri tubülin proteininden oluşan mikrotübüllerdir; kromozomları kutuplara çeker.

**Tuzak:** B; aktin filamentleri hayvan hücrelerinde sitokinezde boğum oluşturur, iğ ipliği değildir.

**44** **Doğru cevap: D** (The sodium–potassium pump)

**Çözüm:** $Na^+/K^+$ pompası iyonları derişim gradyanına karşı taşır (aktif taşıma), bu yüzden ATP harcar.

**Tuzak:** C; kolaylaştırılmış difüzyon taşıyıcı protein kullanır ama gradyan yönünde olduğu için enerji gerektirmez.

**45** **Doğru cevap: B** (Stroma)

**Çözüm:** Calvin döngüsü stromada gerçekleşir ve ışık tepkimelerinin ürettiği ATP ile NADPH'yi kullanır.

**Tuzak:** A, ışığa bağlı tepkimelerin yeridir.

**46** **Doğru cevap: E** (prophase I of meiosis)

**Çözüm:** Profaz I'de homolog kromozomlar eşleşir (tetrat/sinaps) ve kromatitler arasında parça değişimi olur; bu genetik çeşitliliği artırır. Mitozda homologlar eşleşmez.

**47** **Doğru cevap: C** (1/2)

**Çözüm:** Anne $X^AX^a$, baba $X^AY$. Oğul X'ini anneden alır: $X^a$ gelme olasılığı 1/2.

**Tuzak:** tüm çocuklar içindeki oranı (1/4, B) vermek; soru yalnızca oğlan çocuğu soruyor.

**48** **Doğru cevap: B** (They break down dead organic matter and return mineral nutrients to the soil)

**Çözüm:** Bakteri ve mantarlar ölü organizmaları ve atıkları parçalayıp mineralleri üreticilerin yeniden kullanabileceği biçime dönüştürür; madde döngüsünü tamamlar.

**49** **Doğru cevap: D** (actin filaments slide over myosin filaments, and the sarcomeres shorten)

**Çözüm:** Kayan iplikler modeli: miyozin başları aktine bağlanıp onu çeker, filamentlerin boyu değişmez ama sarkomer kısalır. Süreç ATP ve $Ca^{2+}$ gerektirir.

**Tuzak:** A; filamentlerin kendisi kısalmaz.

**50** **Doğru cevap: A** (Left ventricle)

**Çözüm:** Sol karıncık oksijenli kanı aortla tüm vücuda pompalar; bu yüzden duvarı en kalın odacıktır.

**Tuzak:** B, kanı pulmoner artere pompalar.

## Kimya · Soru 51–60

**51** **Doğru cevap: A** (4 g)

**Çözüm:** 9 g suda 1 g H vardır. 36 g suda 36/9 = 4 g H (ve 32 g O).

**Tuzak:** C, oksijen kütlesidir.

**52** **Doğru cevap: D** (18)

**Çözüm:** Bir kabuktaki en fazla elektron $2n^2 = 2 \cdot 9 = 18$ ($3s^2\ 3p^6\ 3d^{10}$).

**Tuzak:** oktet kuralını hatırlayıp 8 (A) demek; E ise orbital sayısıdır ($n^2$).

**53** **Doğru cevap: B** (Ne)

**Çözüm:** İyonlaşma enerjisi periyotta sağa doğru artar, grupta aşağı doğru azalır. Ne (2. periyot, soy gaz) en yüksektir; Ar aynı grupta ama bir alttadır.

**Tuzak:** soy gaz olduğu için Ar'ı (E) seçmek.

**54** **Doğru cevap: E** (sp)

**Çözüm:** O=C=O: C'nin çevresinde iki elektron bölgesi (iki çift bağ), ortaklanmamış çift yok. Molekül doğrusal (180°), hibritleşme sp.

**Tuzak:** çift bağ görüp otomatik olarak $sp^2$ (B) demek.

**55** **Doğru cevap: C** (Sulphurous acid)

**Çözüm:** $H_2SO_4$ sülfürik asit (-ic, S'nin yüksek yükseltgenme basamağı +6); $H_2SO_3$ sülfüröz asit (-ous, +4). $H_2S$ hidrojen sülfürdür.

**56** **Doğru cevap: B** ($Cu^{2+}$)

**Çözüm:** $Cu^{2+}$ elektron alır (+2 → 0), indirgenir; bu yüzden yükseltgen (oksitleyici) ajandır. Zn elektron verir, indirgen ajandır.

**Tuzak:** yükseltgenen türü (Zn, A) yükseltgen sanmak.

**57** **Doğru cevap: D** (12)

**Çözüm:** NaOH kuvvetli baz: $[OH^-] = 10^{-2}$ → pOH = 2 → pH = 14 − 2 = 12.

**Tuzak:** pOH'yi pH sanmak (A).

**58** **Doğru cevap: A** (6 atm)

**Çözüm:** Dalton yasası: $p(O_2) = x(O_2) \cdot P = (3/5) \cdot 10 = 6$ atm.

> **Tuzak:** B, $N_2$'nin kısmi basıncıdır; E, basıncı eşit bölmektir.

**59** **Doğru cevap: E** ($CO_2$ and $CH_4$)

**Çözüm:** $CO_2$ ve metan kızılötesi ışınları soğurur ve atmosferi ısıtır. Atmosferin ana bileşenleri $N_2$, $O_2$ ve Ar kızılötesini soğurmaz.

**60** **Doğru cevap: C** (A carbonyl group (C=O) bonded to two carbon atoms)

**Çözüm:** Ketonlarda karbonil grubu zincirin içindedir, iki karbona bağlanır (örn. propanon, $CH_3COCH_3$).

> **Tuzak:** D aldehit, E eter, A alkol, B karboksilik asittir.

## Fizik · Soru 61–65

**61** **Doğru cevap: B** (−1)

**Çözüm:** $a \cdot b = 1 \cdot 2 + 2 \cdot 0 + 3 \cdot (-1) = 2 + 0 - 3 = -1$.

> **Tuzak:** skaler çarpımın sonucu bir sayıdır, vektör değil (D).

**62** **Doğru cevap: A** (3 s)

**Çözüm:** $h = \tfrac{1}{2}gt^2 \rightarrow t = \sqrt{(2h/g)} = \sqrt{(90/10)} = 3$ s.

> **Tuzak:** ½'yi unutup $t^2 = 4{,}5 \rightarrow \sim 2{,}1$ s ya da $h/g = 4{,}5$ (B) bulmak.

**63** **Doğru cevap: E** (8 N)

**Çözüm:** Sistem: $a = F/(m_1 + m_2) = 20/5 = 4$ m/s². İp yalnızca 2 kg'lık bloğu çeker: $T = 2 \cdot 4 = 8$ N.

> **Tuzak:** B, 3 kg'lık bloğa etki eden net kuvvettir; A, ipte tüm kuvvetin iletildiğini sanmaktır.

**64** **Doğru cevap: C** (8 m/s)

**Çözüm:** Süreklilik denklemi: $A_1v_1 = A_2v_2 \rightarrow 4 \cdot 2 = 1 \cdot v_2 \rightarrow v_2 = 8$ m/s.

> **Tuzak:** hızın kesitle doğru orantılı olduğunu sanmak (A).

**65** **Doğru cevap: D** (Outside the magnet, they go from the north pole to the south pole)

**Çözüm:** Alışılmış yön: mıknatısın dışında N'den S'ye, içinde S'den N'ye (kapalı çizgiler). Çizgiler kesişmez ve kutuplar yakınında daha sıktır.

> **Tuzak:** E; kırılan her parça yine iki kutuplu bir mıknatıstır.

CENT-S · DENEME SINAVI

# 05

65 soru · 140 dakika · 6 bölüm

| Bölüm | Sorular | Soru sayısı | Süre |
|---|---|---|---|
| Reading and Comprehension<br>Okuma ve Anlama | 1–10 | 10 | 30 dk |
| Mathematics<br>Matematik | 11–25 | 15 | 30 dk |
| Reasoning on Texts and Data<br>Metin ve Veri Üzerinde Akıl Yürütme | 26–40 | 15 | 30 dk |
| Biology<br>Biyoloji | 41–50 | 10 | 20 dk |
| Chemistry<br>Kimya | 51–60 | 10 | 20 dk |
| Physics<br>Fizik | 61–65 | 5 | 10 dk |
| **Toplam** | **1–65** | **65** | **140 dk** |

## Sınav kuralları

- Sınavı tek oturumda, gerçek süreyle çözün.
- Her bölümün süresi yalnızca o bölüm için geçerlidir; süresi biten bölüme geri dönülemez.
- Doğru cevap **+1**, yanlış cevap **−0,25**, boş **0** puandır.
- Sınavı bitirmeden cevap anahtarına bakmayın.

## Süre kaydı

Başlangıç

Bitiş

Puan

SECTION 1

# Reading and Comprehension

Questions **1–10** · 10 questions · **30 min**

**TEXT 1 (NON-FICTION)**

When a patient feels better after taking a pill that contains nothing but sugar, doctors speak of the placebo effect. For much of the twentieth century this was treated chiefly as a nuisance: an effect that had to be subtracted from the results of a clinical trial in order to discover what a new drug really did. A treatment was considered effective only if it worked better than a placebo given to a similar group of patients who did not know which they had received.

More recently, researchers have begun to study the placebo effect for its own sake. It turns out to be surprisingly specific. Placebos seem to work best on symptoms that the brain itself helps to regulate, such as pain, nausea and fatigue, and hardly at all on conditions such as infections or broken bones. The context matters too: an injection tends to produce a stronger effect than a pill, and two pills a stronger effect than one. Even the price can play a part — in one experiment, volunteers reported more relief from an "expensive" painkiller than from an identical "cheap" one.

None of this means that illness is "all in the mind". What the research suggests, rather, is that the expectations a patient brings to a treatment are themselves a biological factor, capable of changing the way the body processes signals. This raises an awkward question for medicine. If a doctor's confident manner can genuinely reduce a patient's pain, is it honest to encourage expectations that a treatment cannot justify?

**1** What is the main purpose of the text?

(A) To prove that all illnesses are caused by the mind
(B) To explain how new drugs are produced
(C) To argue that clinical trials are useless
(D) To compare the prices of different painkillers
(E) To show how the placebo effect has become a subject of study in itself, and what it reveals

**2** Traditionally, what was the placebo used for in clinical trials?

(A) To treat patients who could not afford real drugs
(B) To reduce the side effects of new drugs
(C) As a comparison to measure the real effect of a new drug
(D) To make injections less painful
(E) To study the cost of treatments

**3** According to the text, placebos have little or no effect on:

(A) infections and broken bones
(B) pain
(C) nausea
(D) fatigue
(E) symptoms regulated by the brain

**4** The "awkward question" mentioned at the end of the text concerns:

(A) the high price of modern painkillers
(B) the difficulty of organising clinical trials
(C) whether injections are more effective than pills
(D) whether it is honest to raise expectations that a treatment cannot justify
(E) whether patients should know the name of their illness

### TEXT 2 (LITERARY)

For three days the fog had not lifted. It came in from the sea each morning like a slow grey animal and lay down over the town, and by noon even the church tower had disappeared. People spoke more quietly than usual, as though the fog might be listening.

Ada liked it. She would not have admitted this to her neighbours, who complained about damp washing and cancelled boats, but she liked the way the world shrank to the few metres around her. In the fog there was no horizon to remind her of the places she had never been, and no ships passing on their way to them. The street ended at the baker's door; the harbour was only a sound of water and the occasional cry of a gull she could not see.

On the fourth morning she woke to sunlight striking the ceiling. She lay still for a long moment before going to the window. The sea was there again, enormous and glittering, and far out a white ship was moving steadily south. Ada watched it until her coffee went cold. Then she went downstairs and began, without quite knowing why, to look for the old suitcase under the stairs.

**5** The expression "as though the fog might be listening" suggests that:

(A) the fog was very noisy
(B) the fog created a hushed, almost secretive atmosphere
(C) people were afraid of an animal
(D) the town was empty
(E) people could not hear each other

**6** Why did Ada like the fog?

(A) Because she did not have to do the washing
(B) Because the boats were cancelled and she could rest
(C) Because her neighbours liked it too
(D) Because it hid the horizon and the ships that reminded her of places she had never been
(E) Because she could hear the gulls more clearly

**7** What does the last sentence of the text suggest?

(A) Ada wants to clean the house
(B) Ada is going to visit the baker
(C) Seeing the sea and the ship has awakened in Ada a desire to leave
(D) Ada is preparing to welcome a guest
(E) Ada is angry because the fog has lifted

**TEXT 3 (JOURNALISTIC)**

A growing number of restaurants are offering a choice that would have seemed strange a few years ago: the same dish in two sizes, at two prices. The trend began as a response to food waste, which surveys suggest accounts for a significant share of what restaurants throw away. Plates that come back to the kitchen half full represent not only lost ingredients but also the energy and labour used to prepare them.

The results so far are encouraging. One chain that introduced smaller portions across its menus reported that the amount of food left on plates fell by almost a third within six months, while total sales remained roughly stable. Customers, it seems, do not necessarily want less food; they want to be able to choose.

Some chefs are less enthusiastic. They argue that a dish is designed as a whole, and that reducing it changes the balance between its parts. Others point out that smaller portions are not always cheaper to produce, since preparation time is the same, and fear that customers will expect prices to fall in proportion to the size.

Campaigners against food waste welcome the change but warn against seeing it as a solution in itself. Most food, they note, is wasted not in restaurants but in homes and earlier in the supply chain, long before it reaches a plate.

**8** According to the text, what do the results of the restaurant chain suggest about customers?

(A) They want to pay less for every dish
(B) They prefer large portions
(C) They stopped going to the restaurant
(D) They waste more food at home
(E) They do not necessarily want less food, but they want to be able to choose

**9** Why are some chefs less enthusiastic about smaller portions?

(A) Because reducing a dish can change the balance between its parts
(B) Because smaller portions take longer to cook
(C) Because customers complained about the taste
(D) Because sales fell by a third
(E) Because the ingredients are more expensive

**10** What warning do the campaigners against food waste give?

(A) Restaurants should stop serving large portions
(B) Most food is wasted elsewhere, so this measure is not enough on its own
(C) Smaller portions increase waste at home
(D) Restaurants should lower all their prices
(E) The supply chain does not waste any food

SECTION 2

# Mathematics

Questions **11–25** · 15 questions · **30 min**

**11** What is the remainder when $2^{100}$ is divided by 3?

(A) 0
(B) 2
(C) 1
(D) 3
(E) It cannot be determined without a calculator

**12** The price of a shirt is increased by 10% and the new price is then reduced by 10%. Compared to the original price, the final price is:

(A) the same (B) 1% higher (C) 10% lower (D) 1% lower (E) 0.1% lower

**13** How many positive divisors does the number 72 have?

(A) 6 (B) 12 (C) 8 (D) 10 (E) 24

**14** If $x + 1/x = 3$, what is the value of $x^2 + 1/x^2$?

(A) 9 (B) 3 (C) 11 (D) 6 (E) 7

**15** The solutions of the inequality $-x^2 + 4x \geq 0$ are:

(A) $0 \leq x \leq 4$ (B) $x \leq 0$ or $x \geq 4$ (C) $x \geq 4$
(D) $0 < x < 4$ (E) every real number

**16** The real numbers x and y satisfy $x + y = 5$ and $xy = 6$. What is the value of $x^2 + y^2$?

(A) 25 (B) 11 (C) 13 (D) 36 (E) 19

**17** The graph of the function $f(x) = 1/(x - 2) + 3$ has:

(A) vertical asymptote $x = -2$ and horizontal asymptote $y = 3$
(B) vertical asymptote $x = 3$ and horizontal asymptote $y = 2$
(C) vertical asymptote $x = 2$ and horizontal asymptote $y = 0$
(D) vertical asymptote $x = 0$ and horizontal asymptote $y = 3$
(E) vertical asymptote $x = 2$ and horizontal asymptote $y = 3$

**18** The vertex of the parabola $y = x^2 - 4x + c$ lies on the x-axis. What is the value of c?

(A) 2 (B) −4 (C) 0 (D) 4 (E) 16

**19** The value of $\log_2 (8\sqrt{2})$ is:

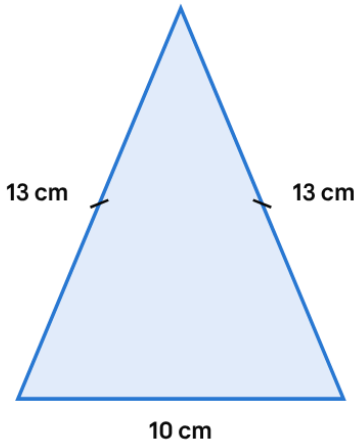
(A) 4 (B) 7/2 (C) 3 (D) 5/2 (E) 8

**20** The mass of a radioactive substance halves every 5 years. After 15 years, what fraction of the initial mass remains?

(A) 1/8 (B) 1/3 (C) 1/6 (D) 1/15 (E) 1/4

**21** An isosceles triangle has a base of 10 cm and two equal sides of 13 cm. What is its area?

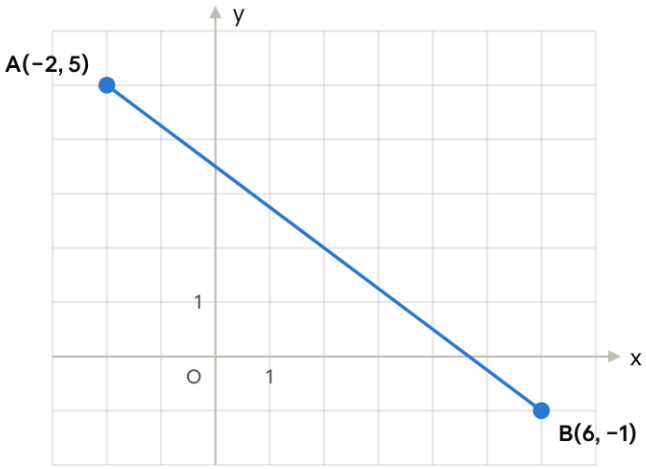
**An isosceles triangle**




(A) 65 cm² (B) 130 cm² (C) 120 cm² (D) 60 cm² (E) 30 cm²

**22** What is the midpoint of the segment joining A(−2, 5) and B(6, −1)?

**The segment AB**

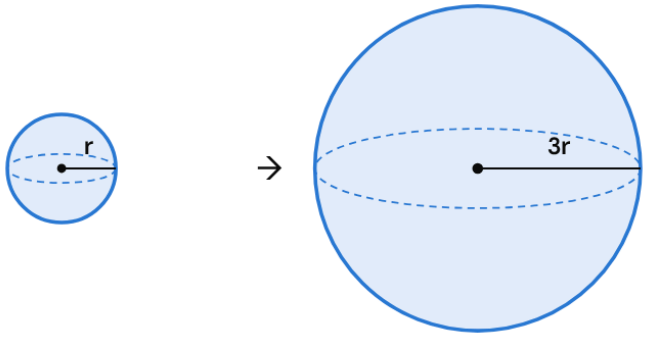



Each grid square is 1 unit

(A) (4, 4) (B) (2, 2) (C) (8, −6) (D) (−4, 3) (E) (2, 3)

**23** If the radius of a sphere is tripled, its volume is multiplied by:

**Radius r becomes radius 3r**




(A) 3 (B) 9 (C) 6 (D) 81 (E) 27

**24** Three different prizes must be given to three of the 8 students of a class, one prize per student. In how many ways can this be done?

(A) 336 (B) 56 (C) 512 (D) 24 (E) 120

**25** A and B are independent events with P(A) = 0.3 and P(B) = 0.5. What is the probability that at least one of the two events occurs?

(A) 0.8 (B) 0.15 (C) 0.65 (D) 0.35 (E) 0.5

SECTION 3

## Reasoning on Texts and Data

Questions **26–40** · 15 questions · **30 min**

**26** The statement "It is not true that Anna is both tall and blonde" is equivalent to:

(A) Anna is neither tall nor blonde
(B) Anna is tall and not blonde
(C) If Anna is not tall, then she is blonde
(D) If Anna is tall, then she is not blonde
(E) Anna is not tall and she is blonde

**27** Which of the following is a counterexample to the statement "Every rectangle whose diagonals are equal is a square"?

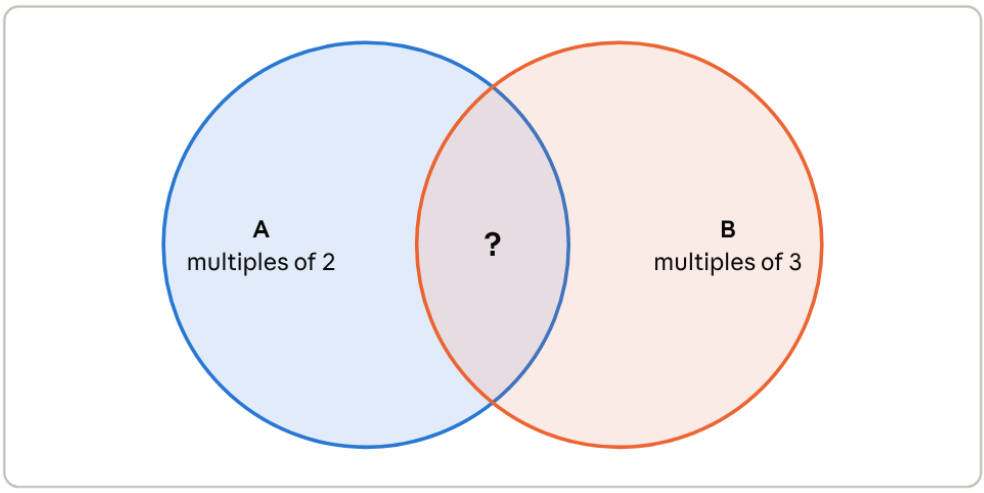
(A) A square with side 2
(B) A rectangle with sides 2 and 3
(C) A rhombus that is not a square
(D) A circle
(E) An isosceles trapezoid

**28** A shop announces: "Customers who spend more than €100 receive a free gift." Sara received a free gift. What can be concluded?

(A) Sara spent more than €100
(B) Sara spent exactly €100
(C) Sara spent less than €100
(D) Sara did not pay anything
(E) It cannot be concluded with certainty how much Sara spent

**29** Let A be the set of multiples of 2 and B the set of multiples of 3 among the natural numbers from 1 to 20. How many elements does A ∪ B have?

**Natural numbers from 1 to 20**




(A) 13 (B) 16 (C) 3 (D) 10 (E) 7

**30** A league gives 3 points for a win and 1 for a draw. Teams with the same points are ranked by the smaller number of defeats.

| Team | Wins | Draws | Defeats |
|---|---|---|---|
| Lions | 8 | 2 | 4 |
| Eagles | 7 | 5 | 2 |
| Wolves | 6 | 6 | 2 |
| Bears | 9 | 0 | 5 |

Which team is in second place?

(A) Lions (B) Bears
(C) Eagles (D) Wolves
(E) Lions and Eagles, equally

**31** In an election, 60% of the registered voters voted. Candidate X received 45% of the votes cast. What percentage of the registered voters voted for X?

(A) 45% (B) 27% (C) 15% (D) 33% (E) 105%

**32** On a map with scale 1 : 25 000, two villages are 8 cm apart. What is the real distance between them?

(A) 20 km (B) 0.2 km (C) 8 km (D) 2 km (E) 25 km

**33** Three boxes are labelled 1, 2 and 3, and only one contains gold. Label 1 says: "The gold is in this box." Label 2 says: "The gold is not in this box." Label 3 says: "The gold is not in box 1." Exactly one label is true. Where is the gold?

(A) In box 1 (B) In box 3 (C) In box 1 or in box 3
(D) It cannot be determined (E) In box 2

**34** An electricity bill consists of a fixed monthly fee of €8 plus €0.25 per kWh. A family used 200 kWh in January, 180 kWh in February and 160 kWh in March. What is the total cost for the three months?

(A) €159 (B) €135 (C) €143 (D) €167 (E) €24

**35** A researcher wants to know whether the average height of the students in a school has changed over the last 10 years. Which procedure is the most suitable?

(A) Measuring the tallest student each year
(B) Asking students whether they feel taller than their parents
(C) Comparing the mean height of students of the same ages, measured today and 10 years ago
(D) Measuring the height of the teachers
(E) Counting the number of students in the school

**36** 2 litres of a fruit drink containing 20% sugar are mixed with 3 litres of a drink containing 10% sugar. What is the percentage of sugar in the mixture?

(A) 15% (B) 14% (C) 30% (D) 12% (E) 16%

**37** Paolo is older than Rita. Rita is older than Sara. Tom is younger than Sara. Ugo is older than Paolo. Who is the youngest?

(A) Paolo (B) Rita (C) Sara (D) Ugo (E) Tom

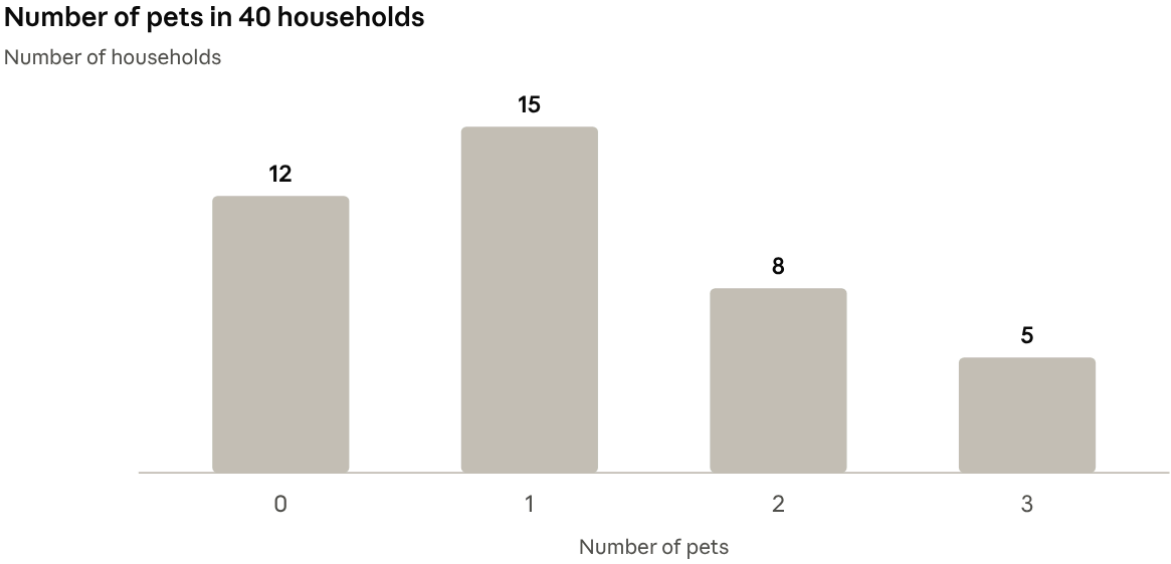
**38** To obtain a driving licence, it is necessary to pass both the theory test and the practical test. Mario has passed the theory test but failed the practical test. Which statement is certainly true?

(A) For now, Mario cannot obtain the driving licence
(B) Mario will obtain the licence
(C) Passing the theory test is sufficient to obtain the licence
(D) Mario must repeat the theory test
(E) Mario is allowed to drive alone

**39** A runner completes each 400 m lap in 80 seconds. Keeping the same pace, how long does it take her to run 10 km?

(A) 20 min (B) 40 min (C) 25 min (D) 33 min 20 s (E) 3 h 20 min

**40** A survey recorded the number of pets in 40 households.




What is the mean number of pets per household?

(A) 1.5 (B) 1 (C) 1.15 (D) 11.5 (E) 0.87

SECTION 4

## Biology

Questions **41–50** · 10 questions · **20 min**

**41** Which of the following carbohydrates is a monosaccharide?

(A) Fructose (B) Sucrose (C) Lactose (D) Starch (E) Cellulose

**42** A peptide bond forms between:

(A) two phosphate groups
(B) two monosaccharides
(C) two complementary nitrogenous bases
(D) the carboxyl group of one amino acid and the amino group of another, with the release of a water molecule
(E) a fatty acid and glycerol

**43** According to the fluid mosaic model, the plasma membrane is mainly made of:

(A) cellulose and pectin
(B) a phospholipid bilayer with proteins embedded in it
(C) a single layer of proteins
(D) DNA and RNA
(E) chitin

**44** What is the main function of the Golgi apparatus?

(A) Replication of DNA
(B) Production of ATP
(C) Photosynthesis
(D) Cell division
(E) Modifying, sorting and packaging proteins

**45** How do bacteria usually reproduce?

(A) Mitosis (B) Meiosis (C) Binary fission
(D) Budding of the nucleus (E) Crossing-over

**46** Two individuals with genotype AaBb are crossed. The two genes assort independently. What fraction of the offspring is expected to have genotype aabb?

(A) 1/16 (B) 9/16 (C) 3/16 (D) 1/4 (E) 1/8

**47** The genetic code is said to be "degenerate" (redundant). This means that:

(A) one codon can code for several different amino acids
(B) several different codons can code for the same amino acid
(C) the code is different in every organism
(D) codons overlap with each other
(E) there are only 20 codons

**48** What is the main function of root hairs?

(A) Photosynthesis
(B) Gas exchange with the atmosphere
(C) Transport of sugars
(D) Seed production
(E) Increasing the surface area for the absorption of water and mineral salts

**49** A tapeworm lives in the intestine of its host and absorbs part of the host's digested food, harming it. This relationship is an example of:

(A) mutualism (B) commensalism (C) parasitism
(D) competition (E) predation

**50** Which statement correctly describes transmission at a chemical synapse?

(A) The impulse passes directly from the dendrite of one neuron to the dendrite of another
(B) Neurotransmitters are released by the postsynaptic neuron
(C) The synapse transmits signals equally in both directions
(D) Neurotransmitters released from the presynaptic terminal bind to receptors on the postsynaptic membrane
(E) The synaptic cleft is filled with myelin

SECTION 5

# Chemistry

Questions **51–60** · 10 questions · **20 min**

**51** At the same temperature and pressure, 22.4 L of $H_2$ and 22.4 L of $CO_2$ contain:

(A) the same mass
(B) the same number of molecules
(C) the same density
(D) the same number of atoms
(E) a different number of molecules

**52** Nitrogen and hydrogen react according to $N_2(g) + 3\ H_2(g) \rightarrow 2\ NH_3(g)$. Measuring all volumes at the same temperature and pressure, what volume of $NH_3$ is obtained from 3 L of $H_2$ with excess $N_2$?

(A) 3 L (B) 6 L (C) 1 L (D) 4 L (E) 2 L

**53** Metals are good conductors of electricity because:

(A) their valence electrons are delocalised and free to move
(B) they contain free protons
(C) their ions move as in a solution
(D) their atoms are joined by covalent bonds
(E) they form hydrogen bonds

**54** What is the relative molecular mass of calcium hydroxide, $Ca(OH)_2$? (Ar: Ca = 40, O = 16, H = 1)

(A) 57 (B) 58 (C) 74 (D) 112 (E) 72

**55** What is the percentage by mass of nitrogen in ammonium nitrate, $NH_4NO_3$? (Ar: N = 14, H = 1, O = 16)

(A) 17.5% (B) 28% (C) 50% (D) 35% (E) 60%

**56** Which of the following aqueous solutions is a good conductor of electricity?

(A) Glucose in water
(B) Pure (distilled) water
(C) Ethanol in water
(D) Sucrose in water
(E) Potassium chloride in water

**57** Which of the following pairs, dissolved in water, forms a buffer solution?

(A) HCl and NaCl (B) $CH_3COOH$ and $CH_3COONa$ (C) NaOH and NaCl
(D) $HNO_3$ and $KNO_3$ (E) $H_2O$ and NaCl

**58** In acidic solution, the permanganate ion is reduced according to the half-reaction $MnO_4^- \rightarrow Mn^{2+}$. How many electrons does each manganese atom gain?

(A) 2 (B) 3 (C) 7 (D) 5 (E) 1

**59** What is the correct procedure for diluting concentrated sulphuric acid?

(A) Pour water quickly into the acid
(B) Mix acid and water at once in a closed container
(C) Pour the acid slowly into the water while stirring
(D) Heat the acid before adding water
(E) Add solid NaOH to the acid first

**60** What is the IUPAC name of the compound $CH_2=CH–CH_2–CH_3$?

(A) But-1-ene (B) But-2-ene (C) Butane
(D) Propene (E) 2-methylpropene

SECTION 6

## Physics

Questions **61–65** · 5 questions · **10 min**

**61** A car travels at 72 km/h. What is its speed in m/s?

(A) 72 m/s (B) 7.2 m/s (C) 259 m/s (D) 2 m/s (E) 20 m/s

**62** A car moves at a constant speed of 10 m/s around a circular curve of radius 50 m. What is the magnitude of its centripetal acceleration?

(A) 0.2 m/s² (B) 5 m/s² (C) 2 m/s² (D) 500 m/s² (E) 20 m/s²

**63** If the speed of a body is doubled, its kinetic energy:

(A) becomes 4 times larger (B) becomes 2 times larger (C) does not change
(D) becomes 8 times larger (E) is halved

**64** An ideal gas at 27 °C is heated at constant pressure until its volume doubles. What is its final temperature?

(A) 54 °C (B) 600 °C (C) 300 °C (D) 327 °C (E) 13.5 °C

**65** When a potential difference of 10 V is applied to a resistor, a current of 2 A flows through it. What current flows if the potential difference is increased to 20 V? (The resistance does not change.)

(A) 2 A (B) 4 A (C) 1 A (D) 8 A (E) 0.5 A

END OF THE TEST · SINAVIN SONU

DENEME SINAVI 5

# Cevap Anahtarı

Cevaplarınızı karşılaştırın, ardından aşağıdaki tabloyla bölüm bölüm puanınızı hesaplayın.

**Okuma ve Anlama** — Soru 1–10

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| E | C | A | D | B | D | C | E | A | B |

**Matematik** — Soru 11–25

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | D | B | E | A | C | E | D | B | A | D | B | E | A | C |

**Metin ve Veri Üzerinde Akıl Yürütme** — Soru 26–40

| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | B | E | A | C | B | D | E | A | C | B | E | A | D | C |

**Biyoloji** — Soru 41–50

| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|
| A | D | B | E | C | A | B | E | C | D |

**Kimya** — Soru 51–60

| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| B | E | A | C | D | E | B | D | C | A |

**Fizik** — Soru 61–65

| 61 | 62 | 63 | 64 | 65 |
|---|---|---|---|---|
| E | C | A | D | B |

| Bölüm | Soru | Doğru | Yanlış | Boş | Puan |
|---|---|---|---|---|---|
| Okuma ve Anlama | 10 | | | | |
| Matematik | 15 | | | | |
| Metin ve Veri Üzerinde Akıl Yürütme | 15 | | | | |
| Biyoloji | 10 | | | | |
| Kimya | 10 | | | | |
| Fizik | 5 | | | | |
| **Toplam** | **65** | | | | |

Puan = Doğru × 1 − Yanlış × 0,25. Boş bırakılan sorular puanı etkilemez. En yüksek puan 65'tir.

DENEME SINAVI 5

# Çözümler

## Okuma ve Anlama · Soru 1–10

**1** **Doğru cevap: E** (To show how the placebo effect has become a subject of study in itself, and what it reveals)

**Çözüm:** Metin plasebonun bir "rahatsızlık" olarak görülmesinden başlı başına bir araştırma konusu olmasına geçişi ve bunun söylediği şeyleri anlatır.

**Tuzak:** A, metnin açıkça reddettiği bir iddiadır.

**2** **Doğru cevap: C** (As a comparison to measure the real effect of a new drug)

**Çözüm:** Bir tedavi ancak benzer bir gruba verilen plasebodan daha iyi sonuç verirse etkili sayılıyordu: plasebo bir karşılaştırma ölçütüydü.

**3** **Doğru cevap: A** (infections and broken bones)

**Çözüm:** "Enfeksiyonlar veya kırık kemikler gibi durumlarda neredeyse hiç" etki etmez.

**Tuzak:** B, C, D ve E plasebonun en iyi işe yaradığı alanlardır.

**4** **Doğru cevap: D** (whether it is honest to raise expectations that a treatment cannot justify)

**Çözüm:** Doktorun güvenli tavrı gerçekten ağrıyı azaltıyorsa, tedavinin haklı çıkarmadığı beklentiler yaratmak dürüst müdür? Soru etik bir sorundur.

**5** **Doğru cevap: B** (the fog created a hushed, almost secretive atmosphere)

**Çözüm:** Sis kişileştirilir; insanların daha alçak sesle konuşması sessiz, sır gibi bir atmosfer yaratır.

**Tuzak:** C, "yavaş gri bir hayvan" benzetmesini gerçek anlamında okumaktır.

**6** **Doğru cevap: D** (Because it hid the horizon and the ships that reminded her of places she had never been)

**Çözüm:** Sisin içinde ona hiç gitmediği yerleri hatırlatacak bir ufuk ya da gemi yoktu.

**Tuzak:** C; komşular sisten şikayet ediyordu.

**7** **Doğru cevap: C** (Seeing the sea and the ship has awakened in Ada a desire to leave)

**Çözüm:** Ufuk ve güneye giden gemi geri gelince Ada, "neden olduğunu tam bilmeden" eski valizini arar: bastırılmış seyahat isteği uyanır.

**8** **Doğru cevap: E** (They do not necessarily want less food, but they want to be able to choose)

**Çözüm:** Tabakta kalan yemek neredeyse üçte bir azaldı ve satışlar sabit kaldı: müşteriler daha az yemek değil, seçim hakkı istiyor.

**Tuzak:** A; metin müşterilerin daha az ödemek istediğini söylemez, bunu şeflerin korkusu olarak aktarır.

**9** **Doğru cevap: A** (Because reducing a dish can change the balance between its parts)

**Çözüm:** Üçüncü paragraf: bir yemek bütün olarak tasarlanır; küçültmek parçaları arasındaki dengeyi değiştirir.

**Tuzak:** B; hazırlık süresi "aynı" kalır, daha uzun değil. D; tabakta kalan yemek üçte bir azaldı, satışlar değil.

**10** **Doğru cevap: B** (Most food is wasted elsewhere, so this measure is not enough on its own)

**Çözüm:** Değişikliği olumlu karşılarlar ama tek başına çözüm değildir: israfın çoğu evlerde ve tedarik zincirinde olur.

**Tuzak:** E, metnin söylediğinin tersidir.

## Matematik · Soru 11–25

**11** **Doğru cevap: C** (1)

**Çözüm:** Kalanlar döngüsü: $2^1 \to 2$, $2^2 \to 1$, $2^3 \to 2$, $2^4 \to 1$, … Çift üsler için kalan 1. Ya da $2 \equiv -1 \pmod 3 \to (-1)^{100} = 1$.

**Tuzak:** D; kalan bölenden küçük olmalıdır.

**12** **Doğru cevap: D** (1% lower)

**Çözüm:** $1{,}10 \cdot 0{,}90 = 0{,}99 \to$ %1 daha düşük.

**Tuzak:** +%10 ve −%10'un birbirini götürdüğünü sanmak (A); ikinci yüzde daha büyük bir taban üzerinden hesaplanır.

**13** **Doğru cevap: B** (12)

**Çözüm:** $72 = 2^3 \cdot 3^2$. Bölen sayısı $(3 + 1)(2 + 1) = 12$: 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72.

**14** **Doğru cevap: E** (7)

**Çözüm:** $(x + 1/x)^2 = x^2 + 2 + 1/x^2 = 9 \rightarrow x^2 + 1/x^2 = 7$.

**Tuzak:** karesini alırken $2 \cdot x \cdot (1/x) = 2$ terimini unutup 9 (A) demek.

**15** **Doğru cevap: A** ($0 \le x \le 4$)

**Çözüm:** $x(4 - x) \ge 0$. Parabol aşağı açıktır; kökler 0 ve 4 arasında (uçlar dahil) negatif değildir.

**Tuzak:** $a < 0$ olduğunu fark etmeyip B'yi seçmek; eşitliği unutmak D'ye götürür.

**16** **Doğru cevap: C** (13)

**Çözüm:** $x^2 + y^2 = (x + y)^2 - 2xy = 25 - 12 = 13$. Kontrol: $\{x, y\} = \{2, 3\} \rightarrow 4 + 9 = 13$.

**Tuzak:** $(x + y)^2 = x^2 + y^2$ sanmak (A).

**17** **Doğru cevap: E** (vertical asymptote $x = 2$ and horizontal asymptote $y = 3$)

**Çözüm:** $y = 1/x$'in grafiği 2 birim sağa, 3 birim yukarı kayar: dikey asimptot $x = 2$, yatay asimptot $y = 3$.

**Tuzak:** C; +3 kayması yatay asimptotu da kaydırır.

**18** **Doğru cevap: D** (4)

**Çözüm:** Tepe noktası $x = 4/2 = 2$; $y(2) = 4 - 8 + c = c - 4 = 0 \rightarrow c = 4$. Ya da $\Delta = 16 - 4c = 0$ (çakışık kök).

**Tuzak:** A, tepe noktasının apsisidir.

**19** **Doğru cevap: B** (7/2)

**Çözüm:** $8\sqrt{2} = 2^3 \cdot 2^{(1/2)} = 2^{(7/2)}$. $\log_2 2^{(7/2)} = 7/2$.

**Tuzak:** $\sqrt{2}$'nin logaritmasını 1 almak (A).

**20** **Doğru cevap: A** (1/8)

**Çözüm:** 15 yıl = 3 yarılanma süresi: $(1/2)^3 = 1/8$.

**Tuzak:** üstel azalmayı doğrusal sanmak (C: $1/(2 \cdot 3)$).

**21** **Doğru cevap: D** (60 cm²)

**Çözüm:** Yükseklik tabanı ikiye böler: $h = \sqrt{(13^2 - 5^2)} = 12$. Alan $= 10 \cdot 12 / 2 = 60$ cm².

**Tuzak:** 2'ye bölmeyi unutmak (C).

**22** **Doğru cevap: B** ((2, 2))

**Çözüm:** $((-2 + 6)/2, (5 + (-1))/2) = (2, 2)$.

**Tuzak:** C, B − A fark vektörüdür; A, toplamı 2'ye bölmemektir.

**23** **Doğru cevap: E** (27)

**Çözüm:** $V = (4/3)\pi r^3 \rightarrow (3r)^3 = 27r^3$.

**Tuzak:** B, yüzey alanının katıdır ($r^2$).

**24** **Doğru cevap: A** (336)

**Çözüm:** Ödüller farklı olduğu için sıra önemlidir: $8 \cdot 7 \cdot 6 = 336$.

**Tuzak:** B, ödüller aynı olsaydı (C(8,3)) doğru olurdu; C, bir öğrencinin birden fazla ödül almasına izin verir.

**25** **Doğru cevap: C** (0.65)

**Çözüm:** $P(A \cap B) = 0{,}3 \cdot 0{,}5 = 0{,}15$. $P(A \cup B) = 0{,}3 + 0{,}5 - 0{,}15 = 0{,}65$.

**Tuzak:** olaylar ayrık olmadığı halde olasılıkları toplamak (A); B kesişimdir.

## Metin ve Veri Üzerinde Akıl Yürütme · Soru 26–40

**26** **Doğru cevap: D** (If Anna is tall, then she is not blonde)

**Çözüm:** $\neg(U \wedge S) \equiv \neg U \vee \neg S \equiv U \rightarrow \neg S$. Uzunsa sarışın değildir.

**Tuzak:** A çok güçlüdür ($\neg U \wedge \neg S$); B ve E yalnızca birer olası durumdur.

**27** **Doğru cevap: B** (A rectangle with sides 2 and 3)

**Çözüm:** Tüm dikdörtgenlerin köşegenleri eşittir; 2×3 dikdörtgen koşulu sağlar ama kare değildir.

**Tuzak:** E; ikizkenar yamuğun köşegenleri eşittir ama dikdörtgen değildir, yani koşulu sağlamaz.

**28** **Doğru cevap: E** (It cannot be concluded with certainty how much Sara spent)

**Çözüm:** Kural "100 €'dan fazla → hediye" der; tersini ("hediye → 100 €'dan fazla") söylemez. Hediye başka bir nedenle de verilmiş olabilir.

**Tuzak:** sonucu doğrulayıp koşulun doğru olduğunu sanmak (A).

**29** **Doğru cevap: A** (13)

**Çözüm:** $|A| = 10$, $|B| = 6$, $|A \cap B| = 6$'nın katları = 3 (6, 12, 18). $|A \cup B| = 10 + 6 - 3 = 13$.

**Tuzak:** kesişimi çıkarmayı unutmak (B).

**30** **Doğru cevap: C** (Eagles)

**Çözüm:** Puanlar: Lions 26, Eagles 26, Wolves 24, Bears 27. Birinci Bears. Lions ile Eagles eşit; Eagles'ın yenilgisi daha az ($2 < 4$) → ikinci Eagles.

**Tuzak:** en çok galibiyeti olanı ikinci saymak ya da eşitlik kuralını unutmak (E).

**31** **Doğru cevap: B** (27%)

**Çözüm:** $0{,}60 \cdot 0{,}45 = 0{,}27 = \%27$.

**Tuzak:** yüzdeler farklı tabanlara göre verilmiştir; doğrudan %45 demek (A) ya da fark almak (C) yanlıştır.

**32** **Doğru cevap: D** (2 km)

**Çözüm:** $8 \cdot 25\,000 = 200\,000$ cm = 2000 m = 2 km.

**Tuzak:** cm'den km'ye çevirirken bir basamak kaydırmak (A veya B).

**33** **Doğru cevap: E** (In box 2)

**Çözüm:** Altın 1'de: etiket 1 ve 2 doğru → 2 doğru ×. Altın 2'de: 1 yanlış, 2 yanlış, 3 doğru → 1 doğru ✔. Altın 3'te: 2 ve 3 doğru → 2 doğru ×. Altın 2. kutudadır.

**34** **Doğru cevap: A** (€159)

**Çözüm:** Tüketim 540 kWh · 0,25 = 135 €; sabit ücret 3 · 8 = 24 €. Toplam 159 €.

**Tuzak:** sabit ücreti bir kez saymak (C) ya da hiç saymamak (B).

**35** **Doğru cevap: C** (Comparing the mean height of students of the same ages, measured today and 10 years ago)

**Çözüm:** Karşılaştırma aynı ölçüt (ortalama) ve aynı yaş grupları için yapılmalıdır; yoksa yaş farkları sonucu bozar.

**Tuzak:** A tek bir uç değere bakar, ortalamayı temsil etmez.

**36** **Doğru cevap: B** (14%)

**Çözüm:** Şeker: $0{,}20 \cdot 2 + 0{,}10 \cdot 3 = 0{,}7$ L. 0,7/5 = %14.

**Tuzak:** hacimleri dikkate almadan yüzdelerin ortalamasını almak (A).

**37** **Doğru cevap: E** (Tom)

**Çözüm:** Sıralama (yaşlıdan gence): Ugo > Paolo > Rita > Sara > Tom. En genç Tom.

**38** **Doğru cevap: A** (For now, Mario cannot obtain the driving licence)

**Çözüm:** Ehliyet → (teori ∧ uygulama). Uygulama yok → ehliyet yok (karşıt ters).

**Tuzak:** D; teorik sınavı tekrarlaması gerektiği bilgide yoktur.

**39** **Doğru cevap: D** (33 min 20 s)

**Çözüm:** 10 000/400 = 25 tur. $25 \cdot 80$ s = 2000 s = 33 dk 20 sn.

**Tuzak:** C, tur sayısını dakika sanmaktır.

**40** **Doğru cevap: C** (1.15)

**Çözüm:** Toplam hayvan: $0 \cdot 12 + 1 \cdot 15 + 2 \cdot 8 + 3 \cdot 5 = 46$. 46/40 = 1,15.

**Tuzak:** sütun başlıklarının ortalamasını (0, 1, 2, 3 → 1,5; A) almak; B ise mod/medyandır.

## Biyoloji · Soru 41–50

**41** **Doğru cevap: A** (Fructose)

**Çözüm:** Fruktoz tek şeker birimidir. Sakaroz (glikoz + fruktoz) ve laktoz (glikoz + galaktoz) disakkarit; nişasta ve selüloz polisakkarittir.

**42** **Doğru cevap: D** (the carboxyl group of one amino acid and the amino group of another, with the release of a water molecule)

**Çözüm:** Peptit bağı bir dehidrasyon (kondenzasyon) tepkimesidir: –COOH ile $–NH_2$ arasında oluşur ve $H_2O$ açığa çıkar.

**Tuzak:** B glikozidik, E ester bağıdır; C hidrojen bağıdır.

**43** **Doğru cevap: B** (a phospholipid bilayer with proteins embedded in it)

**Çözüm:** Zar, içinde proteinlerin hareket edebildiği bir fosfolipit çift katmanıdır; hayvan hücrelerinde kolesterol de içerir.

**Tuzak:** A bitki hücre duvarı, E mantar hücre duvarı bileşenidir.

**44** **Doğru cevap: E** (Modifying, sorting and packaging proteins)

**Çözüm:** Golgi, ER'den gelen proteinleri değiştirir (örn. glikozilasyon), sınıflandırır ve veziküllerle hedeflerine gönderir; lizozomları da oluşturur.

**45** **Doğru cevap: C** (Binary fission)

**Çözüm:** Bakteriler halkasal DNA'larını kopyalar ve hücre ikiye bölünür (ikiye bölünme).

**Tuzak:** A; mitoz çekirdek ve iğ iplikleri gerektirir, ökaryotlara özgüdür.

**46** **Doğru cevap: A** (1/16)

**Çözüm:** P(aa) = 1/4, P(bb) = 1/4. Bağımsız dağılım: 1/4 · 1/4 = 1/16.

**Tuzak:** B, iki baskın fenotipi (A_B_) gösteren oranıdır.

**47** **Doğru cevap: B** (several different codons can code for the same amino acid)

**Çözüm:** 64 kodon ve 20 amino asit vardır; çoğu amino asit birden fazla kodonla belirlenir (örn. lösin 6 kodon).

**Tuzak:** A, belirsizlik olurdu; genetik kod belirsiz değildir. C yanlış; kod neredeyse evrenseldir.

**48** **Doğru cevap: E** (Increasing the surface area for the absorption of water and mineral salts)

**Çözüm:** Kök tüyleri epidermis hücrelerinin uzantılarıdır ve emilim yüzeyini büyük ölçüde artırır.

**49** **Doğru cevap: C** (parasitism)

**Çözüm:** Bir tür yararlanır, diğeri zarar görür (+/–) ve konak genellikle hemen ölmez: parazitlik.

**Tuzak:** E; avcılıkta av öldürülüp tüketilir.

**50** **Doğru cevap: D** (Neurotransmitters released from the presynaptic terminal bind to receptors on the postsynaptic membrane)

**Çözüm:** Uyarı akson ucuna ulaşınca veziküller nörotransmitteri sinaptik boşluğa bırakır; madde difüzyonla geçip postsinaptik zardaki reseptörlere bağlanır. Bu yüzden iletim tek yönlüdür (C yanlış).

## Kimya · Soru 51–60

**51** **Doğru cevap: B** (the same number of molecules)

**Çözüm:** Avogadro yasası: aynı T ve P'de eşit hacimdeki gazlar eşit sayıda molekül içerir.

**Tuzak:** D; $H_2$ molekülü 2, $CO_2$ molekülü 3 atomludur, atom sayıları farklıdır. Kütle ve yoğunluk da farklıdır.

**52** **Doğru cevap: E** (2 L)

**Çözüm:** Gay-Lussac: gaz hacimleri katsayılarla orantılıdır. 3 hacim $H_2$ → 2 hacim $NH_3$ → 2 L.

**Tuzak:** hacmin korunduğunu sanmak (A); gazlarda hacim korunmaz, kütle korunur.

**53** **Doğru cevap: A** (their valence electrons are delocalised and free to move)

**Çözüm:** Metalik bağda pozitif iyonlar, serbestçe hareket eden değerlik elektronları "denizi" içindedir; bu elektronlar akımı taşır.

**Tuzak:** C, iyonik çözeltilerin iletkenliğidir.

**54** **Doğru cevap: C** (74)

**Çözüm:** 40 + 2 · (16 + 1) = 40 + 34 = 74.

**Tuzak:** parantezi yok sayıp 40 + 16 + 2 = 58 (B) ya da 40 + 17 = 57 (A) bulmak.

**55** **Doğru cevap: D** (35%)

**Çözüm:** Mr = 14 + 4 + 14 + 48 = 80. Azot iki atomdur: 28/80 = %35.

> **Tuzak:** yalnızca bir N saymak (A, %17,5).

**56** **Doğru cevap: E** (Potassium chloride in water)

**Çözüm:** KCl kuvvetli elektrolittir; suda $K^+$ ve $Cl^-$ iyonlarına ayrışır. Glikoz, etanol ve sakaroz elektrolit değildir; saf su çok az iyon içerir.

**57** **Doğru cevap: B** ($CH_3COOH$ and $CH_3COONa$)

**Çözüm:** Tampon = zayıf asit + konjuge bazı (ya da zayıf baz + konjuge asidi). Asetik asit zayıftır, asetat konjuge bazıdır.

> **Tuzak:** A ve D'deki asitler kuvvetlidir; konjuge bazları ($Cl^-$, $NO_3^-$) asit ekleyince tampon görevi görmez.

**58** **Doğru cevap: D** (5)

**Çözüm:** $MnO_4^-$'de Mn: x + 4(−2) = −1 → x = +7. +7 → +2: 5 elektron alır. $MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$.

> **Tuzak:** yükseltgenme basamağını (+7, C) elektron sayısı sanmak.

**59** **Doğru cevap: C** (Pour the acid slowly into the water while stirring)

**Çözüm:** Seyreltme çok ekzotermiktir. Asit suya yavaşça eklenirse ısı büyük su kütlesine dağılır; suyu asite eklemek ani kaynamaya ve sıçramaya yol açar. Kural: "asit suya, su asite asla".

**60** **Doğru cevap: A** (But-1-ene)

**Çözüm:** Dört karbonlu zincir (but-), bir çift bağ (-en) ve çift bağ C1–C2 arasında: but-1-en (1-büten).

> **Tuzak:** B'de çift bağ C2–C3 arasındadır; C'de çift bağ yoktur.

## Fizik · Soru 61–65

**61** **Doğru cevap: E** (20 m/s)

**Çözüm:** 1 km/h = 1000 m / 3600 s = 1/3,6 m/s. 72/3,6 = 20 m/s.

> **Tuzak:** 3,6 ile bölmek yerine çarpmak (C).

**62** **Doğru cevap: C** ($2\ m/s^2$)

**Çözüm:** $a = v^2/r = 100/50 = 2\ m/s^2$. Hızın büyüklüğü sabit olsa da yönü değiştiği için ivme vardır.

> **Tuzak:** v/r (A) veya v·r (D) yazmak.

**63** **Doğru cevap: A** (becomes 4 times larger)

**Çözüm:** $K = \frac{1}{2}mv^2$; v → 2v ise K → 4K.

> **Tuzak:** kinetik enerjiyi hızla doğrusal sanmak (B).

**64** **Doğru cevap: D** (327 °C)

**Çözüm:** Sabit basınçta V/T sabittir; T kelvin olmalıdır. 27 °C = 300 K → 600 K = 327 °C.

> **Tuzak:** Celsius değerini ikiye katlayıp 54 °C (A) bulmak; B ise kelvin değerini Celsius sanmaktır.

**65** **Doğru cevap: B** (4 A)

**Çözüm:** R = V/I = 10/2 = 5 Ω. I = 20/5 = 4 A. Ohm yasası: akım gerilimle doğru orantılıdır.

> **Tuzak:** akımı gerilimle ters orantılı sanmak (C).

CENT-S · DENEME SINAVI

# 06

65 soru · 140 dakika · 6 bölüm

| Bölüm | Sorular | Soru sayısı | Süre |
|---|---|---|---|
| Reading and Comprehension<br>Okuma ve Anlama | 1–10 | 10 | 30 dk |
| Mathematics<br>Matematik | 11–25 | 15 | 30 dk |
| Reasoning on Texts and Data<br>Metin ve Veri Üzerinde Akıl Yürütme | 26–40 | 15 | 30 dk |
| Biology<br>Biyoloji | 41–50 | 10 | 20 dk |
| Chemistry<br>Kimya | 51–60 | 10 | 20 dk |
| Physics<br>Fizik | 61–65 | 5 | 10 dk |
| **Toplam** | **1–65** | **65** | **140 dk** |

## Sınav kuralları

- Sınavı tek oturumda, gerçek süreyle çözün.
- Her bölümün süresi yalnızca o bölüm için geçerlidir; süresi biten bölüme geri dönülemez.
- Doğru cevap **+1**, yanlış cevap **−0,25**, boş **0** puandır.
- Sınavı bitirmeden cevap anahtarına bakmayın.

## Süre kaydı

Başlangıç

Bitiş

Puan

SECTION 1

# Reading and Comprehension

Questions **1–10** · 10 questions · **30 min**

**TEXT 1 (NON-FICTION)**

For most of history, people counted without zero. The Romans, whose numerals were used across Europe for more than a thousand years, had no symbol for it, and their system made arithmetic laborious: multiplying two large numbers in Roman numerals was a task for specialists, usually performed with the help of a counting board rather than on paper.

The decisive step was taken in India, where, by around the seventh century, mathematicians were using a place-value system in which the position of a digit determined its value and a special sign marked an empty position. This sign did more than fill a gap. Indian scholars began to treat it as a number in its own right, one that could be added, subtracted and multiplied, and they set out rules for doing so — even, with less success, for dividing by it.

The new numerals reached Europe through Arabic texts, and their adoption was slow. Merchants appreciated how easily accounts could be kept, but some city authorities distrusted the new figures precisely because they were so easy to alter: a 0 could be turned into a 6 or a 9 with a stroke of the pen. For a time, official documents in some places were still required to use Roman numerals or to write amounts out in words.

It is hard now to imagine mathematics without zero. Yet its history is a reminder that even the most basic tools of thought were once inventions, accepted only after long resistance.

**1** What is the main topic of the text?

(A) The life of Roman merchants
(B) The rules for dividing by zero
(C) The origin of zero and its slow acceptance in Europe
(D) The advantages of Roman numerals
(E) The history of the counting board

**2** According to the text, why was arithmetic laborious for the Romans?

(A) Because they did not use paper
(B) Because their numerals had no zero, so calculations required specialists and counting boards
(C) Because they used Arabic numerals incorrectly
(D) Because they could not count beyond a thousand
(E) Because merchants refused to keep accounts

**3** Why did some city authorities distrust the new numerals?

(A) Because they came from Arabic texts
(B) Because merchants did not understand them
(C) Because they made calculations slower
(D) Because they could easily be altered to falsify amounts
(E) Because they did not include the number zero

**4** In the second paragraph, the sentence "This sign did more than fill a gap" refers to the fact that Indian scholars:

(A) used the sign only to mark empty positions
(B) replaced all other digits with the sign
(C) forbade the use of the sign in official documents
(D) invented the counting board
(E) treated zero as a number with its own rules of calculation

### TEXT 2 (LITERARY)

Every afternoon at four the old man came to the same bench in the square, unfolded a paper bag and began to feed the pigeons. He did it methodically, a few crumbs at a time, as though following instructions only he could read. The birds knew him. They arrived before he sat down and left, all together, the moment the bag was empty.

The boy had been watching for a week before he dared to sit at the other end of the bench. The old man did not look at him. After a while, without a word, he tore the bag in two and held out one half.

The boy took it. He threw the crumbs too quickly, in one clumsy handful, and the pigeons fought over them and scattered. The old man said nothing, but when the boy's half was empty he poured a few crumbs from his own into the boy's palm and showed him, with a small movement of his wrist, how to let them fall one by one.

They never learned each other's names. In the spring the old man stopped coming, and for some days the pigeons waited by the empty bench. Then the boy bought a bag of his own.

**5** The phrase "as though following instructions only he could read" suggests that the old man:

(A) fed the pigeons in a careful, almost ritual way
(B) was reading a book while feeding the birds
(C) could not see very well
(D) had been told by someone how to feed pigeons
(E) fed the birds in a hurry

**6** How does the old man react to the boy's clumsy way of throwing the crumbs?

(A) He scolds him
(B) He takes back the bag
(C) He silently shows him a better way
(D) He laughs at him
(E) He leaves the bench

**7** What does the ending of the text suggest?

(A) The boy is afraid of the pigeons
(B) The old man has moved to another square
(C) The pigeons have found a new place to eat
(D) The boy is looking for the old man
(E) The boy is taking over the old man's habit

### TEXT 3 (JOURNALISTIC)

In car parks, school yards and the edges of motorways, a new kind of urban forest is appearing. Volunteers plant dozens of native tree species very close together — sometimes three or four saplings per square metre — on plots no bigger than a tennis court. Supporters claim that these "mini-forests" grow up to ten times faster than conventional plantations and become self-sustaining within three years.

The method has become popular because it promises visible results on small, cheap pieces of land, and because it gives residents something to do. A planting day can bring together hundreds of people who have never met their neighbours.

Scientists are cautiously interested but sceptical of the boldest claims. Trees planted so densely compete fiercely for light, and many die within the first years; the survivors do grow quickly, but a forest is more than its trees. Some ecologists point out that the long-term biodiversity of such plots has hardly been studied, and that the figure of "ten times faster" comes mainly from organisations that promote the method.

Few critics, however, oppose the projects themselves. Their concern is that city councils may treat a handful of small, photogenic plots as a substitute for protecting large existing green spaces, which store far more carbon and shelter far more wildlife.

**8** According to the text, why has the method become popular?

(A) Because it has been proved to grow forests ten times faster
(B) Because it gives visible results on small, cheap plots and involves residents
(C) Because it requires only one tree species
(D) Because it replaces large green spaces
(E) Because scientists recommend it

**9** What is the scientists' attitude towards the mini-forests?

(A) Completely hostile
(B) Enthusiastic about all the claims
(C) Indifferent
(D) Interested, but doubtful about the boldest claims
(E) They have not expressed any opinion

**10** What is the critics' main concern?

(A) That councils may use small plots as a substitute for protecting large existing green spaces
(B) That volunteers do not know their neighbours
(C) That the trees grow too slowly
(D) That native species are not used
(E) That the plots are too large

SECTION 2

## Mathematics

Questions **11–25** · 15 questions · **30 min**

**11** Which is the largest natural number smaller than √200?

(A) 12 (B) 13 (C) 15 (D) 100 (E) 14

**12** The price of a bicycle falls from €250 to €200. By what percentage must the new price increase to return to €250?

(A) 20% (B) 25% (C) 50% (D) 30% (E) 15%

**13** Let $a = 3^4 \cdot 5 \cdot 7$ and $b = 3^4 \cdot 7 \cdot 11$. Which is the factorisation of $a + b$?

(A) $3^8 \cdot 7$ (B) $3^4 \cdot 5 \cdot 7 \cdot 11$ (C) $2^4 \cdot 3^8 \cdot 7$
(D) $2^4 \cdot 3^4 \cdot 7$ (E) $3^4 \cdot 7 \cdot 55$

**14** What is the domain of the real function $f(x) = \sqrt{(x - 1)} \cdot \ln(5 - x)$?

(A) $[1, 5)$ (B) $(1, 5)$ (C) $[1, +\infty)$ (D) $(-\infty, 5)$ (E) $(1, 5]$

**15** Let $a$ and $b$ be real numbers such that $-2 < a < 3$ and $-1 < b < 4$. Then surely:

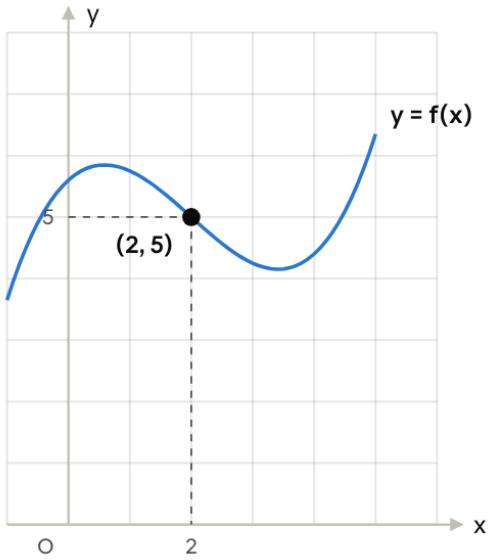
(A) $-3 < a - b < 7$ (B) $-1 < a - b < 7$ (C) $-6 < a - b < 4$
(D) $-2 < a - b < 4$ (E) $-5 < a - b < 7$

**16** Consider the polynomial $P(x) = x^3 - 4x^2 + kx$, where $k$ is a real parameter. $P$ has three distinct real roots if and only if:

(A) $k < 4$ (B) $k < 4$ and $k \neq 0$ (C) $k > 4$
(D) $k = 4$ (E) $k > 0$

**17** Let $f : \mathbb{R} \to \mathbb{R}$ and $g(x) = f(x + 3) - 1$. If the point $(2, 5)$ belongs to the graph of $f$, which point surely belongs to the graph of $g$?

**A portion of the graph of f**




(A) $(-1, 4)$ (B) $(5, 4)$ (C) $(-1, 6)$ (D) $(5, 6)$ (E) $(2, 4)$

**18** The solutions of the inequality $\log_3 (x - 2) < 2$ are:

(A) $x < 11$ (B) $x > 11$ (C) $2 < x < 8$ (D) $x > 2$ (E) $2 < x < 11$

**19** Which is the correct order of the numbers $\sqrt{2}$, $\sqrt[3]{3}$ and $\sqrt[5]{5}$?

(A) $\sqrt{2} < \sqrt[3]{3} < \sqrt[5]{5}$ (B) $\sqrt[3]{3} < \sqrt{2} < \sqrt[5]{5}$ (C) $\sqrt[5]{5} < \sqrt{2} < \sqrt[3]{3}$
(D) $\sqrt[5]{5} < \sqrt[3]{3} < \sqrt{2}$ (E) They are all equal

**20** For which value of the real parameter a are the straight lines $2x + ay = 3$ and $4x - 6y = 1$ parallel?

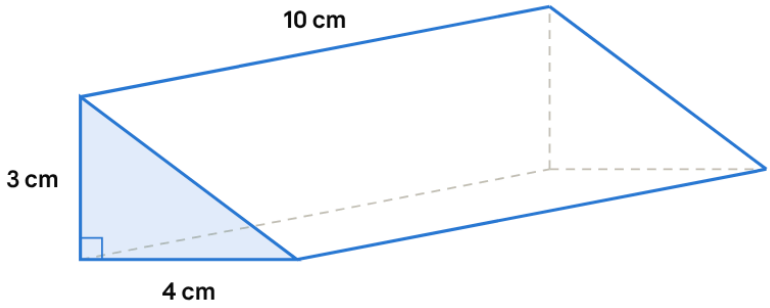
(A) $a = 3$ (B) $a = -2$ (C) $a = 2$ (D) $a = -3$ (E) $a = 12$

**21** Which of the following points lies inside the circle with equation $x^2 + y^2 - 4x = 0$?

(A) (1, 1) (B) (0, 2) (C) (4, 1) (D) (−1, 0) (E) (2, 2)

**22** A right prism has as its base a right-angled triangle with legs 3 cm and 4 cm, and its height is 10 cm. What is its volume?

**A right triangular prism**




(A) $120\ cm^3$ (B) $70\ cm^3$ (C) $30\ cm^3$ (D) $600\ cm^3$ (E) $60\ cm^3$

**23** A number is drawn at random from 1 to 20 (all equally likely). What is the probability that it is a multiple of 3 or a multiple of 5?

(A) 1/2 (B) 9/20 (C) 2/5 (D) 1/4 (E) 3/10

**24** At a meeting, each of 12 people shakes hands exactly once with every other person. How many handshakes take place?

(A) 132 (B) 144 (C) 24 (D) 66 (E) 12

**25** In class A, 10 students have a mean mark of 6. In class B, 15 students have a mean mark of 8. What is the mean mark of all 25 students?

(A) 7 (B) 7.5 (C) 7.2 (D) 6.8 (E) 14

SECTION 3

## Reasoning on Texts and Data

Questions **26–40** · 15 questions · **30 min**

**26** A sample of a population is tested for three traits A, B and C. All people with trait A also have traits B and C. Based on this information, we can infer that:

(A) a person without trait A has neither trait B nor trait C
(B) a person with trait B certainly has trait A
(C) a person without trait C certainly does not have trait A
(D) a person with both traits B and C certainly has trait A
(E) a person without trait A certainly does not have trait B

**27** The statement "Whenever it is Sunday and it is sunny, Laura goes cycling" is equivalent to:

(A) If Laura goes cycling, it is Sunday and it is sunny
(B) If it is not Sunday, Laura does not go cycling
(C) Laura goes cycling only on Sundays
(D) When it is Sunday and cloudy, Laura does not go cycling
(E) If it is sunny and Laura does not go cycling, then it is not Sunday

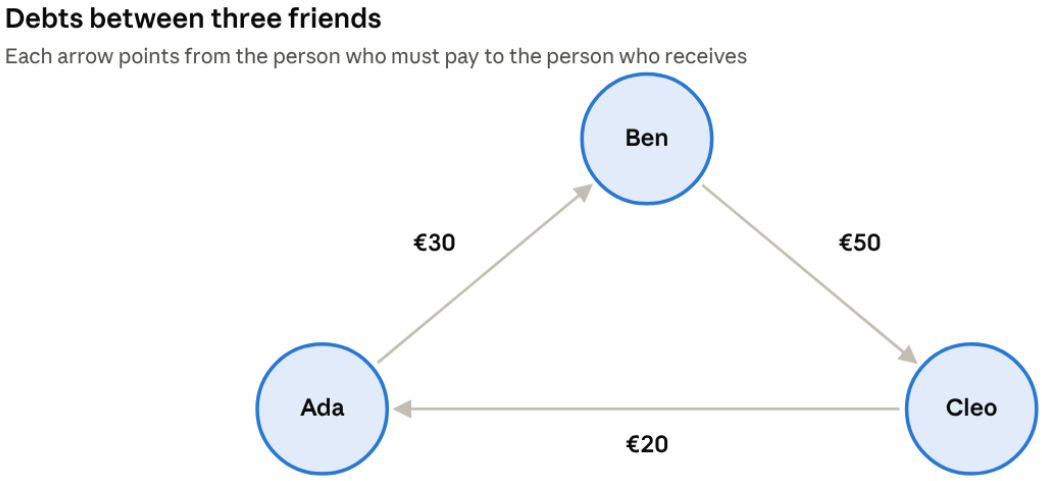
**28** In a board game, the rules state: "You can play the bonus round only if you have collected at least 10 points." Which of the following situations can NOT occur?

(A) A player with 8 points plays the bonus round
(B) A player with 12 points does not play the bonus round
(C) A player with 10 points plays the bonus round
(D) A player with 15 points plays the bonus round
(E) A player with 5 points does not play the bonus round

**29** Consider the three words 'planet', 'sun', 'orbit' and the following statements: (1) Each of them contains at least one "n" or one "t". (2) None of them has more than five letters. (3) At least one of them has exactly three letters and exactly one vowel. (4) Each of them has at least two vowels. Which statements are true?

(A) Only 1
(B) Only 3
(C) Only 1, 3 and 4
(D) Only 1 and 3
(E) Only 2 and 4

**30** Three friends have some debts between them: Ada owes Ben €30, Ben owes Cleo €50 and Cleo owes Ada €20. If all the debts are fully repaid, which of them end up with more money than before?




(A) Only Ada
(B) Only Cleo
(C) Only Ben and Cleo
(D) None of them
(E) All of them

**31** Each year a sample of people was asked whether they travelled abroad during that year.

| Year | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|
| People in the sample | 500 | 600 | 400 | 800 | 500 |
| Travelled abroad | 40 | 45 | 32 | 60 | 40 |

In which years was there a percentage decrease of travellers in the sample compared to the previous year?

(A) Only 2022
(B) Only 2022, 2024 and 2025
(C) Only 2022 and 2024
(D) Only 2023 and 2025
(E) Only 2024

**32** A chemist makes two monoatomic substances A and B react to give substance C: 3 atoms of A and 2 atoms of B form one molecule of C. When the ratio between the total masses of A and B is 9/4, there are no leftovers. What is the ratio between the masses of a single atom of A and a single atom of B?

(A) 3 : 2 (B) 9 : 4 (C) 2 : 3 (D) 27 : 8 (E) 4 : 9

**33** Olivia puts all her magazines on the five shelves of a bookcase: the first four shelves contain the same number of magazines, and the fifth contains 10 more than each of the others. What can she do to have the same number of magazines on every shelf?

(A) Move 10 magazines from the fifth shelf to the first
(B) Move 5 magazines from the fifth shelf to each of the others
(C) It is impossible
(D) Move 2 magazines from the fifth shelf to the first shelf only
(E) Move 2 magazines from the fifth shelf to each of the other four

**34** A school has 400 students. Which of the following statements is certainly true?

(A) At least two students were born in January
(B) At least one student was born on 1 January
(C) In every month at least 33 students were born
(D) At least two students have their birthday on the same day of the year
(E) Exactly 33 students were born in each month

**35** In a biology paper we read: "The bacterial population has varied, starting from time t = 0, according to the law $N = N_0 \cdot 2^{(t/3)}$, where t is the number of hours since t = 0." We can deduce that the population:

(A) was $N_0$ at t = 0 and then tripled every 2 hours
(B) was $N_0$ at t = 0 and then doubled every 3 hours
(C) was $2N_0$ at t = 0 and then doubled every 3 hours
(D) was $N_0$ at t = 0 and then doubled every hour
(E) increased by 3 individuals every 2 hours

**36** A university collected data on two degree courses.

| | Male candidates | Male admission rate | Female candidates | Female admission rate |
|---|---|---|---|---|
| Course 1 | 200 | 50% | 100 | 60% |
| Course 2 | 100 | 20% | 300 | 30% |

Which statement is correct?

(A) Women have a higher admission rate in each course, but men have a higher admission rate overall

(B) Overall, more men than women were admitted

(C) In Course 2, the ratio of admitted men to admitted women is 1 : 3

(D) Course 1 has a lower overall admission rate than Course 2

(E) Overall, women have a higher admission rate than men

**37** Consider the following groups: doctors, women, people under 18, surgeons. Assume that all doctors are adults. Which description of their relationships is correct?

(A) Surgeons and doctors are disjoint groups

(B) The group of doctors is contained in the group of surgeons

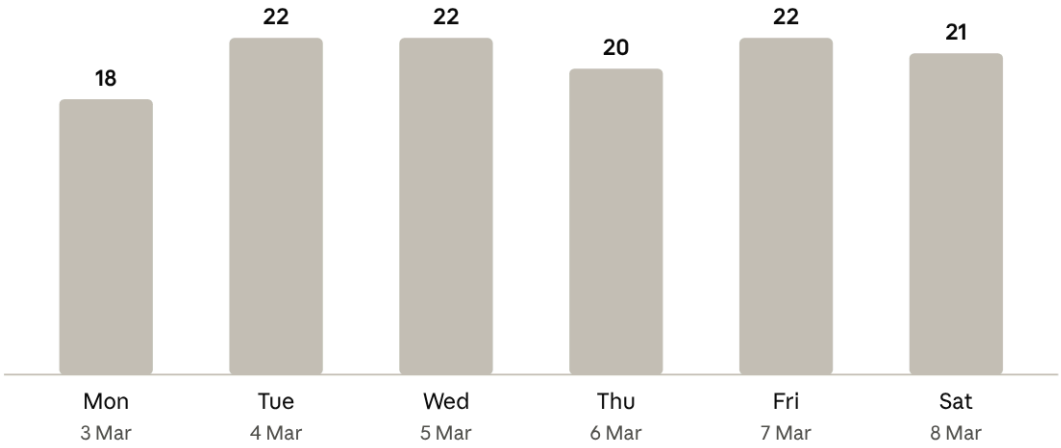
(C) Surgeons are contained in doctors; people under 18 do not overlap with doctors; women overlap with all the other groups

(D) People under 18 are contained in women

(E) Women are contained in doctors

**38** Some possible dates were proposed for a party, and the chart shows how many guests are available on each date.

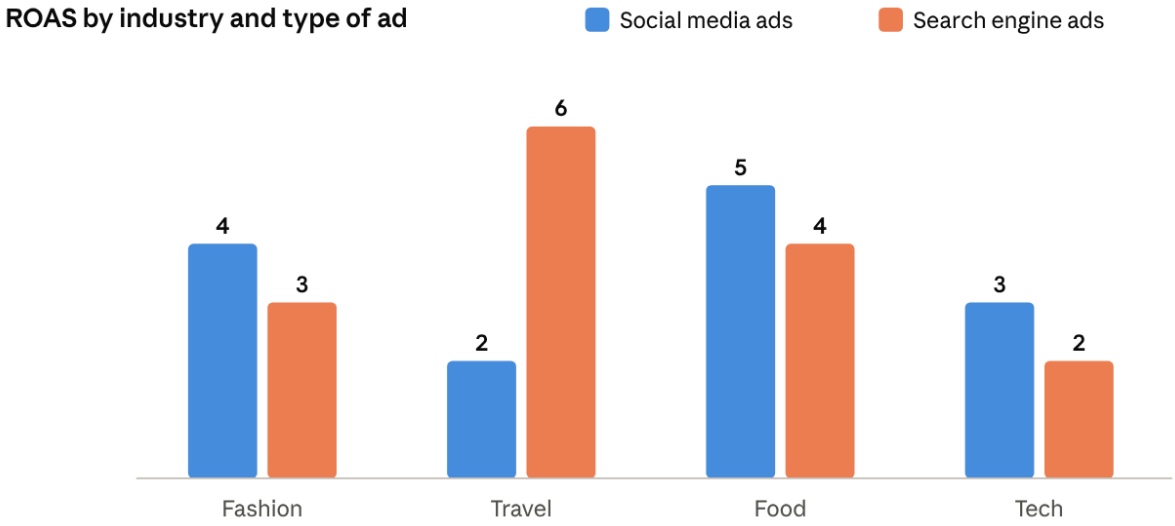
**Guests available on each proposed date**




The party will be held on a date with the highest number of available guests. In case of a tie, a Wednesday or a Friday is chosen, if possible. If more than one date still remains, the latest of them is chosen. On which date will the party be held?

(A) 4 March (B) 5 March (C) 8 March (D) 6 March (E) 7 March

**39** ROAS (return on advertising spend) is revenue divided by the money spent on ads. The chart shows the ROAS of four industries for two kinds of ads.




Consider: (1) Most industries had a higher ROAS on social media than on search engines. (2) The food industry spent more on social media ads than the tech industry. (3) In travel, search engine ads generated about six times the money spent on them. Which statements are certainly correct?

(A) Only 1
(B) Only 1 and 3
(C) Only 2
(D) Only 1 and 2
(E) Only 3

**40** Which of the listed numbers is a counterexample to the statement "Every integer divisible by both 4 and 6 is divisible by 24"?

(A) 24 (B) 48 (C) 18 (D) 12 (E) 72

SECTION 4

## Biology

Questions **41–50** · 10 questions · **20 min**

**41** Some insects can walk on the surface of a pond without sinking. Which property of water makes this possible?

(A) Its high specific heat capacity
(B) The low density of ice
(C) Its high boiling point
(D) Its neutral pH
(E) Its surface tension, due to cohesion between molecules

**42** Disulphide bridges, which stabilise the tertiary structure of many proteins, form between the side chains of which amino acid?

(A) Glycine (B) Cysteine (C) Alanine (D) Leucine (E) Serine

**43** Which type of cell junction allows ions and small molecules to pass directly from one cell to the next, for example between heart muscle cells?

(A) Tight junctions
(B) Desmosomes
(C) Gap junctions
(D) Hemidesmosomes
(E) Adherens junctions

**44** In differential centrifugation, cell components are separated at increasing speeds. Which of the following sediments last, only at the highest speed?

(A) Ribosomes (B) Nuclei (C) Mitochondria
(D) Unbroken whole cells (E) Chloroplasts

**45** Cells that have permanently stopped dividing, such as most mature neurons, are found in which phase?

(A) S (B) G2 (C) M (D) G0 (E) Prophase

**46** A test cross between a dihybrid AaBb and a double recessive aabb gives the following offspring: 45% AaBb, 45% aabb, 5% Aabb, 5% aaBb. What is the recombination frequency between the two genes?

(A) 5% (B) 10% (C) 45% (D) 50% (E) 90%

**47** In snapdragons, flower colour shows incomplete dominance: red × white gives all pink plants in F1. What is the expected phenotypic ratio in F2 (pink × pink)?

(A) 3 red : 1 white (B) 9 : 3 : 3 : 1 (C) All pink
(D) 1 pink : 1 white (E) 1 red : 2 pink : 1 white

**48** Which ecological pyramid can never be inverted?

(A) The pyramid of numbers (B) The pyramid of biomass
(C) The pyramid of energy (D) All of them can be inverted
(E) None of them can be inverted

**49** In a flower, which structure produces pollen?

(A) Anther (B) Stigma (C) Ovary (D) Style (E) Sepal

**50** In which part of the nephron does the filtration of blood take place?

(A) Loop of Henle (B) Collecting duct
(C) Distal convoluted tubule (D) Glomerulus and Bowman's capsule
(E) Ureter

SECTION 5

## Chemistry

Questions **51–60** · 10 questions · **20 min**

**51** Which of the following elements has the lowest electronegativity?

(A) F (B) O (C) Cs (D) N (E) Cl

**52** A solution is diluted 1 : 5 by adding water. Which quantity does NOT change during the dilution?

(A) The number of moles of solute (B) The concentration of the solute
(C) The volume of the solution (D) The mass of solvent
(E) The density of the solution

**53** Consider the reaction $2\ Fe^{3+} + Sn^{2+} \rightarrow 2\ Fe^{2+} + Sn^{4+}$. Which species is the reducing agent?

(A) $Fe^{3+}$ (B) $Fe^{2+}$ (C) $Sn^{4+}$ (D) $H^{+}$ (E) $Sn^{2+}$

**54** The table shows the concentrations of calcium and magnesium ions in three water samples.

| Sample | $Ca^{2+}$ (mg/dm³) | $Mg^{2+}$ (mg/dm³) |
|---|---|---|
| P | 20 | 5 |
| Q | 150 | 30 |
| R | 80 | 10 |

Which order corresponds to increasing water hardness?

(A) Q < R < P (B) P < Q < R (C) R < P < Q (D) P < R < Q (E) R < Q < P

**55** Two compartments are separated by a membrane permeable only to water. Compartment A contains 0.1 mol $dm^{-3}$ NaCl; compartment B contains 0.1 mol $dm^{-3}$ glucose. What happens?

(A) Water flows towards B
(B) Water flows towards A, because solution A contains more dissolved particles
(C) Nothing happens, because the concentrations are equal
(D) Water flows towards B, because glucose molecules are larger
(E) NaCl passes into compartment B

**56** How many $sp^3$-hybridised carbon atoms are present in 3-methylbut-1-ene, $CH_2{=}CH{-}CH(CH_3){-}CH_3$?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

**57** In an energy profile, the reactants are at 120 kJ/mol, the transition state at 200 kJ/mol and the products at 40 kJ/mol. Which statement is correct?

(A) Ea = 80 kJ/mol and ΔH = −80 kJ/mol
(B) Ea = 200 kJ/mol and ΔH = −80 kJ/mol
(C) Ea = 80 kJ/mol and ΔH = +80 kJ/mol
(D) Ea = 160 kJ/mol and ΔH = −80 kJ/mol
(E) Ea = 120 kJ/mol and ΔH = +40 kJ/mol

**58** A sealed vessel contains solid naphthalene (melting point 80 °C, it also sublimes easily) and sand ($SiO_2$, melting point about 1700 °C). The vessel is heated to 100 °C and then cooled back to room temperature. Which statement correctly describes what happens?

(A) Both substances melt and then solidify
(B) The sand melts and the naphthalene remains solid
(C) Both substances vaporise
(D) Neither substance undergoes any change
(E) The naphthalene melts and partly vaporises, then solidifies again on cooling; the sand remains solid

**59** Which property is typical of ionic compounds?

(A) Low melting points; they never conduct electricity
(B) High melting points; they conduct electricity when molten or dissolved in water
(C) They are gases at room temperature
(D) They conduct electricity in the solid state
(E) They are always insoluble in water

**60** A carboxylic acid reacts with an alcohol in the presence of an acid catalyst. The products are:

(A) an ether and hydrogen
(B) an aldehyde and water
(C) a ketone and carbon dioxide
(D) an ester and water
(E) an alkene and water

SECTION 6

## Physics

Questions **61–65** · 5 questions · **10 min**

**61** A sound wave passes from air into water, where it travels faster. Which of its quantities remains unchanged?

(A) Frequency
(B) Wavelength
(C) Speed
(D) Wavelength and speed
(E) None of them

**62** Two cars move at constant speed on two concentric circular tracks of radius 20 m and 30 m, and both complete one lap in the same time. What is the ratio between the speed of the car on the outer track and the speed of the car on the inner track?

(A) 2/3 (B) 1 (C) 9/4 (D) 3/2 (E) 4/9

**63** At night, the land cools down faster than the sea, so the air above the sea is warmer than the air above the land. At ground level, the resulting breeze blows:

(A) from the sea towards the land
(B) parallel to the coast
(C) from the land towards the sea
(D) vertically downwards
(E) There is no breeze at night

**64** An electron (charge $-1.6 \cdot 10^{-19}$ C) is placed in a uniform electric field of 1000 N/C directed upwards. Neglecting gravity, what force acts on the electron?

(A) $1.6 \cdot 10^{-16}$ N, upwards
(B) $1.6 \cdot 10^{-22}$ N, downwards
(C) 1000 N, downwards
(D) Zero
(E) $1.6 \cdot 10^{-16}$ N, downwards

**65** The position–time graph of a body is a straight line with negative slope. This means that the body:

(A) is at rest
(B) moves with constant velocity in the negative direction
(C) accelerates uniformly
(D) slows down until it stops
(E) is in free fall

END OF THE TEST · SINAVIN SONU

DENEME SINAVI 6

# Cevap Anahtarı

Cevaplarınızı karşılaştırın, ardından aşağıdaki tabloyla bölüm bölüm puanınızı hesaplayın.

**Okuma ve Anlama** — Soru 1–10

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| C | B | D | E | A | C | E | B | D | A |

**Matematik** — Soru 11–25

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | B | D | A | C | B | A | E | C | D | A | E | B | D | C |

**Metin ve Veri Üzerinde Akıl Yürütme** — Soru 26–40

| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C | E | A | D | B | C | A | E | D | B | A | C | E | B | D |

**Biyoloji** — Soru 41–50

| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|
| E | B | C | A | D | B | E | C | A | D |

**Kimya** — Soru 51–60

| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| C | A | E | D | B | C | A | E | B | D |

**Fizik** — Soru 61–65

| 61 | 62 | 63 | 64 | 65 |
|---|---|---|---|---|
| A | D | C | E | B |

| Bölüm | Soru | Doğru | Yanlış | Boş | Puan |
|---|---|---|---|---|---|
| Okuma ve Anlama | 10 | | | | |
| Matematik | 15 | | | | |
| Metin ve Veri Üzerinde Akıl Yürütme | 15 | | | | |
| Biyoloji | 10 | | | | |
| Kimya | 10 | | | | |
| Fizik | 5 | | | | |
| **Toplam** | **65** | | | | |

Puan = Doğru × 1 − Yanlış × 0,25. Boş bırakılan sorular puanı etkilemez. En yüksek puan 65'tir.

DENEME SINAVI 6

# Çözümler

## Okuma ve Anlama · Soru 1–10

**1** **Doğru cevap: C** (The origin of zero and its slow acceptance in Europe)

**Çözüm:** Metin sıfırın Hindistan'da ortaya çıkışını ve Avrupa'da yavaş benimsenmesini anlatır.

> **Tuzak:** B ve E metinde geçen ayrıntılardır.

**2** **Doğru cevap: B** (Because their numerals had no zero, so calculations required specialists and counting boards)

**Çözüm:** Sıfır ve basamak değeri olmadığı için büyük sayılarla çarpma uzman işiydi ve çoğunlukla sayma tahtasıyla yapılırdı.

**3** **Doğru cevap: D** (Because they could easily be altered to falsify amounts)

**Çözüm:** Bir 0, tek bir kalem darbesiyle 6 ya da 9'a çevrilebiliyordu; bu yüzden resmî belgelerde Roma rakamları veya yazıyla tutar istendi.

> **Tuzak:** A; metin kaynağı belirtir ama güvensizliğin nedeni olarak göstermez.

**4** **Doğru cevap: E** (treated zero as a number with its own rules of calculation)

**Çözüm:** Sıfır yalnızca boş basamağı göstermekle kalmadı; toplanabilen, çıkarılabilen, çarpılabilen bir sayı olarak ele alındı.

> **Tuzak:** A, "daha fazlasını yaptı" ifadesinin tersidir.

**5** **Doğru cevap: A** (fed the pigeons in a careful, almost ritual way)

**Çözüm:** Yöntemli, azar azar besleme ve "yalnızca onun okuyabildiği talimatlar" benzetmesi neredeyse bir ritüeli anlatır.

> **Tuzak:** B ve D, benzetmeyi gerçek anlamında okumaktır.

**6** **Doğru cevap: C** (He silently shows him a better way)

**Çözüm:** Hiçbir şey söylemez; kendi kırıntılarından verip bileğinin küçük bir hareketiyle tek tek bırakmayı gösterir.

**7** **Doğru cevap: E** (The boy is taking over the old man's habit)

**Çözüm:** Yaşlı adam gelmeyi bırakınca güvercinler bekler; çocuk kendi torbasını alır: onun yerini devralır.

> **Tuzak:** B; metin adamın neden gelmediğini söylemez.

**8** **Doğru cevap: B** (Because it gives visible results on small, cheap plots and involves residents)

**Çözüm:** İkinci paragraf: küçük ve ucuz arazilerde görünür sonuç vaat eder ve sakinlere yapacak bir şey verir.

> **Tuzak:** A; "on kat" iddiası kanıtlanmamıştır, yöntemi destekleyen kuruluşlardan gelir.

**9** **Doğru cevap: D** (Interested, but doubtful about the boldest claims)

**Çözüm:** "Temkinli bir ilgi" duyarlar ama "en iddialı savları kuşkuyla karşılarlar".

> **Tuzak:** A; üçüncü paragrafa göre bilim insanları "temkinli bir ilgi" duyar, projelere karşı değildir.

**10** **Doğru cevap: A** (That councils may use small plots as a substitute for protecting large existing green spaces)

**Çözüm:** Belediyeler birkaç küçük, fotoğrafa uygun alanı büyük yeşil alanları korumak yerine bir ikame olarak görebilir.

> **Tuzak:** D; metin yerli türlerin kullanıldığını söyler.

## Matematik · Soru 11–25

**11** **Doğru cevap: E** (14)

**Çözüm:** $14^2 = 196 < 200 < 225 = 15^2 \rightarrow 14 < \sqrt{200} < 15$.

> **Tuzak:** 200'ü 2'ye bölüp 100 (D) demek.

**12** **Doğru cevap: B** (25%)

**Çözüm:** Artış 50 €, taban yeni fiyat 200 €: 50/200 = %25.

> **Tuzak:** düşüş yüzdesiyle (%20, A) aynı olduğunu sanmak; taban değişmiştir.

**13** **Doğru cevap: D** ($2^4 \cdot 3^4 \cdot 7$)

**Çözüm:** a + b = $3^4 \cdot 7 \cdot (5 + 11) = 3^4 \cdot 7 \cdot 16 = 2^4 \cdot 3^4 \cdot 7$.

**Tuzak:** B, EKOK'tur; E'de 5 + 11 yerine 5·11 alınmıştır.

**14** **Doğru cevap: A** ([1, 5))

**Çözüm:** $\sqrt{(x-1)}$ için $x \geq 1$; $\ln(5-x)$ için $5 - x > 0 \rightarrow x < 5$. Kesişim [1, 5).

**Tuzak:** kök için de kesin eşitsizlik kullanıp B'yi seçmek.

**15** **Doğru cevap: C** ($-6 < a - b < 4$)

**Çözüm:** a − b'nin en küçüğü: a en küçük, b en büyük → −2 − 4 = −6. En büyüğü: a en büyük, b en küçük → 3 − (−1) = 4.

**Tuzak:** a − b yerine a + b'nin aralığını hesaplamak A'ya götürür (−2 + (−1) = −3, 3 + 4 = 7). Alt ve üst sınırları kendi aralarında çıkarmak da yanlıştır: en küçük fark için b'nin en büyük değeri alınır. E'deki −5 alt sınırı kesin değildir; örneğin a = −1,9 ve b = 3,9 için a − b = −5,8.

**16** **Doğru cevap: B** ($k < 4$ and $k \neq 0$)

**Çözüm:** $P(x) = x(x^2 - 4x + k)$. x = 0 bir köktür. İkinci dereceden çarpanın iki farklı kökü olmalı: $\Delta = 16 - 4k > 0 \rightarrow k < 4$. Ayrıca bu kökler 0'dan farklı olmalı: $k \neq 0$ (k = 0'da $P = x^2(x - 4)$).

**Tuzak:** k = 0 durumunu unutup A'yı seçmek.

**17** **Doğru cevap: A** ((−1, 4))

**Çözüm:** x + 3 = 2 → x = −1; g(−1) = f(2) − 1 = 4. Grafik 3 birim sola, 1 birim aşağı kayar.

**Tuzak:** f(x + 3)'ü sağa kayma sanmak (B).

**18** **Doğru cevap: E** ($2 < x < 11$)

**Çözüm:** Tanım: $x - 2 > 0$. Taban 3 > 1, eşitsizlik korunur: $x - 2 < 3^2 = 9 \rightarrow x < 11$. Kesişim $2 < x < 11$.

**Tuzak:** tanım koşulunu unutmak (A) ya da $3^2$ yerine 3·2 kullanmak (C).

**19** **Doğru cevap: C** ($\sqrt[5]{5} < \sqrt{2} < \sqrt[3]{3}$)

**Çözüm:** $\sqrt{2}$ ile $\sqrt[3]{3}$: 6. kuvvet → $2^3 = 8 < 3^2 = 9$, yani $\sqrt{2} < \sqrt[3]{3}$. $\sqrt{2}$ ile $\sqrt[5]{5}$: 10. kuvvet → $2^5 = 32 > 5^2 = 25$, yani $\sqrt[5]{5} < \sqrt{2}$.

**Tuzak:** kök içi büyüdükçe değerin büyüdüğünü sanmak (A).

**20** **Doğru cevap: D** (a = −3)

**Çözüm:** İkinci doğrunun eğimi 4/6 = 2/3. Birincinin eğimi −2/a. $-2/a = 2/3 \rightarrow a = -3$. Kontrol: 2x − 3y = 3, yani 4x − 6y = 6 ≠ 1 → paralel ve farklı.

**Tuzak:** işareti karıştırıp A'yı seçmek.

**21** **Doğru cevap: A** ((1, 1))

**Çözüm:** Çember: $(x-2)^2 + y^2 = 4$, merkez (2, 0), r = 2. İç bölge: $x^2 + y^2 - 4x < 0$. (1, 1): 1 + 1 − 4 = −2 < 0 ✔. (2, 2): 0, çember üzerinde. Diğerleri pozitif, dışarıda.

**Tuzak:** E'yi içeride sanmak; sınır üzerindeki nokta iç bölgeye ait değildir.

**22** **Doğru cevap: E** (60 $cm^3$)

**Çözüm:** Taban alanı 3·4/2 = 6 $cm^2$. V = 6 · 10 = 60 $cm^3$.

**Tuzak:** üçgen alanında 2'ye bölmeyi unutmak (A).

**23** **Doğru cevap: B** (9/20)

**Çözüm:** 3'ün katları: 6 (3, 6, 9, 12, 15, 18). 5'in katları: 4 (5, 10, 15, 20). İkisi birden: 15. (6 + 4 − 1)/20 = 9/20.

**Tuzak:** 15'i iki kez sayarak 10/20 (A) bulmak.

**24** **Doğru cevap: D** (66)

**Çözüm:** Her tokalaşma bir çifttir: C(12,2) = 12·11/2 = 66.

**Tuzak:** her tokalaşmayı iki kez sayarak 132 (A) bulmak.

**25** **Doğru cevap: C** (7.2)

**Çözüm:** Toplam: 10·6 + 15·8 = 60 + 120 = 180. 180/25 = 7,2.

**Tuzak:** ortalamaların ortalamasını (7, A) almak; sınıflar eşit büyüklükte değildir.

## Metin ve Veri Üzerinde Akıl Yürütme · Soru 26–40

**26** **Doğru cevap: C** (a person without trait C certainly does not have trait A)

**Çözüm:** A → (B ∧ C), dolayısıyla A → C. Karşıt tersi: ¬C → ¬A.

**Tuzak:** B ve D koşulu ters çevirir; A ve E olumsuzları alır. Bu kalıp geçmiş sınavlarda çıkmıştır.

**27** **Doğru cevap: E** (If it is sunny and Laura does not go cycling, then it is not Sunday)

**Çözüm:** (Pazar ∧ Güneşli) → Bisiklet. Karşıt tersi: ¬Bisiklet → (¬Pazar ∨ ¬Güneşli). Hava güneşliyse geriye ¬Pazar kalır.

> **Tuzak:** A tersi, B ve D olumsuzudur; ifade bu durumlar hakkında bir şey söylemez.

**28** **Doğru cevap: A** (A player with 8 points plays the bonus round)

**Çözüm:** "Yalnızca ... ise": bonus turu → en az 10 puan. 8 puanla bonus oynamak kuralı çiğner.

> **Tuzak:** B; kural 10 puanın yeterli değil, gerekli olduğunu söyler, dolayısıyla 12 puanlı oyuncu oynamayabilir.

**29** **Doğru cevap: D** (Only 1 and 3)

**Çözüm:** (1) planet (n, t), sun (n), orbit (t) → doğru. (2) planet 6 harf → yanlış. (3) sun: 3 harf, 1 ünlü → doğru. (4) sun'da tek ünlü var → yanlış.

**30** **Doğru cevap: B** (Only Cleo)

**Çözüm:** Net akışlar: Ada −30 + 20 = −10; Ben +30 − 50 = −20; Cleo +50 − 20 = +30. Yalnızca Cleo kazançlı çıkar. Kontrol: net toplam 0.

**31** **Doğru cevap: C** (Only 2022 and 2024)

**Çözüm:** Yüzdeler: 2021 %8; 2022 %7,5 (düşüş); 2023 %8 (artış); 2024 %7,5 (düşüş); 2025 %8 (artış).

> **Tuzak:** mutlak sayılara bakıp 2023 ve 2025'i (D) seçmek; 2022 ve 2024'te sayı arttığı halde oran düşmüştür.

**32** **Doğru cevap: A** (3 : 2)

**Çözüm:** 3a/2b = 9/4 → a/b = (9/4)·(2/3) = 3/2.

> **Tuzak:** kütle oranını atom kütleleri oranı sanmak (B).

**33** **Doğru cevap: E** (Move 2 magazines from the fifth shelf to each of the other four)

**Çözüm:** Toplam 5x + 10; her rafta x + 2 olmalı. Beşinci raftan 4 · 2 = 8 dergi taşınır: x + 10 − 8 = x + 2 ✔.

> **Tuzak:** farkı ikiye bölüp her rafa 5 dergi taşımak (B); doğrusu 10'luk farkı 5 rafa eşit paylaştırmaktır (her raf x + 2).

**34** **Doğru cevap: D** (At least two students have their birthday on the same day of the year)

**Çözüm:** Güvercin yuvası ilkesi: yılda en fazla 366 farklı gün var, 400 > 366.

> **Tuzak:** A, B, C, E dağılımın düzgün olduğunu varsayar; öğrencilerin hiçbiri Ocak'ta doğmamış olabilir.

**35** **Doğru cevap: B** (was $N_0$ at t = 0 and then doubled every 3 hours)

**Çözüm:** t = 0: $N = N_0 \cdot 2^0 = N_0$. t = 3: $N = 2N_0$; t = 6: $4N_0$. Her 3 saatte iki katına çıkar.

> **Tuzak:** taban ile üsteki böleni karıştırmak (A).

**36** **Doğru cevap: A** (Women have a higher admission rate in each course, but men have a higher admission rate overall)

**Çözüm:** Kabul edilenler: 1. derste erkek 100, kadın 60; 2. derste erkek 20, kadın 90. Toplam: erkek 120/300 = %40, kadın 150/400 = %37,5. Kadınlar her derste önde, toplamda geride (Simpson paradoksu). B: 120 < 150 ×. C: 20 : 90 = 2 : 9 ×. D: %53 > %27,5 ×.

**37** **Doğru cevap: C** (Surgeons are contained in doctors; people under 18 do not overlap with doctors; women overlap with all the other groups)

**Çözüm:** Her cerrah doktordur (alt küme). Doktorlar yetişkin olduğundan 18 yaş altıyla kesişmez. Kadınlar; doktor, cerrah ve 18 yaş altı gruplarının her biriyle kesişir. Bu tip soru sınavda Venn diyagramı seçimi olarak sorulur.

**38** **Doğru cevap: E** (7 March)

**Çözüm:** En yüksek değer 22: 4, 5 ve 7 Mart. Çarşamba veya Cuma: 5 ve 7 Mart. En geç tarih: 7 Mart.

> **Tuzak:** alışkanlıkla "ilk tarih" kuralını uygulayıp B'yi seçmek; kuralı dikkatle okuyun.

**39** **Doğru cevap: B** (Only 1 and 3)

**Çözüm:** (1) Fashion, Food, Tech'te sosyal medya daha yüksek: 4'te 3 → doğru. (2) ROAS bir orandır; harcama miktarları bilinmez → doğrulanamaz. (3) ROAS = 6 → gelir harcamanın 6 katı → doğru.

> **Tuzak:** oranı mutlak miktar sanmak (2).

**40** **Doğru cevap: D** (12)

**Çözüm:** 12, 4'e ve 6'ya bölünür ama 24'e bölünmez. EKOK(4, 6) = 12'dir, 24 değil.

> **Tuzak:** C; 18, 4'e bölünmediği için koşulu sağlamaz. A, B, E ifadeyi doğrular.

## Biyoloji · Soru 41–50

**41** **Doğru cevap: E** (Its surface tension, due to cohesion between molecules)

**Çözüm:** Su molekülleri hidrojen bağlarıyla birbirine tutunur (kohezyon); yüzeyde esnek bir "zar" gibi davranan yüzey gerilimi oluşur.

**42** **Doğru cevap: B** (Cysteine)

**Çözüm:** Sistein yan zincirinde –SH (sülfhidril) grubu taşır; iki sistein arasında S–S kovalent bağı oluşur. Geçmiş sınavlarda "kükürt içeren biyomolekül" sorusu çıkmıştır; cevap amino asitlerdir (sistein, metiyonin).

**43** **Doğru cevap: C** (Gap junctions)

**Çözüm:** Ara bağlantılar (gap junction) iki hücrenin sitoplazmasını bağlayan kanallardır; kalpte uyarının hızla yayılmasını sağlar.

> **Tuzak:** A, hücre aralığını mühürleyen (sızdırmaz) bağlantıdır; B ve D mekanik tutunma sağlar.

**44** **Doğru cevap: A** (Ribosomes)

**Çözüm:** Sıra büyüklük ve yoğunluğa göredir: bütün hücreler ve çekirdekler → mitokondri/kloroplast → mikrozomlar → ribozomlar (en küçük, en yüksek hız).

> **Tuzak:** B, ilk çöken organeldir.

**45** **Doğru cevap: D** (G0)

**Çözüm:** G0, hücre döngüsünden çıkmış, bölünmeyen ama metabolik olarak aktif hücrelerin evresidir.

**46** **Doğru cevap: B** (10%)

**Çözüm:** Rekombinantlar ebeveyn kombinasyonlarından az olanlardır: %5 + %5 = %10. Genler bağlıdır (bağımsız olsalardı dört sınıf eşit, %25 olurdu).

> **Tuzak:** yalnızca bir rekombinant sınıfı saymak (A).

**47** **Doğru cevap: E** (1 red : 2 pink : 1 white)

**Çözüm:** Kk × Kk → 1 KK (kırmızı) : 2 Kk (pembe) : 1 kk (beyaz). Eksik baskınlıkta fenotip oranı genotip oranına eşittir.

> **Tuzak:** tam baskınlık gibi 3 : 1 (A) demek.

**48** **Doğru cevap: C** (The pyramid of energy)

**Çözüm:** Her trofik düzeyde enerji ısı olarak kaybedilir; bir düzey altındakinden fazla enerji alamaz. Sayı piramidi (bir ağaç, binlerce böcek) ve biyokütle piramidi (okyanusta fitoplankton) ters olabilir.

**49** **Doğru cevap: A** (Anther)

**Çözüm:** Başçık (anter) erkek organın (stamen) polen üreten kısmıdır.

> **Tuzak:** B, C, D dişi organın (pistil) bölümleridir; E çanak yaprağıdır.

**50** **Doğru cevap: D** (Glomerulus and Bowman's capsule)

**Çözüm:** Glomerül kılcallarında kan basıncı plazmayı Bowman kapsülüne süzer. Henle kulpu ve tübüller geri emilim ve salgılama yapar; üreter idrarı böbrekten mesaneye taşır.

## Kimya · Soru 51–60

**51** **Doğru cevap: C** (Cs)

**Çözüm:** Elektronegatiflik periyodik tabloda sağa ve yukarı doğru artar. Sezyum (1. grup, 6. periyot) sol altta yer alır; en düşük değerlerden birine sahiptir.

> **Tuzak:** soruyu "en yüksek" diye okuyup F'yi (A) seçmek.

**52** **Doğru cevap: A** (The number of moles of solute)

**Çözüm:** Yalnızca çözücü eklenir; çözünen madde miktarı sabit kalır: $c_1V_1 = c_2V_2$. Hacim artar, derişim azalır.

**53** **Doğru cevap: E** ($Sn^{2+}$)

**Çözüm:** Sn +2 → +4: elektron verir, yükseltgenir, indirgen ajandır. $Fe^{3+}$ +3 → +2: elektron alır, yükseltgen ajandır.

> **Tuzak:** indirgenen türü ($Fe^{3+}$) indirgen sanmak.

**54** **Doğru cevap: D** (P < R < Q)

**Çözüm:** Suyun sertliği çözünmüş $Ca^{2+}$ ve $Mg^{2+}$ iyonlarından kaynaklanır. Her iki iyon için de sıra P < R < Q.

> **Tuzak:** azalan sırayı (A) seçmek.

**55** **Doğru cevap: B** (Water flows towards A, because solution A contains more dissolved particles)

**Çözüm:** NaCl → $Na^+$ + $Cl^-$: 0,2 mol $dm^{-3}$ tanecik; glikoz 0,1. A hipertoniktir; su A'ya geçer.

> **Tuzak:** molar derişimler eşit diye ozmotik derişimin de eşit olduğunu sanmak (C).

**56** **Doğru cevap: C** (3)

**Çözüm:** 5 karbon var. C1 ve C2 çift bağdadır ($sp^2$). C3, C4 ve metil karbonu yalnızca tekli bağ yapar ($sp^3$): 3.

> **Tuzak:** metil dalını saymayı unutmak (B). Hibritleşme soruları son sınavlarda tekrar tekrar çıkmıştır.

**57** **Doğru cevap: A** (Ea = 80 kJ/mol and ΔH = −80 kJ/mol)

**Çözüm:** Ea = geçiş hali − tepkenler = 200 − 120 = 80. ΔH = ürünler − tepkenler = 40 − 120 = −80 (ekzotermik).

> **Tuzak:** Ea'yı sıfırdan ölçmek (B) ya da ürünlerden ölçmek (D: geri tepkimenin Ea'sı).

**58** **Doğru cevap: E** (The naphthalene melts and partly vaporises, then solidifies again on cooling; the sand remains solid)

**Çözüm:** 100 °C naftalinin erime noktasının üzerindedir, kumun erime noktasının ise çok altındadır. Naftalin sıvılaşır ve buharı basıncı artırır; soğuyunca yeniden katılaşır. Bu, geçmiş sınavdaki iyot–tuz sorusunun bir varyasyonudur.

**59** **Doğru cevap: B** (High melting points; they conduct electricity when molten or dissolved in water)

**Çözüm:** İyonik kristallerde güçlü elektrostatik çekimler yüksek erime noktası verir. Katıda iyonlar sabit olduğundan iletmez; eriyik veya çözeltide iyonlar hareket edince iletir.

> **Tuzak:** D, metallerin özelliğidir.

**60** **Doğru cevap: D** (an ester and water)

**Çözüm:** Esterleşme: R–COOH + R′–OH ⇌ R–COO–R′ + $H_2O$. Örnek: asetik asit + etanol → etil asetat + su.

> **Tuzak:** E, alkollerin dehidrasyonudur.

## Fizik · Soru 61–65

**61** **Doğru cevap: A** (Frequency)

**Çözüm:** Frekansı kaynak belirler, ortam değişince değişmez. Suda hız artar; λ = v/f olduğundan dalga boyu da artar. Geçmiş sınavlarda bu ilke sorulmuştur (örneğin kayadan geçen ses).

**62** **Doğru cevap: D** (3/2)

**Çözüm:** Aynı periyot → aynı açısal hız ω. v = ωr → $v_2/v_1$ = 30/20 = 3/2.

> **Tuzak:** aynı süre = aynı hız sanmak (B).

**63** **Doğru cevap: C** (from the land towards the sea)

**Çözüm:** Deniz üzerindeki sıcak hava yükselir ve orada alçak basınç oluşur; karadaki soğuk, yoğun hava denize doğru akar (kara meltemi). Gündüz durum tersidir (deniz meltemi, geçmiş sınav sorusu).

**64** **Doğru cevap: E** ($1.6 \cdot 10^{-16}$ N, downwards)

**Çözüm:** $F = qE = 1{,}6 \cdot 10^{-19} \cdot 10^3 = 1{,}6 \cdot 10^{-16}$ N. Negatif yük, alana zıt yönde kuvvet alır: aşağı.

> **Tuzak:** yükün işaretini unutup yukarı (A) demek; B'de üsler çarpılmak yerine bölünmüştür.

**65** **Doğru cevap: B** (moves with constant velocity in the negative direction)

**Çözüm:** x–t grafiğinin eğimi hızdır. Sabit eğim = sabit hız; negatif eğim = negatif yönde hareket.

> **Tuzak:** negatif eğimi yavaşlama (D) sanmak; ivme ancak eğim değişirse (eğri) vardır.

CENT-S · DENEME SINAVI

# 07

65 soru · 140 dakika · 6 bölüm

| Bölüm | Sorular | Soru sayısı | Süre |
|---|---|---|---|
| Reading and Comprehension<br>Okuma ve Anlama | 1–10 | 10 | 30 dk |
| Mathematics<br>Matematik | 11–25 | 15 | 30 dk |
| Reasoning on Texts and Data<br>Metin ve Veri Üzerinde Akıl Yürütme | 26–40 | 15 | 30 dk |
| Biology<br>Biyoloji | 41–50 | 10 | 20 dk |
| Chemistry<br>Kimya | 51–60 | 10 | 20 dk |
| Physics<br>Fizik | 61–65 | 5 | 10 dk |
| **Toplam** | **1–65** | **65** | **140 dk** |

## Sınav kuralları

- Sınavı tek oturumda, gerçek süreyle çözün.
- Her bölümün süresi yalnızca o bölüm için geçerlidir; süresi biten bölüme geri dönülemez.
- Doğru cevap **+1**, yanlış cevap **−0,25**, boş **0** puandır.
- Sınavı bitirmeden cevap anahtarına bakmayın.

## Süre kaydı

Başlangıç

Bitiş

Puan

SECTION 1

# Reading and Comprehension

Questions **1–10** · 10 questions · **30 min**

**TEXT 1 (NON-FICTION)**

Few experiences are as universally disliked as waiting in a queue, yet the frustration it causes has surprisingly little to do with the length of the wait itself. Studies of customers in banks, airports and supermarkets have repeatedly found that people's satisfaction depends less on how long they actually wait than on how long they feel they have waited — and the two can differ greatly.

Unoccupied time, for example, feels longer than occupied time. This is why lifts often have mirrors beside them and why some theme parks entertain visitors in the queue. Uncertainty makes waiting worse: a delay of twenty minutes is easier to bear if it has been announced than if the customer has no idea how long it will last. And unfair waits are the most irritating of all. People who see a later arrival served before them will often feel more aggrieved than those who simply waited longer.

For this reason, many organisations have stopped trying only to shorten queues and have begun to manage the experience of waiting instead. A single line feeding several counters, now common in post offices, does not necessarily reduce the average wait, but it removes the anxiety of choosing the "wrong" line and guarantees that customers are served in order of arrival.

Such measures can look like tricks. Their defenders reply that a feeling is no less real for being a feeling: a customer who leaves calm has, in an important sense, been better served.

**1** Which of the following best expresses the main idea of the text?

(A) Satisfaction depends mainly on the perceived wait, so organisations try to manage the experience of waiting

(B) Queues in post offices are longer than in banks

(C) The only way to satisfy customers is to eliminate queues

(D) Mirrors make lifts move faster

(E) Customers are rarely annoyed by waiting

**2** According to the text, why do lifts often have mirrors beside them?

(A) To make the building look larger

(B) To let people check who is behind them

(C) To reduce the actual waiting time

(D) To make the wait seem fairer

(E) To keep people occupied, so that the wait feels shorter

**3** According to the text, what is the advantage of a single line feeding several counters?

(A) It always reduces the average wait

(B) It removes the anxiety of choosing a line and serves customers in order of arrival

(C) It allows staff to take longer breaks

(D) It entertains customers while they wait

(E) It lets customers choose their favourite counter

**4** What do the defenders of these measures mean by "a feeling is no less real for being a feeling"?

(A) Customers should not trust their feelings
(B) Feelings are less important than facts
(C) The measures are only tricks
(D) Improving how customers feel is a genuine improvement in the service
(E) Queues will disappear in the future

**TEXT 2 (LITERARY)**

The address on the envelope had been written by her aunt in careful capitals, as if the city might refuse to deliver her otherwise. Marta had read it so many times on the train that the words no longer meant anything; they had become a shape, like a face seen too often.

The street, when she found it, was narrower than she had imagined and much louder. Children were shouting in a language she understood only in pieces, and somewhere above her a radio was playing a song her mother used to sing while ironing. She stopped, absurdly moved, and a man with a cart of oranges had to step around her, muttering.

Number fourteen had a blue door with the paint coming away in long strips. She stood in front of it for a while, holding the envelope in both hands. It occurred to her that once she knocked, the journey would be over and something else, which had no name yet, would begin. She was not sure she was ready to give up the journey. Then the door opened from the inside, and a woman with her mother's eyes said her name.

**5** The sentence "the words no longer meant anything; they had become a shape" suggests that Marta:

(A) could not read her aunt's handwriting
(B) had forgotten the address
(C) had read the address so often that it had lost its meaning for her
(D) did not know the language of the city
(E) was drawing the address on the envelope

**6** Why does Marta stop in the street, "absurdly moved"?

(A) Because she hears a song that her mother used to sing
(B) Because the children are shouting at her
(C) Because the man with the oranges is rude to her
(D) Because the street is narrower than she expected
(E) Because she has lost the envelope

**7** Why does Marta hesitate before knocking on the door?

(A) Because she is not sure the address is correct
(B) Because she is afraid of her aunt
(C) Because the door is broken
(D) Because she is reluctant to end the journey and begin something unknown
(E) Because she wants to go back home immediately

**TEXT 3 (JOURNALISTIC)**

When a group of companies agreed to let their employees work four days a week for the same pay, sceptics predicted chaos. Six months later, most of the firms involved have decided to keep the arrangement. Managers report that productivity stayed roughly the same, while staff sickness and resignations fell noticeably.

The organisers of the trial attribute these results to a simple change in habits. With one day fewer to work, teams cut meetings shorter, reduced interruptions and became stricter about which tasks really mattered. "People stopped confusing being busy with being productive," one manager said.

The model does not suit every sector. Hospitals, schools and shops cannot simply close for a day; they need more staff to cover the same hours, which raises costs. Some participants also admitted that the compressed week made their remaining days more intense, and a minority said they felt more stressed than before.

Economists point out that the firms that volunteered for the trial were probably those most likely to succeed, and warn against drawing conclusions for the whole economy. Still, the results have encouraged other companies to experiment, and the question is no longer whether a shorter week is possible, but where it makes sense.

**8** According to the organisers, what explains the results of the trial?

(A) Employees were paid more
(B) Companies hired many new workers
(C) Teams worked more efficiently, with shorter meetings and a stricter focus on important tasks
(D) Productivity increased sharply
(E) Employees worked longer hours on the remaining days

**9** According to the text, why does the four-day week not suit hospitals, schools and shops?

(A) Because their employees do not want it
(B) Because they are less productive
(C) Because they did not take part in the trial
(D) Because their staff would feel more stressed
(E) Because they cannot close for a day and would need more staff, which raises costs

**10** What is the economists' warning?

(A) The four-day week will reduce productivity in every sector
(B) The firms in the trial chose to take part and were probably more likely to succeed, so the results cannot be generalised
(C) The trial lasted too long
(D) Workers should be paid less if they work four days
(E) The question of whether a shorter week is possible is now closed

SECTION 2

# Mathematics

Questions **11–25** · 15 questions · **30 min**

**11** The number (8/27)^(−2/3) is equal to:

(A) 9/4 (B) 4/9 (C) −4/9 (D) 3/2 (E) 2/3

**12** The price of an item, including 22% VAT, is €61. What is the price without VAT?

(A) €47.58 (B) €48.80 (C) €50.00 (D) €39.00 (E) €74.42

**13** For $x \neq 2$, the expression $(x^3 - 8)/(x - 2)$ is equal to:

(A) $x^2 + 4$ (B) $x^2 - 2x + 4$ (C) $(x - 2)^2$ (D) $x^2 + 4x + 4$ (E) $x^2 + 2x + 4$

**14** What is the set of real solutions of the equation $|x| + |x - 2| = 2$?

(A) $\{0, 2\}$ (B) $[0, 2]$ (C) $\{1\}$ (D) $\varnothing$ (E) $\mathbb{R}$

**15** The real numbers x, y, z satisfy x + y = 5, y + z = 7 and x + z = 6. What is the value of y?

(A) 2 (B) 4 (C) 9 (D) 3 (E) 5

**16** Let f(x) = 3x − 2. Which is the expression of the composite function f(f(x))?

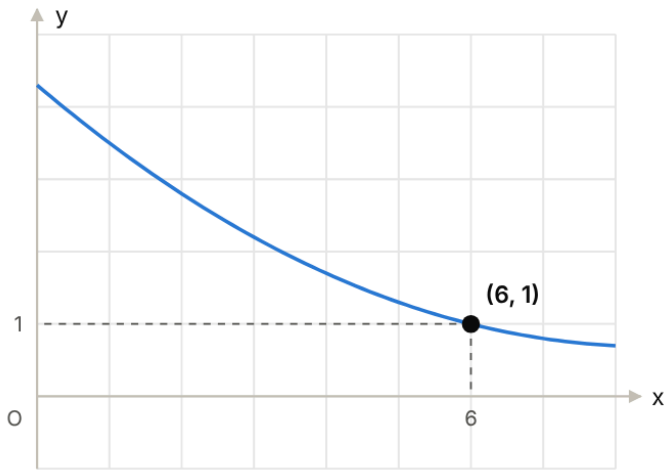
(A) 9x − 8 (B) 9x − 4 (C) $9x^2 - 4$ (D) 6x − 4 (E) 3x − 4

**17** For which values of x is f(x) = 1/(2x − 4) positive?

(A) x < 2 (B) x > 4 (C) x > 2
(D) x ≠ 2 (E) For every real x

**18** The point (6, 1) belongs to the graph of y = f(x). Which point surely belongs to the graph of y = f(2x)?

**A portion of the graph of y = f(x)**




(A) (12, 1) (B) (6, 2) (C) (6, 1/2) (D) (3, 2) (E) (3, 1)

**19** What is the solution of the equation $3 \cdot 2^x = 15$?

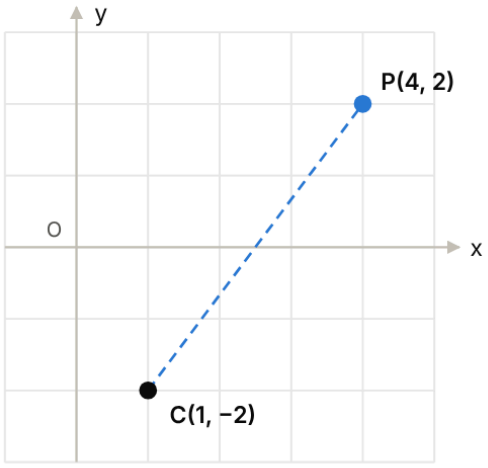
(A) $(\log_2 15)/3$ (B) $\log_2 5$ (C) 5/2 (D) $\log_5 2$ (E) $\log_2 12$

**20** The solutions of the inequality $2^{(x^2)} < 16$ are:

(A) $x < 2$ (B) $x < 4$ (C) $x > -2$
(D) $-2 < x < 2$ (E) $x < -2$ or $x > 2$

**21** Which is the equation of the circle with centre (1, −2) passing through the point (4, 2)?

**The centre C and a point P of the circle**

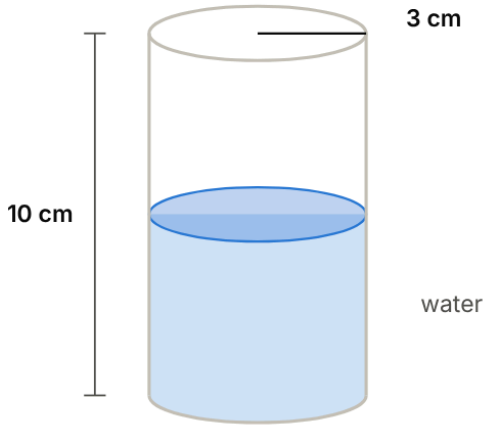



Each grid square is 1 unit

(A) $(x + 1)^2 + (y - 2)^2 = 25$ (B) $(x - 1)^2 + (y + 2)^2 = 5$ (C) $(x - 1)^2 + (y + 2)^2 = 25$
(D) $(x - 4)^2 + (y - 2)^2 = 25$ (E) $x^2 + y^2 = 25$

**22** A cylindrical glass has an internal radius of 3 cm and a height of 10 cm. It is filled with water up to half its height. What is the volume of the water?

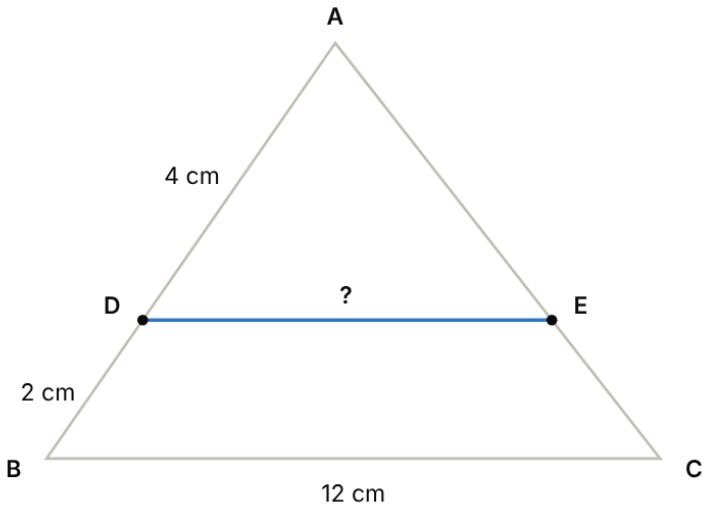
**A cylindrical glass, half full of water**




(A) $45\pi$ cm³ (B) $90\pi$ cm³ (C) $30\pi$ cm³ (D) $15\pi$ cm³ (E) $9\pi$ cm³

**23** In triangle ABC, the segment DE is parallel to BC, with D on AB and E on AC. If AD = 4 cm, DB = 2 cm and BC = 12 cm, what is the length of DE?

**Triangle ABC with DE parallel to BC**




(A) 6 cm (B) 4 cm (C) 24 cm (D) 8 cm (E) 9 cm

**24** A fair die is rolled twice. What is the probability of obtaining at least one six?

(A) 1/3 (B) 11/36 (C) 1/36 (D) 10/36 (E) 25/36

**25** Consider the data set 2, 4, 4, 5, 10. If the value 10 is replaced by 20, then:

(A) neither the mean nor the median changes
(B) both the mean and the median increase
(C) the median increases and the mean does not change
(D) the mean decreases
(E) the mean increases by 2 and the median does not change

SECTION 3

## Reasoning on Texts and Data

Questions **26–40** · 15 questions · **30 min**

**26** For a triangle, the condition "the sum of two of its angles is 90°", with respect to the triangle being right-angled, is:

(A) necessary but not sufficient
(B) necessary and sufficient
(C) sufficient but not necessary
(D) neither necessary nor sufficient
(E) necessary only for isosceles triangles

**27** Consider the statement "I take the bus or I walk", where "or" is inclusive. In which case is the statement false?

(A) I take the bus and I also walk
(B) I only take the bus
(C) I only walk
(D) I neither take the bus nor walk
(E) The statement is always true

**28** Which of the following statements is incompatible with "Some cats are black" (that is, they cannot both be true)?

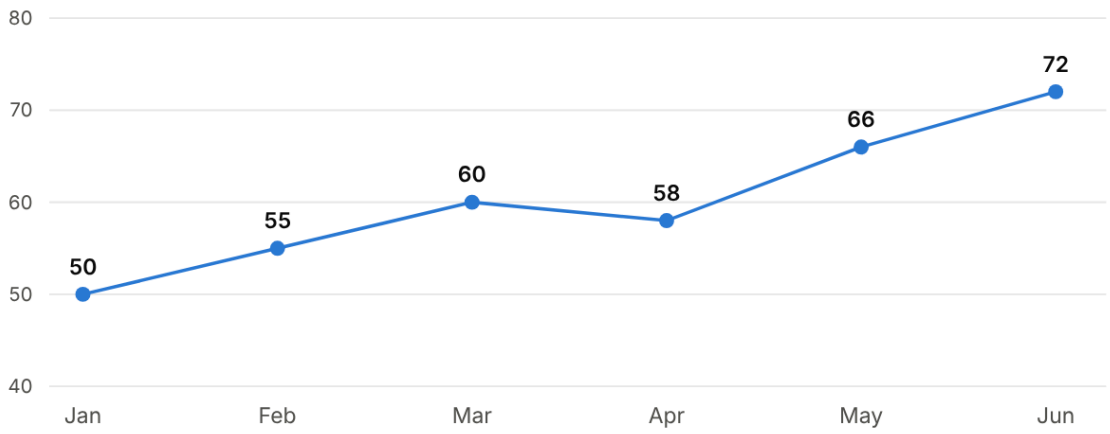
(A) All cats are black
(B) Some cats are not black
(C) No cat is black
(D) Some black animals are cats
(E) Most cats are white

**29** Let A = {1, 2, 3, 4, 5, 6}, B = {4, 5, 6, 7, 8} and C = {2, 4, 6, 8}. What is the set (A \ B) ∩ C?

(A) {4, 6} (B) {1, 3} (C) {2, 4, 6} (D) ∅ (E) {2}

**30** The graph shows the number of subscribers (in thousands) of a streaming service.

**Subscribers of a streaming service (thousands)**




In which month was the increase compared to the previous month the largest (in absolute terms)?

(A) May (B) June (C) February (D) March (E) April

**31** The unemployment rate of a region rose from 8% to 10%. Which statement is correct?

(A) Unemployment rose by 2%
(B) Unemployment rose by 20%
(C) Unemployment rose by 10 percentage points
(D) The rate rose by 2 percentage points, which is a relative increase of 25%
(E) Unemployment decreased

**32** An adult train ticket costs twice as much as a child ticket. A family of 2 adults and 3 children pays €84 in total. How much does a child ticket cost?

(A) €24 (B) €12 (C) €14 (D) €16.80 (E) €28

**33** In a class of 30 students, 18 play football, 12 play basketball and 5 play neither sport. How many students play both?

(A) 0 (B) 10 (C) 5 (D) 7 (E) 25

**34** Three houses — red, blue and green — stand in a row. The green house is immediately to the right of the red house. The blue house is not in the middle. The red house is not at the left end. Which house is in the middle?

(A) The green house
(B) The blue house
(C) It cannot be determined
(D) Either the blue or the green house
(E) The red house

**35** A car travels from town A to town B at 60 km/h and returns along the same road at 40 km/h. What is its average speed for the whole trip?

(A) 48 km/h (B) 50 km/h (C) 45 km/h (D) 52 km/h (E) 100 km/h

**36** A family's annual water bill shows the total consumption in cubic metres ($m^3$). To find the average number of litres used per day, one must:

(A) divide the consumption by 12
(B) multiply the consumption by 365
(C) divide the consumption by 1000 and then by 365
(D) multiply the consumption by 1000 and divide by 365
(E) multiply the consumption by 1000 and by 365

**37** A model for children aged 1 to 10 gives height h (in cm) as h = 75 + 6t, where t is age in years. Someone applies it to a 40-year-old and obtains 315 cm. What is the best comment?

(A) The person is very tall
(B) The result is meaningless, because the model is used outside the range in which it is valid
(C) The model must be multiplied by 2 for adults
(D) Adults grow by 6 cm per year
(E) The calculation contains an arithmetic error

**38** In a long-jump final, each athlete has three attempts ("x" = foul). Athletes are ranked by their best jump; ties are broken by the second-best jump.

| Athlete | Ana | Ben | Cara | Dev | Eli |
|---|---|---|---|---|---|
| Jump 1 (m) | 6.10 | 6.40 | 6.30 | 6.15 | 6.25 |
| Jump 2 (m) | 6.35 | x | 6.38 | 6.40 | 6.25 |
| Jump 3 (m) | 6.20 | 6.05 | 6.38 | 6.10 | 6.30 |

Who finishes second?

(A) Dev (B) Cara (C) Ben (D) Ana (E) Eli

**39** The body mass index is BMI = mass / height². If a person's mass stays the same while their height increases by 10%, their BMI:

(A) decreases by about 17%
(B) decreases by 10%
(C) decreases by 20%
(D) increases by 21%
(E) does not change

**40** A company has 200 employees: 30% work in sales, 25% in production and the rest in other departments. Women are 40% of the sales staff, 20% of the production staff and 38% of all employees. How many women work in the other departments?

(A) 34 (B) 90 (C) 38 (D) 76 (E) 42

SECTION 4

## Biology

Questions **41–50** · 10 questions · **20 min**

**41** The primary structure of a protein is:

(A) its three-dimensional folding
(B) the sequence of its amino acids
(C) the association of several polypeptide chains
(D) the formation of α-helices
(E) the set of its disulphide bridges

**42** Compared to DNA, RNA:

(A) contains deoxyribose and thymine
(B) is always double-stranded
(C) is found only in the nucleus
(D) contains ribose and uracil and is usually single-stranded
(E) contains no phosphate groups

**43** What are the main functions of the smooth endoplasmic reticulum?

(A) Lipid synthesis and detoxification (B) Protein synthesis
(C) ATP synthesis (D) DNA replication
(E) Photosynthesis

**44** Which plastids are specialised in storing starch, for example in potato tubers?

(A) Chloroplasts (B) Chromoplasts (C) Amyloplasts
(D) Mitochondria (E) Vacuoles

**45** Introns are:

(A) coding sequences that are translated into proteins
(B) found only in bacteria
(C) ribosomal proteins
(D) the regions of tRNA that bind amino acids
(E) non-coding sequences that are removed from the pre-mRNA in eukaryotes

**46** A diploid cell with 2n = 8 undergoes mitosis. The result is:

(A) four cells with 4 chromosomes each
(B) two cells with 4 chromosomes each
(C) four cells with 8 chromosomes each
(D) two genetically identical cells, each with 8 chromosomes
(E) two cells with 16 chromosomes each

**47** Barnacles attach themselves to the skin of whales, gaining transport and access to food, without harming or benefiting the whale. This relationship is:

(A) commensalism (B) mutualism (C) parasitism
(D) predation (E) competition

**48** Which feature is typical of epithelial tissue?

(A) Cells scattered in an abundant extracellular matrix
(B) The ability to contract
(C) Closely joined cells resting on a basement membrane, without blood vessels
(D) The transmission of nerve impulses
(E) The presence of osteocytes

**49** Where does the chemical digestion of proteins begin in the human digestive system?

(A) In the mouth, by salivary amylase
(B) Only in the small intestine
(C) In the large intestine
(D) In the liver
(E) In the stomach, by pepsin in an acidic environment

**50** During inhalation:

(A) the diaphragm relaxes and moves upwards
(B) the diaphragm contracts and flattens, increasing the volume of the thorax
(C) the pressure in the lungs becomes higher than atmospheric pressure
(D) the volume of the thorax decreases
(E) the intercostal muscles always remain relaxed

SECTION 5

## Chemistry

Questions **51–60** · 10 questions · **20 min**

**51** According to VSEPR theory, what is the shape of the boron trifluoride molecule ($BF_3$)?

(A) Linear (B) Tetrahedral (C) Trigonal pyramidal
(D) Trigonal planar (E) Bent

**52** Which of the following processes has a positive entropy change ($\Delta S > 0$)?

(A) Water freezing
(B) Ice melting
(C) Steam condensing
(D) $2\ H_2(g) + O_2(g) \rightarrow 2\ H_2O(l)$
(E) A gas being compressed at constant temperature

**53** A reaction has $\Delta H > 0$ and $\Delta S > 0$. When is it spontaneous?

(A) Always (B) Never
(C) Only at low temperature (D) It is always at equilibrium
(E) Only at sufficiently high temperature

**54** What is the expression of the equilibrium constant Kc for $N_2O_4(g) \rightleftharpoons 2\ NO_2(g)$?

(A) $[NO_2]^2 / [N_2O_4]$ (B) $[N_2O_4] / [NO_2]^2$ (C) $2[NO_2] / [N_2O_4]$
(D) $[NO_2] / [N_2O_4]$ (E) $[NO_2]^2 \cdot [N_2O_4]$

**55** Which statement about a catalyst is correct?

(A) It increases ΔH of the reaction
(B) It shifts the equilibrium towards the products
(C) It lowers the activation energy, increasing the rates of both the forward and the reverse reactions
(D) It is consumed during the reaction
(E) It increases the equilibrium constant

**56** A volume is measured as (25.4 ± 0.2) mL. What is the approximate relative (percentage) uncertainty of the measurement?

(A) 0.2% (B) about 0.8% (C) 2% (D) 8% (E) 25.4%

**57** The label of a soft drink states "Sugars: 10.6 g per 100 mL". About how much sugar does a 330 mL can contain?

(A) 10.6 g (B) 3.2 g (C) 106 g (D) about 35 g (E) 330 g

**58** How does photochemical smog form in cities?

(A) From CFCs reacting in the stratosphere
(B) From $SO_2$ dissolving in rainwater
(C) From $CO_2$ and $CH_4$ trapping heat
(D) From $N_2$ and $O_2$ reacting in the dark
(E) From nitrogen oxides and volatile organic compounds reacting in sunlight, forming ground-level ozone

**59** Which of the following metals reacts with dilute hydrochloric acid, releasing hydrogen gas?

(A) Zinc (B) Copper (C) Silver (D) Gold (E) Platinum

**60** Which pair of compounds are structural isomers?

(A) Methane and ethane
(B) Ethanol and ethanoic acid
(C) Ethanol ($CH_3CH_2OH$) and dimethyl ether ($CH_3OCH_3$)
(D) Propane and propene
(E) Benzene and cyclohexane

SECTION 6

## Physics

Questions **61–65** · 5 questions · **10 min**

**61** Two vectors a and b have magnitudes 3 and 4, and the angle between them is 30°. What is the magnitude of their vector (cross) product a × b?

(A) 12 (B) 10.4 (C) 6 (D) 7 (E) 0

**62** Two cars travel in the same direction on a straight motorway, at 90 km/h and 70 km/h with respect to the road. What is the speed of the faster car with respect to the slower one?

(A) 20 km/h (B) 160 km/h (C) 80 km/h (D) 70 km/h (E) 0 km/h

**63** An ideal fluid flows through a horizontal pipe that becomes narrower. In the narrow section, compared to the wide section, the pressure is:

(A) higher
(B) the same
(C) zero
(D) lower
(E) dependent only on the density of the fluid

**64** Which statement is consistent with the second law of thermodynamics?

(A) Heat flows spontaneously from a colder body to a hotter body
(B) No heat engine working in a cycle can convert all the heat it absorbs into work
(C) Energy can be created in an efficient engine
(D) A well-designed engine can have an efficiency of 100%
(E) The entropy of an isolated system always decreases

**65** A light wave in vacuum has a frequency of $5.0 \cdot 10^{14}$ Hz. What is its wavelength? ($c = 3.0 \cdot 10^{8}$ m/s)

(A) $1.67 \cdot 10^{6}$ m (B) $1.5 \cdot 10^{23}$ m (C) $6.0 \cdot 10^{-6}$ m
(D) 60 nm (E) 600 nm

END OF THE TEST · SINAVIN SONU

DENEME SINAVI 7

# Cevap Anahtarı

Cevaplarınızı karşılaştırın, ardından aşağıdaki tabloyla bölüm bölüm puanınızı hesaplayın.

**Okuma ve Anlama** — Soru 1–10

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| A | E | B | D | C | A | D | C | E | B |

**Matematik** — Soru 11–25

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | C | E | B | D | A | C | E | B | D | C | A | D | B | E |

**Metin ve Veri Üzerinde Akıl Yürütme** — Soru 26–40

| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B | D | C | E | A | D | B | C | E | A | D | B | C | A | E |

**Biyoloji** — Soru 41–50

| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|
| B | D | A | C | E | D | A | C | E | B |

**Kimya** — Soru 51–60

| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| D | B | E | A | C | B | D | E | A | C |

**Fizik** — Soru 61–65

| 61 | 62 | 63 | 64 | 65 |
|---|---|---|---|---|
| C | A | D | B | E |

| Bölüm | Soru | Doğru | Yanlış | Boş | Puan |
|---|---|---|---|---|---|
| Okuma ve Anlama | 10 | | | | |
| Matematik | 15 | | | | |
| Metin ve Veri Üzerinde Akıl Yürütme | 15 | | | | |
| Biyoloji | 10 | | | | |
| Kimya | 10 | | | | |
| Fizik | 5 | | | | |
| **Toplam** | **65** | | | | |

Puan = Doğru × 1 − Yanlış × 0,25. Boş bırakılan sorular puanı etkilemez. En yüksek puan 65'tir.

DENEME SINAVI 7

# Çözümler

## Okuma ve Anlama · Soru 1–10

**1** **Doğru cevap: A** (Satisfaction depends mainly on the perceived wait, so organisations try to manage the experience of waiting)

**Çözüm:** Memnuniyet gerçek bekleme süresinden çok algılanan süreye bağlıdır; kurumlar da bu yüzden deneyimi yönetir.

> **Tuzak:** C, metnin "yalnızca kısaltmaya çalışmayı bıraktılar" ifadesiyle çelişir.

**2** **Doğru cevap: E** (To keep people occupied, so that the wait feels shorter)

**Çözüm:** "Meşgul olmayan zaman, meşgul zamandan daha uzun hissedilir"; aynalar insanları meşgul eder.

> **Tuzak:** C; gerçek süre değişmez, yalnızca algı değişir.

**3** **Doğru cevap: B** (It removes the anxiety of choosing a line and serves customers in order of arrival)

**Çözüm:** Tek sıra ortalama beklemeyi mutlaka azaltmaz ama "yanlış sırayı" seçme kaygısını kaldırır ve varış sırasını garanti eder.

> **Tuzak:** A, metnin açıkça reddettiği iddiadır.

**4** **Doğru cevap: D** (Improving how customers feel is a genuine improvement in the service)

**Çözüm:** Sakin ayrılan müşteri "önemli bir anlamda daha iyi hizmet almıştır": duygunun iyileşmesi gerçek bir kazanımdır.

> **Tuzak:** C, eleştirmenlerin görüşüdür; savunucular buna karşılık verir.

**5** **Doğru cevap: C** (had read the address so often that it had lost its meaning for her)

**Çözüm:** Çok tekrarlanan bir şey anlamını yitirip bir şekle dönüşür, "çok sık görülen bir yüz gibi".

> **Tuzak:** A; adres "özenli büyük harflerle" yazılmıştır.

**6** **Doğru cevap: A** (Because she hears a song that her mother used to sing)

**Çözüm:** Radyoda annesinin ütü yaparken söylediği şarkı çalmaktadır; bu ona evi hatırlatır. "Absurdly" sıradan bir şarkının beklenmedik güçte bir etki yarattığını anlatır.

**7** **Doğru cevap: D** (Because she is reluctant to end the journey and begin something unknown)

**Çözüm:** Kapıyı çaldığında yolculuk bitecek ve "henüz adı olmayan" bir şey başlayacaktır; yolculuğu bırakmaya hazır değildir.

> **Tuzak:** E metinde yoktur.

**8** **Doğru cevap: C** (Teams worked more efficiently, with shorter meetings and a stricter focus on important tasks)

**Çözüm:** İkinci paragraf: toplantılar kısaldı, kesintiler azaldı, önemli işler önceliklendirildi.

> **Tuzak:** D; verimlilik "aşağı yukarı aynı" kaldı. A; maaş değişmedi.

**9** **Doğru cevap: E** (Because they cannot close for a day and would need more staff, which raises costs)

**Çözüm:** Bu kurumlar bir gün kapanamaz; aynı saatleri karşılamak için daha fazla personel gerekir ve maliyet artar.

> **Tuzak:** D, katılımcıların bir kısmı için söylenmiştir, bu sektörlerin nedeni değildir.

**10** **Doğru cevap: B** (The firms in the trial chose to take part and were probably more likely to succeed, so the results cannot be generalised)

**Çözüm:** Gönüllü firmalar başarıya en yatkın olanlardı; sonuçları tüm ekonomiye genellemek yanlıştır (seçim yanlılığı).

> **Tuzak:** E, metnin son cümlesinin yazar tarafından yapılan yorumudur, ekonomistlerin uyarısı değildir.

## Matematik · Soru 11–25

**11** **Doğru cevap: A** (9/4)

**Çözüm:** Negatif üs kesri ters çevirir: (27/8)^(2/3) = (∛(27/8))² = (3/2)² = 9/4.

> **Tuzak:** negatif üssü sonucu negatif yapmak (C) ya da üssün eksi işaretini unutup 4/9 (B) bulmak.

**12** **Doğru cevap: C** (€50.00)

**Çözüm:** Fiyat = net · 1,22 → net = 61/1,22 = 50 €.

> **Tuzak:** 61'in %22'sini çıkarıp 47,58 € (A) bulmak; KDV net fiyat üzerinden hesaplanır.

**13** **Doğru cevap: E** ($x^2 + 2x + 4$)

**Çözüm:** Küp farkı: $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$ → $x^3 - 8 = (x - 2)(x^2 + 2x + 4)$.

**Tuzak:** B, küp toplamı formülündeki çarpandır.

**14** **Doğru cevap: B** ([0, 2])

**Çözüm:** $0 \le x \le 2$ için $x + (2 - x) = 2$: her x çözümdür. $x > 2$ için $2x - 2 = 2 \rightarrow x = 2$ (aralık dışı). $x < 0$ için $-2x + 2 = 2 \rightarrow x = 0$ (aralık dışı). Çözüm kümesi [0, 2]. Geometrik olarak: 0'a ve 2'ye uzaklıkların toplamı 2 olan noktalar.

**Tuzak:** yalnızca uç noktaları bulmak (A).

**15** **Doğru cevap: D** (3)

**Çözüm:** Üç denklem toplanır: $2(x + y + z) = 18 \rightarrow x + y + z = 9$. $y = 9 - (x + z) = 9 - 6 = 3$.

**Tuzak:** C, $x + y + z$ toplamıdır.

**16** **Doğru cevap: A** ($9x - 8$)

**Çözüm:** $f(f(x)) = 3(3x - 2) - 2 = 9x - 6 - 2 = 9x - 8$.

**Tuzak:** $f(x) \cdot f(x)$ çarpımı ile bileşkeyi karıştırmak (C) ya da $-2$'yi dağıtmayı unutmak (B).

**17** **Doğru cevap: C** ($x > 2$)

**Çözüm:** Pay $1 > 0$; kesir payda pozitifken pozitiftir: $2x - 4 > 0 \rightarrow x > 2$.

**Tuzak:** D, tanım kümesidir.

**18** **Doğru cevap: E** ((3, 1))

**Çözüm:** $2x = 6 \rightarrow x = 3$; $y = f(6) = 1$. $f(2x)$ grafiği yatay olarak 2 kat sıkışır.

**Tuzak:** apsisi 2 ile çarpmak (A) ya da $2f(x)$ dönüşümüyle karıştırmak (B).

**19** **Doğru cevap: B** ($\log_2 5$)

**Çözüm:** $2^x = 5 \rightarrow x = \log_2 5$ ($\approx 2{,}32$).

**Tuzak:** önce logaritma alıp sonra 3'e bölmek (A); $(\log_2 15)/3 \neq \log_2 5$.

**20** **Doğru cevap: D** ($-2 < x < 2$)

**Çözüm:** $16 = 2^4$; taban $> 1$: $x^2 < 4 \rightarrow -2 < x < 2$.

**Tuzak:** $x^2 < 4$'ü $x < 2$ olarak çözmek (A).

**21** **Doğru cevap: C** ($(x - 1)^2 + (y + 2)^2 = 25$)

**Çözüm:** $r = \sqrt{((4 - 1)^2 + (2 + 2)^2)} = \sqrt{(9 + 16)} = 5$. Denklem $(x - 1)^2 + (y + 2)^2 = 25$.

**Tuzak:** sağ tarafa $r^2$ yerine r yazmak (B) ya da merkez işaretlerini ters almak (A).

**22** **Doğru cevap: A** ($45\pi$ cm³)

**Çözüm:** $V = \pi r^2 h = \pi \cdot 9 \cdot 5 = 45\pi$ cm³ ($\approx 141$ cm³).

**Tuzak:** B, tam bardaktır; C, yanal alanın yarısıyla karıştırmaktır.

**23** **Doğru cevap: D** (8 cm)

**Çözüm:** ADE ~ ABC (Thales). Oran $AD/AB = 4/6 = 2/3$. $DE = 12 \cdot 2/3 = 8$ cm.

**Tuzak:** $AD/DB = 2$ oranını kullanmak (C veya A).

**24** **Doğru cevap: B** (11/36)

**Çözüm:** Tümleyen: hiç altı gelmemesi $(5/6)^2 = 25/36$. $1 - 25/36 = 11/36$.

**Tuzak:** $1/6 + 1/6 = 1/3$ (A); iki altının geldiği durum iki kez sayılır.

**25** **Doğru cevap: E** (the mean increases by 2 and the median does not change)

**Çözüm:** Toplam 10 artar; 5 değer olduğu için ortalama $10/5 = 2$ artar (5 → 7). Medyan ortadaki değerdir (4) ve değişmez. Medyan uç değerlere duyarsızdır.

## Metin ve Veri Üzerinde Akıl Yürütme · Soru 26–40

**26** **Doğru cevap: B** (necessary and sufficient)

**Çözüm:** İki açı 90° ise üçüncüsü $180° - 90° = 90°$ → dik üçgen (yeterli). Dik üçgende diğer iki açının toplamı 90° (gerekli). İki yön de doğru: gerek ve yeter koşul.

**27** **Doğru cevap: D** (I neither take the bus nor walk)

**Çözüm:** P ∨ Q yalnızca iki önerme de yanlışken yanlıştır.

**Tuzak:** A; kapsayıcı "veya"da ikisinin birlikte doğru olması ifadeyi doğru yapar.

**28** **Doğru cevap: C** (No cat is black)

**Çözüm:** "Bazı kediler siyahtır" ile "hiçbir kedi siyah değildir" çelişiktir. A, B, D, E ilk ifadeyle birlikte doğru olabilir.

**Tuzak:** B'yi zıt sanmak; "bazıları siyah" ve "bazıları siyah değil" aynı anda doğru olabilir.

**29** **Doğru cevap: E** ({2})

**Çözüm:** A \ B = A'da olup B'de olmayanlar = {1, 2, 3}. {1, 2, 3} ∩ {2, 4, 6, 8} = {2}.

**Tuzak:** A, A ∩ B ∩ C'dir; fark işlemini kesişim sanmak.

**30** **Doğru cevap: A** (May)

**Çözüm:** Değişimler: Şub +5, Mar +5, Nis −2, May +8, Haz +6. En büyük artış Mayıs.

**Tuzak:** en yüksek değerin olduğu ayı (Haziran, B) seçmek.

**31** **Doğru cevap: D** (The rate rose by 2 percentage points, which is a relative increase of 25%)

**Çözüm:** Fark 10 − 8 = 2 yüzde puanı. Göreli artış 2/8 = %25.

**Tuzak:** yüzde puanı ile yüzde değişimi karıştırmak (A); B'de taban yanlış (2/10).

**32** **Doğru cevap: B** (€12)

**Çözüm:** Çocuk = c, yetişkin = 2c. 2·2c + 3c = 7c = 84 → c = 12 €.

**Tuzak:** A, yetişkin biletidir; D, 84'ü 5 kişiye eşit bölmektir.

**33** **Doğru cevap: C** (5)

**Çözüm:** En az birini oynayan: 30 − 5 = 25. İkisini birden: 18 + 12 − 25 = 5.

**Tuzak:** 18 + 12 = 30 görüp kesişimin 0 olduğunu sanmak (A).

**34** **Doğru cevap: E** (The red house)

**Çözüm:** Yeşil hemen kırmızının sağında: (K, Y, M) veya (M, K, Y). Kırmızı en solda olamaz → (Mavi, Kırmızı, Yeşil). Ortada kırmızı. Kontrol: mavi ortada değil ✔.

**35** **Doğru cevap: A** (48 km/h)

**Çözüm:** Mesafe d olsun: süre d/60 + d/40 = 5d/120 = d/24. Ortalama hız = 2d / (d/24) = 48 km/h.

**Tuzak:** hızların aritmetik ortalamasını (50, B) almak; dönüşte daha uzun süre geçtiği için ortalama 50'nin altındadır.

**36** **Doğru cevap: D** (multiply the consumption by 1000 and divide by 365)

**Çözüm:** 1 $m^3$ = 1000 L → yıllık litre = $m^3$ · 1000; günlük ortalama için 365'e bölünür.

**Tuzak:** C, birim dönüşümünü ters yapar; A aylık ortalamadır.

**37** **Doğru cevap: B** (The result is meaningless, because the model is used outside the range in which it is valid)

**Çözüm:** Hesap doğrudur (75 + 240 = 315), ama model yalnızca 1–10 yaş için geçerlidir. Büyüme yetişkinlikte durur; sonuç gerçek problem için anlamsızdır.

**Tuzak:** E; aritmetik hata yoktur.

**38** **Doğru cevap: C** (Ben)

**Çözüm:** En iyi atlayışlar: Ana 6,35; Ben 6,40; Cara 6,38; Dev 6,40; Eli 6,30. Ben ve Dev eşit; ikinci en iyi: Ben 6,05, Dev 6,15 → Dev birinci, Ben ikinci.

**Tuzak:** Cara'nın iki kez 6,38 atlamasını avantaj sanmak (B).

**39** **Doğru cevap: A** (decreases by about 17%)

**Çözüm:** Yeni BMI = m/(1,1h)² = BMI/1,21 ≈ 0,826·BMI → yaklaşık %17 azalır.

**Tuzak:** kareyi unutmak (B) ya da 1,21 ile çarpmak (D).

**40** **Doğru cevap: E** (42)

**Çözüm:** Toplam kadın 0,38 · 200 = 76. Satış: 60 kişinin %40'ı = 24. Üretim: 50 kişinin %20'si = 10. Diğer: 76 − 24 − 10 = 42.

**Tuzak:** D, tüm kadınlardır; B, diğer departmanlardaki tüm çalışanlardır.

## Biyoloji · Soru 41–50

**41** **Doğru cevap: B** (the sequence of its amino acids)

**Çözüm:** Birincil yapı = peptit bağlarıyla bağlanmış amino asit dizisi; DNA'daki bilgiyle belirlenir ve diğer tüm yapı düzeylerini belirler.

**Tuzak:** D ikincil, A ve E üçüncül, C dördüncül (kuaterner) yapıdır.

**42** **Doğru cevap: D** (contains ribose and uracil and is usually single-stranded)

**Çözüm:** RNA'da şeker riboz, timin yerine urasil vardır; genellikle tek ipliklidir. Sitoplazmada da bulunur (mRNA, tRNA, rRNA).

**Tuzak:** A, DNA'nın özellikleridir.

**43** **Doğru cevap: A** (Lipid synthesis and detoxification)

**Çözüm:** Düz ER'de ribozom yoktur; lipit ve steroit sentezi, karaciğerde detoksifikasyon ve kasta $Ca^{2+}$ depolama yapar.

**Tuzak:** B, granüllü ER'in görevidir.

**44** **Doğru cevap: C** (Amyloplasts)

**Çözüm:** Amiloplastlar nişasta depolayan renksiz plastitlerdir. Kromoplastlar çiçek ve meyvelere renk veren pigmentleri, kloroplastlar klorofili içerir. Mitokondri ve koful plastit değildir.

**45** **Doğru cevap: E** (non-coding sequences that are removed from the pre-mRNA in eukaryotes)

**Çözüm:** Ökaryot genlerinde intronlar transkripsiyondan sonra uçbirleştirme (splicing) ile çıkarılır; kalan ekzonlar olgun mRNA'yı oluşturur. Prokaryot genlerinde genellikle intron yoktur.

**Tuzak:** A, ekzonların tanımıdır.

**46** **Doğru cevap: D** (two genetically identical cells, each with 8 chromosomes)

**Çözüm:** Mitoz kromozom sayısını korur: bir hücreden genetik olarak özdeş iki diploit hücre oluşur.

**Tuzak:** A, mayozun sonucudur.

**47** **Doğru cevap: A** (commensalism)

**Çözüm:** Bir tür yararlanır, diğeri etkilenmez (+/0): kommensalizm.

**Tuzak:** B'de iki tür de yararlanır, C'de konak zarar görür.

**48** **Doğru cevap: C** (Closely joined cells resting on a basement membrane, without blood vessels)

**Çözüm:** Epitel hücreleri sıkı bağlantılarla birbirine yapışıktır, bazal zar üzerinde durur ve damarsızdır; besinleri alttaki bağ dokusundan difüzyonla alır.

**Tuzak:** A ve E bağ dokusu, B kas, D sinir dokusu özelliğidir.

**49** **Doğru cevap: E** (In the stomach, by pepsin in an acidic environment)

**Çözüm:** Midede HCl ortamı asitleştirir ve pepsinojeni pepsine çevirir; pepsin proteinleri peptitlere parçalar. Sindirim ince bağırsakta tripsin vb. ile tamamlanır.

**Tuzak:** A; tükürük amilazı nişastayı sindirir.

**50** **Doğru cevap: B** (the diaphragm contracts and flattens, increasing the volume of the thorax)

**Çözüm:** Diyafram kasılıp düzleşir, dış kaburgalar arası kaslar kaburgaları kaldırır; göğüs hacmi artar, akciğerdeki basınç atmosferin altına düşer ve hava içeri girer.

**Tuzak:** A, C, D solukvermeyi anlatır.

## Kimya · Soru 51–60

**51** **Doğru cevap: D** (Trigonal planar)

**Çözüm:** B'nin 3 değerlik elektronu var; 3 bağ yapar, ortaklanmamış çifti yoktur. Üç elektron bölgesi → düzlem üçgen, 120° ($sp^2$).

**Tuzak:** $NH_3$ ile karıştırıp üçgen piramit (C) demek; $NH_3$'te N'de bir ortaklanmamış çift vardır.

**52** **Doğru cevap: B** (Ice melting)

**Çözüm:** Katı → sıvı geçişinde düzensizlik artar. A, C, E'de düzensizlik azalır; D'de 3 mol gaz sıvıya dönüşür, entropi azalır.

**53** **Doğru cevap: E** (Only at sufficiently high temperature)

**Çözüm:** $\Delta G = \Delta H - T\Delta S$. T yeterince büyükse $T\Delta S > \Delta H$ olur ve $\Delta G < 0$. Örnek: buzun 0 °C üzerinde erimesi.

**Tuzak:** C, $\Delta H < 0$ ve $\Delta S < 0$ durumudur.

**54** **Doğru cevap: A** ($[NO_2]^2$ / $[N_2O_4]$)

**Çözüm:** Kc = ürünlerin derişimleri (katsayılar üs olarak) / tepkenlerin derişimleri.

**Tuzak:** katsayıyı çarpan olarak yazmak (C) ya da kesri ters çevirmek (B).

**55** **Doğru cevap: C** (It lowers the activation energy, increasing the rates of both the forward and the reverse reactions)

**Çözüm:** Katalizör alternatif, daha düşük Ea'lı bir yol sağlar; dengeye daha hızlı ulaşılır ama dengenin konumu, K ve $\Delta H$ değişmez. Tepkime sonunda değişmeden kalır.

**56** **Doğru cevap: B** (about 0.8%)

**Çözüm:** Bağıl belirsizlik = 0,2/25,4 ≈ 0,0079 ≈ %0,8.

**Tuzak:** mutlak belirsizliği (0,2) yüzde sanmak (A).

**57** **Doğru cevap: D** (about 35 g)

**Çözüm:** 10,6 · 330/100 = 10,6 · 3,3 ≈ 35 g.

> **Tuzak:** etiket değerini kutu için kullanmak (A); etiketler genellikle 100 mL başına verilir.

**58** **Doğru cevap: E** (From nitrogen oxides and volatile organic compounds reacting in sunlight, forming ground-level ozone)

**Çözüm:** Trafik kaynaklı $NO_x$ ve uçucu organik bileşikler güneş ışığıyla tepkimeye girer; yer seviyesinde ozon ve diğer oksitleyiciler oluşur.

> **Tuzak:** A ozon tabakası incelmesi, B asit yağmuru, C sera etkisidir.

**59** **Doğru cevap: A** (Zinc)

**Çözüm:** Zn + 2 HCl → $ZnCl_2$ + $H_2$. Aktiflik serisinde hidrojenin üzerindeki metaller (standart indirgenme potansiyeli negatif) asitten $H_2$ açığa çıkarır. Cu ve Ag yarı soy, Au ve Pt soy metallerdir; hidrojenden daha az aktif oldukları için HCl ile $H_2$ açığa çıkarmazlar.

**60** **Doğru cevap: C** (Ethanol ($CH_3CH_2OH$) and dimethyl ether ($CH_3OCH_3$))

**Çözüm:** İkisinin de formülü $C_2H_6O$'dur ama bağlanma farklıdır (alkol ve eter). Farklı yapı farklı özellik verir: etanol hidrojen bağı yapar ve 78 °C'de, dimetil eter −24 °C'de kaynar.

> **Tuzak:** diğer çiftlerin molekül formülleri farklıdır.

## Fizik · Soru 61–65

**61** **Doğru cevap: C** (6)

**Çözüm:** $|a \times b| = |a||b| \sin\theta = 3 \cdot 4 \cdot \sin 30° = 12 \cdot 0{,}5 = 6$.

> **Tuzak:** cos kullanmak (B ≈ 12·0,87, skaler çarpım) ya da açıyı yok saymak (A).

**62** **Doğru cevap: A** (20 km/h)

**Çözüm:** Galileo dönüşümü: $v_{12} = v_1 - v_2 = 90 - 70 = 20$ km/h (aynı yön).

> **Tuzak:** B, zıt yönde giden araçlar için doğru olurdu.

**63** **Doğru cevap: D** (lower)

**Çözüm:** Süreklilik: dar kesitte hız artar. Bernoulli (yatay): $p + \tfrac{1}{2}\rho v^2$ = sabit → hız artarsa basınç azalır.

> **Tuzak:** "dar yerde sıkışır, basınç artar" sezgisi (A).

**64** **Doğru cevap: B** (No heat engine working in a cycle can convert all the heat it absorbs into work)

**Çözüm:** Kelvin–Planck ifadesi: çevrimsel bir makine ısının bir kısmını mutlaka soğuk kaynağa verir; verim < %100.

> **Tuzak:** C birinci yasayı çiğner; A ve E ikinci yasanın tersidir.

**65** **Doğru cevap: E** (600 nm)

**Çözüm:** $\lambda = c/f = 3{,}0\cdot10^{8} / 5{,}0\cdot10^{14} = 0{,}6\cdot10^{-6}$ m = $6{,}0\cdot10^{-7}$ m = 600 nm (turuncu görünür ışık).

> **Tuzak:** f/c almak (A) ya da 10'un kuvvetinde kayma (C, D).

CENT-S · DENEME SINAVI

# 08

65 soru · 140 dakika · 6 bölüm

| Bölüm | Sorular | Soru sayısı | Süre |
|---|---|---|---|
| Reading and Comprehension<br>Okuma ve Anlama | 1–10 | 10 | 30 dk |
| Mathematics<br>Matematik | 11–25 | 15 | 30 dk |
| Reasoning on Texts and Data<br>Metin ve Veri Üzerinde Akıl Yürütme | 26–40 | 15 | 30 dk |
| Biology<br>Biyoloji | 41–50 | 10 | 20 dk |
| Chemistry<br>Kimya | 51–60 | 10 | 20 dk |
| Physics<br>Fizik | 61–65 | 5 | 10 dk |
| **Toplam** | **1–65** | **65** | **140 dk** |

## Sınav kuralları

- Sınavı tek oturumda, gerçek süreyle çözün.
- Her bölümün süresi yalnızca o bölüm için geçerlidir; süresi biten bölüme geri dönülemez.
- Doğru cevap **+1**, yanlış cevap **−0,25**, boş **0** puandır.
- Sınavı bitirmeden cevap anahtarına bakmayın.

## Süre kaydı

Başlangıç

Bitiş

Puan

SECTION 1

# Reading and Comprehension

Questions **1–10** · 10 questions · **30 min**

**TEXT 1 (NON-FICTION)**

It is a curious fact that the people who walk most are often those who think least about walking. The countryman who covers twenty miles in a day on his ordinary business would be astonished to hear that he was taking exercise; he is merely going somewhere. It is the city dweller, who walks very little, who has turned walking into a pursuit, with its special boots, its maps and its literature.

This is not necessarily to be regretted. A thing that is done deliberately can be done with attention, and the deliberate walker notices what the hurried one passes by: the change of light on a hillside, the particular sound of gravel under the foot, the slow way a town gives way to fields. Walking at three miles an hour, he sees the world at very nearly the speed at which the eye was made to see it.

Yet there is a danger that the pursuit swallows the pleasure. The walker who counts his miles, who must reach a certain summit by a certain hour, has merely exchanged one kind of hurry for another. The best walks, it might be argued, are those which have a destination only as an excuse — a village to be reached, a friend to be visited — and which leave the walker free, between departure and arrival, to be nowhere in particular.

**1** Which of the following best expresses the main point of the text?

(A) Countrymen walk more than city dwellers because they are healthier
(B) Walking as a deliberate pursuit can make us more attentive, but turning it into a goal risks spoiling its pleasure
(C) Special boots and maps are necessary for a good walk
(D) Walkers should always have a precise destination
(E) Walking is less useful than other kinds of exercise

**2** According to the author, why would the countryman be astonished to hear that he was taking exercise?

(A) Because he does not like walking
(B) Because he walks very little
(C) Because he uses special boots
(D) Because for him walking is simply a way of going somewhere
(E) Because he prefers to travel by train

**3** The sentence "he sees the world at very nearly the speed at which the eye was made to see it" suggests that:

(A) walking pace allows a natural and attentive way of observing
(B) walkers need glasses
(C) the eye is faster than the feet
(D) walking at three miles an hour is too slow
(E) city dwellers have poor eyesight

**4** Which kind of walker does the author criticise?

(A) The countryman who walks for his business
(B) The walker who visits a friend
(C) The walker who counts his miles and must reach a summit by a fixed time
(D) The walker who notices the change of light
(E) The walker who has no special equipment

**TEXT 2 (LITERARY)**

After the funeral, nobody wanted the garden. The house would be sold, that much was agreed, but the long strip of earth behind it, with its vegetables in tidy rows and its fruit trees trained against the wall, seemed to belong to no one. Paul's sisters talked about it as one talks about an elderly dog: something that would have to be "dealt with".

Paul said nothing. He had not been interested in the garden as a boy; he had spent his Saturdays escaping from it, while his father knelt among the beans with the patience of a man who expected nothing to hurry. But on the last evening, alone, he went out with a torch and found that the tomatoes needed water. He watered them. Then, because the hose was still in his hand, he watered the beans as well, and the small lettuces that his father must have planted only days before.

When he had finished he switched off the torch and stood for a while in the dark, smelling the wet soil. It occurred to him that his father had planted those lettuces knowing that he might not see them grow. Paul had always thought of patience as a kind of waiting. Now he wondered whether it might be something closer to trust.

**5** The comparison of the garden to "an elderly dog" that would have to be "dealt with" suggests that the sisters:

(A) wanted to keep the garden for themselves
(B) intended to buy a dog
(C) loved gardening as much as their father
(D) wanted to sell the garden separately from the house
(E) regarded the garden as a responsibility to be got rid of

**6** The expression "the patience of a man who expected nothing to hurry" presents the father as someone who:

(A) was always late
(B) calmly accepted the slow pace of natural growth
(C) did not care about his garden
(D) was angry with his son
(E) worked very quickly

**7** What does Paul begin to understand at the end of the text?

(A) That patience may be a form of trust in a future one might not see
(B) That he should sell the house quickly
(C) That his sisters were right about the garden
(D) That lettuces grow faster than tomatoes
(E) That he had always loved gardening

**TEXT 3 (JOURNALISTIC)**

Since January, residents of a medium-sized city have been able to travel on its buses and trams without paying. The council, which presented the measure as both an environmental and a social policy, hopes to reduce car traffic in the centre and to help families on low incomes.

The early figures show a rise of about 20% in passenger numbers. But a closer look suggests that much of the increase comes from people who previously walked or cycled, rather than from former drivers. Car traffic in the centre has fallen only slightly, by around 3%. Transport experts are not surprised: for many drivers, they say, the cost of a ticket was never the main reason for using the car. Frequency, reliability and travel time matter more.

The cost of the scheme is considerable. Ticket sales used to cover roughly a fifth of the network's running costs, and that income must now come from the city budget. Critics argue that the same money could have bought more vehicles and more frequent services, which would have attracted drivers more effectively.

Supporters reply that it is too early to judge. Habits change slowly, they argue, and the social benefits — for students, pensioners and the unemployed — are already real, even if they are harder to measure than traffic flows.

**8** According to the text, where does much of the increase in passengers come from?

(A) Tourists visiting the city
(B) Former car drivers
(C) People from neighbouring towns
(D) People who previously walked or cycled
(E) Students who had never travelled before

**9** Why are transport experts not surprised by the results?

(A) Because buses are always crowded
(B) Because the scheme started in winter
(C) Because, for many drivers, the ticket price was never the main reason for using the car
(D) Because the city has too few trams
(E) Because traffic always increases in January

**10** How do the supporters of the scheme reply to the critics?

(A) They admit that the scheme has failed
(B) They propose to reintroduce tickets
(C) They claim that car traffic has fallen sharply
(D) They say that the scheme costs nothing
(E) They argue that it is too early to judge, because habits change slowly and the social benefits are already real

SECTION 2

## Mathematics

Questions **11–25** · 15 questions · **30 min**

**11** Which of the following numbers is irrational?

(A) $\sqrt{0.09}$ (B) $\sqrt[3]{(-8)}$ (C) $0.\overline{3}$ (0.333...)
(D) $\sqrt{8} / 2$ (E) $\sqrt{12} / \sqrt{3}$

**12** In a class, 60% of the students are girls. 25% of the girls and 50% of the boys wear glasses. What percentage of the whole class wears glasses?

(A) 35% (B) 37.5% (C) 75% (D) 30% (E) 40%

**13** For every natural number $n \geq 1$, the expression $(2^{n+2} - 2^n) / (3 \cdot 2^{n-1})$ is equal to:

(A) $2^n$ (B) 1 (C) 2 (D) 4 (E) 3/2

**14** Consider the equation $x^2 - 2(k - 1)x + k + 5 = 0$, where k is a real parameter. For which k is the sum of the solutions equal to 6, and what happens in that case?

(A) k = 3, and the solutions are 2 and 4
(B) k = 4, and the solutions are 1 and 5
(C) k = 2, and there are no real solutions
(D) No such value of k exists
(E) k = 4, and the equation has the double solution x = 3

**15** The solutions of the system $\{ 2x - 1 > 3 ; x^2 < 16 \}$ are:

(A) $x > 2$ (B) $2 < x < 4$ (C) $-4 < x < 4$
(D) $x < 4$ (E) there are no solutions

**16** Consider the function $f(x) = x^3 - x$. Which statement is correct?

(A) f is an even function
(B) f is increasing on all of $\mathbb{R}$
(C) f has exactly one zero
(D) $f(-x) = -f(x)$ for every real x
(E) $f(x) > 0$ for every $x > 0$

**17** Which of the following functions $\mathbb{R} \to \mathbb{R}$ is invertible?

(A) $f(x) = x^2$ (B) $f(x) = 2x + 5$ (C) $f(x) = |x|$
(D) $f(x) = x^2 + 1$ (E) $f(x) = x^4$

**18** How many real solutions does the equation $2^x = 3 - x$ have?

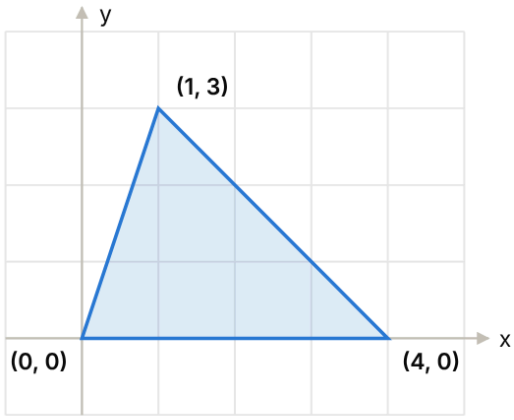
(A) Exactly 1 (B) 0 (C) 2
(D) 3 (E) Infinitely many

**19** If $\log_{10} a = 2$ and $\log_{10} b = 3$, what is the value of $\log_{10} (a^2 / \sqrt{b})$?

(A) 1 (B) 4/3 (C) 6 (D) 7.5 (E) 2.5

**20** What is the area of the triangle with vertices (0, 0), (4, 0) and (1, 3)?

**A triangle in the Cartesian plane**

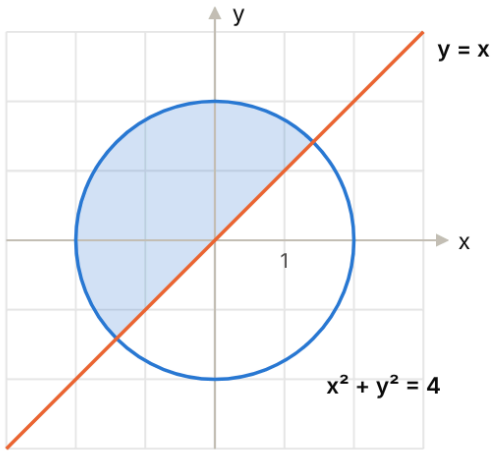



Each grid square is 1 unit

(A) 12 (B) 8 (C) 6 (D) 4 (E) 3

**21** What is the area of the region of the plane defined by the system $\{ x^2 + y^2 \le 4 \; ; \; y \ge x \}$?

**The shaded region: $x^2 + y^2 \le 4$ and $y \ge x$**

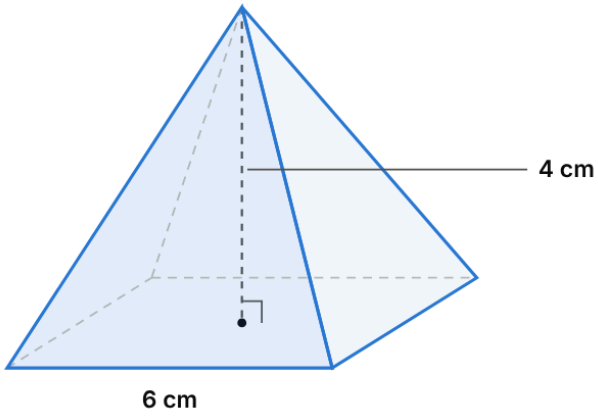



Each grid square is 1 unit

(A) 4π (B) 2π (C) π (D) 8π (E) π/2

**22** A pyramid has a square base of side 6 cm and a height of 4 cm. What is its volume?

**A pyramid with a square base**




(A) 144 cm³ (B) 96 cm³ (C) 72 cm³ (D) 48 cm³ (E) 24 cm³

**23** Five people sit in a row of five chairs. Two of them, Anna and Luca, want to sit next to each other. In how many ways can the five people be seated?

(A) 120 (B) 24 (C) 96 (D) 72 (E) 48

**24** A box contains 4 red and 6 white balls. Two balls are drawn one after the other without replacement. What is the probability that the second ball is red?

(A) 1/3 (B) 4/9 (C) 2/5 (D) 3/10 (E) 1/2

**25** The arithmetic mean of 10 numbers is 15. Each number is increased by 3 and the result is then multiplied by 2. What is the mean of the new numbers?

(A) 36 (B) 33 (C) 30 (D) 18 (E) 48

SECTION 3

## Reasoning on Texts and Data

Questions **26–40** · 15 questions · **30 min**

**26** Which is the negation of the statement "If it is Monday, the museum is closed"?

(A) If it is not Monday, the museum is open
(B) If the museum is closed, it is Monday
(C) It is not Monday and the museum is closed
(D) The museum is never closed
(E) It is Monday and the museum is open

**27** The statement "At least two of the three statements are true" is equivalent to:

(A) At most one of the three statements is false
(B) Exactly two of the statements are true
(C) At least one of the statements is false
(D) All three statements are true
(E) At most two of the statements are true

**28** All A are B. No B is C. Some D are C. Which statement is certainly true?

(A) No D is B
(B) Some A are C
(C) All D are A
(D) Some D are not A
(E) Some C are A

**29** On an island, each inhabitant either always tells the truth or always lies. A says: "We are both liars", referring to himself and to B. What can be concluded?

(A) Both tell the truth
(B) A lies and B tells the truth
(C) Both lie
(D) A tells the truth and B lies
(E) It cannot be determined

**30** The same product is sold in three shops.

| Shop | Price before discount | Discount |
|---|---|---|
| X | €80 | 10% |
| Y | €75 | none |
| Z | €90 | 20% |

Where is the product cheapest?

(A) In shop X
(B) In shop Y
(C) In shops X and Z, at the same price
(D) In shop Z
(E) The price is the same in all three shops

**31** Town A has 1000 inhabitants and grows by 100 inhabitants per year. Town B also has 1000 inhabitants and grows by 8% per year. After how many years will the population of B first exceed that of A?

(A) 3 (B) 5 (C) 6 (D) Never (E) 7

**32** A train travelling at 120 km/h takes 2.5 hours to go from one city to another. How long would the same journey take at 100 km/h?

(A) 2.1 h (B) 2 h (C) 3.5 h (D) 3 h (E) 2.75 h

**33** In a code, every letter is replaced by the letter two places later in the alphabet (Y becomes A and Z becomes B). How is the word CAT written in this code?

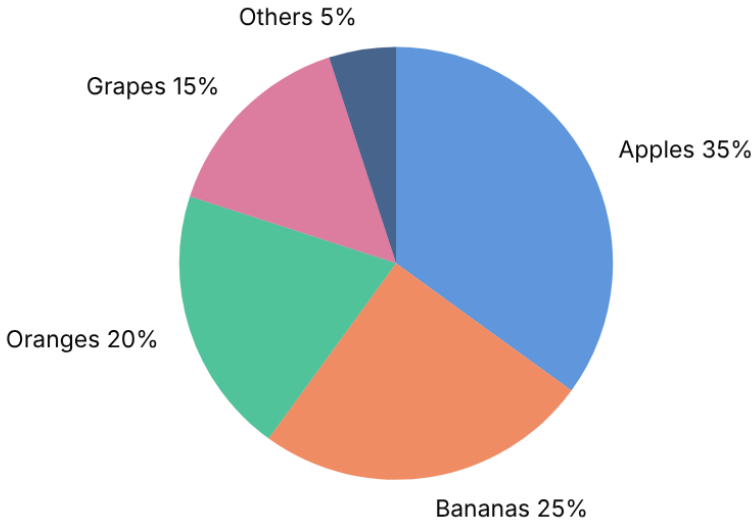
(A) ECV (B) DBU (C) AYR (D) EDV (E) FDW

**34** For each day of a month, a shop records the number of customers and the total takings. To find the average amount spent per customer over the whole month, the shop must:

(A) calculate the average of the daily averages
(B) divide the total takings of the month by the total number of customers of the month
(C) divide the total takings by 30
(D) multiply the number of customers by the number of days
(E) take the median of the daily takings

**35** 400 people were asked their favourite fruit: apples 35%, bananas 25%, oranges 20%, grapes 15%, others 5%. How many more people chose apples than grapes?

**Favourite fruit of 400 people**




(A) 20 (B) 60 (C) 80 (D) 140 (E) 100

**36** The rules of an election state: "A candidate can be elected only if they obtain more than 50% of the votes." Candidate X obtained 52% of the votes. What can be concluded?

(A) X was certainly elected
(B) X was certainly not elected
(C) Another candidate also obtained more than 50%
(D) X needed exactly 50% of the votes
(E) The information is not sufficient to conclude that X was elected

**37** In 5 years, Marco will be twice as old as he was 10 years ago. How old is Marco now?

(A) 25 (B) 15 (C) 20 (D) 30 (E) 35

**38** Five runners P, Q, R, S, T took part in a race (no ties). P finished before Q; Q finished before S; R finished after S; T finished last. Who finished third?

(A) P (B) Q (C) R (D) S (E) T

**39** A recipe uses flour and sugar in the ratio 5 : 2 by mass. How much sugar is needed for 350 g of flour?

(A) 70 g (B) 875 g (C) 140 g (D) 100 g (E) 175 g

**40** Which pair of numbers (a, b) is a counterexample to the statement "If $a^2 > b^2$, then $a > b$"?

(A) $a = 3, b = 2$ (B) $a = -3, b = 2$ (C) $a = 2, b = -3$
(D) $a = 1, b = 0$ (E) $a = 0, b = 0$

SECTION 4
# Biology

Questions **41–50** · 10 questions · **20 min**

**41** Which statement about carbohydrates is correct?

A. Starch is the main component of the plant cell wall
B. Glycogen is the storage polysaccharide of plants
C. Cellulose is a glucose polymer that forms the plant cell wall, and humans cannot digest it
D. Sucrose is a polysaccharide
E. Chitin is the main component of animal bones

**42** Which of the following molecules is a steroid?

A. Cholesterol
B. A triglyceride
C. A phospholipid
D. Glucose
E. Insulin

**43** What is the main function of the nucleolus?

A. DNA replication
B. Lipid synthesis
C. ATP production
D. Digestion of proteins
E. Production of ribosomal RNA and assembly of ribosomal subunits

**44** Which feature of mitochondria supports the endosymbiotic theory of their origin?

A. They have no membranes
B. They contain their own circular DNA and ribosomes
C. They are found only in animal cells
D. They carry out photosynthesis
E. They produce proteins for export from the cell

**45** DNA replication is described as "semi-conservative". This means that:

A. both strands of each new molecule are newly synthesised
B. both original strands stay together in one molecule
C. old and new fragments are mixed at random in both strands
D. each new double helix contains one original strand and one newly synthesised strand
E. DNA is replaced by RNA during replication

**46** A disease is caused by a dominant allele A. A father with genotype Aa and a mother with genotype aa have two children. What is the probability that both children are affected?

A. 1/2
B. 1
C. 1/4
D. 3/4
E. 1/8

**47** In which phase of mitosis do chromosomes condense and become visible under the light microscope?

A. G1
B. S
C. G2
D. Anaphase
E. Prophase

**48** Which statement about photosynthesis is correct?

(A) It converts light energy into chemical energy stored in glucose
(B) It releases $CO_2$ into the atmosphere
(C) It takes place in the mitochondria
(D) It occurs only at night
(E) It consumes oxygen

**49** In the food chain grass → grasshopper → frog → snake → hawk, the frog is:

(A) a producer (B) a primary consumer (C) a tertiary consumer
(D) a secondary consumer (E) a decomposer

**50** Which part of the nervous system controls involuntary functions such as heart rate and digestion?

(A) The somatic nervous system (B) The autonomic nervous system
(C) Only the cerebral cortex (D) Only the sensory neurons
(E) Only the grey matter of the spinal cord

SECTION 5

## Chemistry

Questions **51–60** · 10 questions · **20 min**

**51** A block of ice at 0 °C is heated slowly at constant atmospheric pressure. While the ice is melting, the temperature of the ice–water mixture:

(A) increases steadily
(B) decreases
(C) first increases, then decreases
(D) depends on the mass of ice
(E) remains constant until all the ice has melted

**52** Which of the following is a homogeneous mixture?

(A) Sand and water (B) Oil and water
(C) A solution of sugar in water (D) Granite
(E) Iron filings mixed with sulphur powder

**53** How many orbitals correspond to the quantum numbers n = 2 and l = 1?

(A) 3 (B) 1 (C) 2 (D) 5 (E) 6

**54** Which of the following molecules is polar?

(A) $CO_2$ (B) $CH_4$ (C) $CCl_4$ (D) $H_2O$ (E) $BF_3$

**55** 10 g of $H_2$ and 64 g of $O_2$ react according to $2\,H_2 + O_2 \rightarrow 2\,H_2O$. What is the maximum mass of water that can be produced? (Ar: H = 1, O = 16)

(A) 74 g (B) 72 g (C) 90 g (D) 36 g (E) 64 g

**56** What is the mass concentration (in g $dm^{-3}$) of a 0.50 mol $dm^{-3}$ NaCl solution? (Mr(NaCl) = 58.5)

(A) 58.5 g $dm^{-3}$ (B) 117 g $dm^{-3}$ (C) 0.50 g $dm^{-3}$
(D) 11.7 g $dm^{-3}$ (E) 29.25 g $dm^{-3}$

**57** How many moles of an ideal gas occupy 24.6 L at 300 K and 1.00 atm? (R = 0.082 $L{\cdot}atm{\cdot}mol^{-1}{\cdot}K^{-1}$)

(A) 0.50 mol (B) 2.0 mol (C) 1.0 mol (D) 24.6 mol (E) 0.082 mol

**58** A few drops of phenolphthalein are added to a colourless solution, which turns pink. The solution is:

(A) basic (B) strongly acidic
(C) neutral (D) slightly acidic
(E) certainly a solution of NaCl only

**59** Nitric acid reacts with potassium hydroxide: $HNO_3$ + KOH → salt + $H_2O$. What is the name of the salt formed?

(A) Potassium nitrite (B) Potassium nitride (C) Potassium hydroxide
(D) Potassium nitrate (E) Ammonium nitrate

**60** Which statement correctly describes the structure of benzene ($C_6H_6$)?

(A) All its carbon atoms are $sp^3$-hybridised
(B) It has six $sp^2$-hybridised carbon atoms in a planar ring, with delocalised π electrons
(C) It is a chair-shaped ring like cyclohexane
(D) It has three isolated double bonds that react like those of alkenes
(E) Its molecular formula is $C_6H_{12}$

SECTION 6

## Physics

Questions **61–65** · 5 questions · **10 min**

**61** The intensity of the light received from a point source, as a function of the distance r from the source, follows which model?

(A) Direct proportionality (B) Linear dependence with a negative slope
(C) Exponential decay (D) Inverse-square law
(E) Sinusoidal dependence

**62** A ball is thrown vertically upwards at 20 m/s. Neglecting air resistance (g = 10 $m/s^2$), what maximum height does it reach above the launch point?

(A) 40 m (B) 20 m (C) 10 m (D) 2 m (E) 200 m

**63** A car of mass 1000 kg brakes from 20 m/s to rest. What is the work done on the car by the braking (friction) forces?

(A) $+2 \cdot 10^5$ J (B) $-2 \cdot 10^4$ J (C) $-1 \cdot 10^4$ J (D) 0 J (E) $-2 \cdot 10^5$ J

**64** About how much energy is needed to raise the temperature of 2.0 kg of water by 10 °C? (specific heat of water ≈ 4186 J $kg^{-1}$ $K^{-1}$)

(A) about 84 kJ (B) about 8.4 kJ (C) about 42 kJ
(D) 20 J (E) 4186 J

**65** Two equal positive point charges +q are placed at a distance d from each other. What is the electric field at the midpoint between them?

(A) Twice the field produced by one charge
(B) Directed towards one of the charges
(C) Zero
(D) Infinite
(E) Half the field produced by one charge

END OF THE TEST · SINAVIN SONU

DENEME SINAVI 8

# Cevap Anahtarı

Cevaplarınızı karşılaştırın, ardından aşağıdaki tabloyla bölüm bölüm puanınızı hesaplayın.

### Okuma ve Anlama

Soru 1–10

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| B | D | A | C | E | B | A | D | C | E |

### Matematik

Soru 11–25

| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | A | C | E | B | D | B | A | E | C | B | D | E | C | A |

### Metin ve Veri Üzerinde Akıl Yürütme

Soru 26–40

| 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | A | D | B | C | E | D | A | B | C | E | A | D | C | B |

### Biyoloji

Soru 41–50

| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|
| C | A | E | B | D | C | E | A | D | B |

### Kimya

Soru 51–60

| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| E | C | A | D | B | E | C | A | D | B |

### Fizik

Soru 61–65

| 61 | 62 | 63 | 64 | 65 |
|---|---|---|---|---|
| D | B | E | A | C |

| Bölüm | Soru | Doğru | Yanlış | Boş | Puan |
|---|---|---|---|---|---|
| Okuma ve Anlama | 10 | | | | |
| Matematik | 15 | | | | |
| Metin ve Veri Üzerinde Akıl Yürütme | 15 | | | | |
| Biyoloji | 10 | | | | |
| Kimya | 10 | | | | |
| Fizik | 5 | | | | |
| **Toplam** | **65** | | | | |

Puan = Doğru × 1 − Yanlış × 0,25. Boş bırakılan sorular puanı etkilemez. En yüksek puan 65'tir.

DENEME SINAVI 8

# Çözümler

## Okuma ve Anlama · Soru 1–10

**1** **Doğru cevap: B** (Walking as a deliberate pursuit can make us more attentive, but turning it into a goal risks spoiling its pleasure)

**Çözüm:** İkinci paragraf bilinçli yürüyüşün dikkat kazandırdığını, üçüncüsü ise hedefe dönüşünce zevkin kaybolduğunu söyler.

**Tuzak:** D, yazarın görüşünün tersidir; ona göre varış noktası yalnızca bir bahanedir.

**2** **Doğru cevap: D** (Because for him walking is simply a way of going somewhere)

**Çözüm:** "Yalnızca bir yere gidiyordur": yürümek onun için bir uğraşı değil, ulaşım aracıdır.

**Tuzak:** B, şehirli için söylenmiştir.

**3** **Doğru cevap: A** (walking pace allows a natural and attentive way of observing)

**Çözüm:** Yürüme hızı, gözün ayrıntıları yakalamasına uygun "doğal" bir hızdır; önceki cümledeki gözlemleri (ışık, çakıl sesi) açıklar.

**4** **Doğru cevap: C** (The walker who counts his miles and must reach a summit by a fixed time)

**Çözüm:** Kilometre sayan ve zirveye belli saatte ulaşmak zorunda olan yürüyüşçü "bir tür aceleyi başka biriyle değiştirmiştir".

**Tuzak:** B, yazarın övdüğü yürüyüş türüdür.

**5** **Doğru cevap: E** (regarded the garden as a responsibility to be got rid of)

**Çözüm:** Yaşlı bir köpek gibi "halledilmesi gereken bir şey": bir yük, kurtulunması gereken bir sorumluluk.

**Tuzak:** A, "kimse bahçeyi istemiyordu" ifadesiyle çelişir.

**6** **Doğru cevap: B** (calmly accepted the slow pace of natural growth)

**Çözüm:** Bahçede hiçbir şeyin acele etmeyeceğini bilen biri: doğanın ritmini sakince kabul eden bir karakter.

**Tuzak:** D; metinde babanın oğluna kızdığı söylenmez.

**7** **Doğru cevap: A** (That patience may be a form of trust in a future one might not see)

**Çözüm:** Babası marulları büyüdüklerini göremeyebileceğini bilerek dikmişti; sabır bekleme değil, geleceğe güvendir.

**Tuzak:** E; metin çocukken bahçeden kaçtığını söyler.

**8** **Doğru cevap: D** (People who previously walked or cycled)

**Çözüm:** Artışın büyük kısmı eskiden yürüyen veya bisiklete binenlerden gelir; araba trafiği yalnızca %3 azalmıştır.

**Tuzak:** B, metnin "rather than" ile dışladığı gruptur.

**9** **Doğru cevap: C** (Because, for many drivers, the ticket price was never the main reason for using the car)

**Çözüm:** Sürücüler için sıklık, güvenilirlik ve yolculuk süresi bilet fiyatından daha önemlidir.

**10** **Doğru cevap: E** (They argue that it is too early to judge, because habits change slowly and the social benefits are already real)

**Çözüm:** Son paragraf: yargılamak için erken, alışkanlıklar yavaş değişir ve sosyal faydalar ölçmesi zor olsa da gerçektir.

**Tuzak:** C ve D, metindeki verilerle çelişir.

## Matematik · Soru 11–25

**11** **Doğru cevap: D** (√8 / 2)

**Çözüm:** √8/2 = 2√2/2 = √2, irrasyoneldir. A = 0,3; B = −2; C = 1/3; E = √4 = 2.

**Tuzak:** kök içeren her ifadeyi irrasyonel sanmak (A, E).

**12** **Doğru cevap: A** (35%)

**Çözüm:** 0,60 · 0,25 + 0,40 · 0,50 = 0,15 + 0,20 = 0,35.

**Tuzak:** iki yüzdenin düz ortalamasını (%37,5, B) almak; gruplar eşit büyüklükte değildir.

**13** **Doğru cevap: C** (2)

**Çözüm:** Pay: $2^n(2^2 - 1) = 3 \cdot 2^n$. Oran: $3 \cdot 2^n / (3 \cdot 2^{n-1}) = 2$.

**Tuzak:** yalnızca $2^{n+2}$'yi $2^n$'e bölüp 4 (D) bulmak ya da paydadaki $2^{n-1}$'i $2^n$ gibi alıp 1 (B) bulmak.

**14** **Doğru cevap: E** (k = 4, and the equation has the double solution x = 3)

**Çözüm:** Kökler toplamı $-b/a = 2(k - 1) = 6 \rightarrow k = 4$. Denklem $x^2 - 6x + 9 = 0 = (x - 3)^2$: çakışık kök 3.

**Tuzak:** B; k = 4 doğru ama kökler çarpımı k + 5 = 9 olmalıdır, 1·5 = 5 değil.

**15** **Doğru cevap: B** (2 < x < 4)

**Çözüm:** Birinci: x > 2. İkinci: −4 < x < 4. Kesişim: 2 < x < 4.

**Tuzak:** yalnızca bir eşitsizliği çözmek (A veya C).

**16** **Doğru cevap: D** (f(−x) = −f(x) for every real x)

**Çözüm:** $f(-x) = -x^3 + x = -f(x)$: tek fonksiyon. Sıfırları $x(x^2 - 1) = 0 \rightarrow -1, 0, 1$ (C yanlış). f(0,5) = −0,375 < 0 (E yanlış); bu da B'yi çürütür (f(0) = 0 > f(0,5)).

**17** **Doğru cevap: B** (f(x) = 2x + 5)

**Çözüm:** Tersinir olmak için birebir ve örten olmalıdır. 2x + 5 kesin artandır ve tüm reel değerleri alır; $f^{-1}(y) = (y - 5)/2$. Diğerleri çifttir: f(−x) = f(x), birebir değildir.

**18** **Doğru cevap: A** (Exactly 1)

**Çözüm:** Grafiksel çözüm: $y = 2^x$ kesin artan, y = 3 − x kesin azalan; en fazla bir kez kesişirler. x = 1 için 2 = 2 ✔ → tam bir çözüm.

**Tuzak:** cebirsel olarak çözülemediği için "çözüm yok" (B) demek.

**19** **Doğru cevap: E** (2.5)

**Çözüm:** $\log(a^2/\sqrt{b}) = 2 \log a - \frac{1}{2} \log b = 4 - 1{,}5 = 2{,}5$.

**Tuzak:** bölümü logaritmaların bölümü sanmak (B: 4/3).

**20** **Doğru cevap: C** (6)

**Çözüm:** Taban x-ekseni üzerinde, uzunluğu 4. Yükseklik üçüncü noktanın ordinatı: 3. Alan = 4·3/2 = 6.

**Tuzak:** 2'ye bölmeyi unutmak (A).

**21** **Doğru cevap: B** (2π)

**Çözüm:** Birinci eşitsizlik r = 2 yarıçaplı dairedir (alan 4π). y = x doğrusu merkezden geçer ve daireyi iki eş parçaya böler. Alan 2π.

**Tuzak:** A, tüm dairedir.

**22** **Doğru cevap: D** (48 cm³)

**Çözüm:** V = (1/3) · taban alanı · h = (1/3) · 36 · 4 = 48 cm³.

**Tuzak:** 1/3'ü unutmak (A, prizma hacmi).

**23** **Doğru cevap: E** (48)

**Çözüm:** Anna ve Luca'yı tek bir blok sayalım: 4 birim → 4! = 24. Blok içinde 2 sıralama: 24 · 2 = 48.

**Tuzak:** blok içindeki sırayı unutmak (B).

**24** **Doğru cevap: C** (2/5)

**Çözüm:** P = P(K,K) + P(B,K) = (4/10)(3/9) + (6/10)(4/9) = 12/90 + 24/90 = 36/90 = 2/5. Simetri: birinci topun rengi bilinmediğinde ikinci topun kırmızı olma olasılığı ilk topunkiyle aynıdır.

**Tuzak:** birincinin kırmızı olduğunu varsayıp 3/9 = 1/3 (A) ya da beyaz olduğunu varsayıp 4/9 (B) bulmak.

**25** **Doğru cevap: A** (36)

**Çözüm:** Ortalama doğrusal dönüşümlere aynı şekilde uyar: (15 + 3) · 2 = 36.

**Tuzak:** işlem sırasını ters çevirmek: 15·2 + 3 = 33 (B).

## Metin ve Veri Üzerinde Akıl Yürütme · Soru 26–40

**26** **Doğru cevap: E** (It is Monday and the museum is open)

**Çözüm:** $\neg(P \rightarrow Q) \equiv P \wedge \neg Q$. Koşul gerçekleşir ama sonuç gerçekleşmez.

**Tuzak:** A, önermenin tersidir ($\neg P \rightarrow \neg Q$), B ise karşıtıdır ($Q \rightarrow P$); ikisi de olumsuzlama değildir.

**27** **Doğru cevap: A** (At most one of the three statements is false)

**Çözüm:** "En az 2 doğru" = 2 veya 3 doğru = 1 veya 0 yanlış = "en fazla 1 yanlış".

**Tuzak:** B, üçünün de doğru olduğu durumu dışlar.

**28** **Doğru cevap: D** (Some D are not A)

**Çözüm:** C olan D'ler B olamaz (hiçbir B C değildir); B olmayan da A olamaz (her A, B'dir). Yani C olan D'ler A değildir: bazı D'ler A değildir.

**Tuzak:** A; C olmayan D'ler B olabilir.

**29** **Doğru cevap: B** (A lies and B tells the truth)

**Çözüm:** A doğru söyleseydi kendisi yalancı olurdu: çelişki. Demek ki A yalancıdır ve ifadesi yanlıştır: "ikimiz de yalancıyız" yanlış → en az biri dürüst → B dürüst.

**Tuzak:** ifadeyi doğru kabul edip C'yi seçmek.

**30** **Doğru cevap: C** (In shops X and Z, at the same price)

**Çözüm:** X: 80 · 0,9 = 72 €. Y: 75 €. Z: 90 · 0,8 = 72 €. X ve Z eşit ve en ucuz.

**Tuzak:** en yüksek indirimi (Z) ya da en düşük etiket fiyatını (Y) otomatik olarak en ucuz sanmak.

**31** **Doğru cevap: E** (7)

**Çözüm:** A: 1000 + 100t. B: $1000 \cdot 1{,}08^t$. t = 6: A 1600, B ≈ 1587. t = 7: A 1700, B ≈ 1714 > 1700.

**Tuzak:** D; üstel büyüme başta yavaş görünse de sonunda doğrusal büyümeyi her zaman geçer.

**32** **Doğru cevap: D** (3 h)

**Çözüm:** Mesafe 120 · 2,5 = 300 km. 300/100 = 3 sa. Hız ve süre ters orantılıdır.

**Tuzak:** doğru orantı kurup 2,5 · 100/120 ≈ 2,1 (A) bulmak.

**33** **Doğru cevap: A** (ECV)

**Çözüm:** C → E, A → C, T → V.

**Tuzak:** B bir harf kaydırmadır; C ters yöndedir.

**34** **Doğru cevap: B** (divide the total takings of the month by the total number of customers of the month)

**Çözüm:** Müşteri başı ortalama = toplam hasılat / toplam müşteri.

**Tuzak:** A; günlük müşteri sayıları farklıysa günlük ortalamaların ortalaması yanlış sonuç verir (ağırlıklandırılmamış ortalama). C, günlük ortalama hasılattır.

**35** **Doğru cevap: C** (80)

**Çözüm:** Fark %35 − %15 = %20; 400'ün %20'si = 80.

**Tuzak:** yüzde puanını kişi sayısı sanmak (A); D, elma seçenlerin sayısıdır.

**36** **Doğru cevap: E** (The information is not sufficient to conclude that X was elected)

**Çözüm:** Kural %50'den fazla oyu gerekli koşul olarak verir: seçilmek → %50'den fazla. Yeterli olduğunu söylemez; başka koşullar (katılım oranı, itiraz vb.) olabilir.

**Tuzak:** gerekli koşulu yeterli sanmak (A). C imkansızdır (toplam %100'ü aşar).

**37** **Doğru cevap: A** (25)

**Çözüm:** x + 5 = 2(x − 10) → x + 5 = 2x − 20 → x = 25. Kontrol: 5 yıl sonra 30, 10 yıl önce 15 ✔.

**38** **Doğru cevap: D** (S)

**Çözüm:** Zincir: P < Q < S < R ve T sonuncu → P, Q, S, R, T. Üçüncü S.

**Tuzak:** "önce/sonra" yönünü karıştırmak.

**39** **Doğru cevap: C** (140 g)

**Çözüm:** 350/5 = 70 g bir pay; şeker 2 pay = 140 g.

**Tuzak:** A bir paydır; B oranı ters çevirir (350 · 5/2).

**40** **Doğru cevap: B** (a = −3, b = 2)

**Çözüm:** a = −3, b = 2: $a^2 = 9 > 4 = b^2$ (koşul doğru) ama −3 < 2 (sonuç yanlış).

**Tuzak:** C; 4 > 9 değildir, koşul sağlanmaz, karşıt örnek olamaz.

## Biyoloji · Soru 41–50

**41** **Doğru cevap: C** (Cellulose is a glucose polymer that forms the plant cell wall, and humans cannot digest it)

**Çözüm:** Selüloz β-glikoz polimeridir; insanlarda onu parçalayan enzim (selülaz) yoktur, lif olarak işlev görür.

**Tuzak:** A nişasta depo, B glikojen hayvansal depo, D sakaroz disakkarit, E kitin eklembacaklı iskeleti ve mantar duvarıdır.

**42** **Doğru cevap: A** (Cholesterol)

**Çözüm:** Steroitler dört kaynaşık halkadan oluşan lipitlerdir: kolesterol, testosteron, östrojen.

> **Tuzak:** E; insülin bir protein (peptit) hormondur.

**43** **Doğru cevap: E** (Production of ribosomal RNA and assembly of ribosomal subunits)

**Çözüm:** Çekirdekçikte rRNA genleri transkribe edilir ve proteinlerle birleşerek ribozom alt birimleri oluşur; alt birimler sitoplazmaya geçer.

**44** **Doğru cevap: B** (They contain their own circular DNA and ribosomes)

**Çözüm:** Mitokondrinin bakterilerdekine benzer halkasal DNA'sı, bakteri tipi (70S tipi) ribozomları ve çift zarı vardır; ikiye bölünerek çoğalır.

> **Tuzak:** C; bitki hücrelerinde de mitokondri bulunur.

**45** **Doğru cevap: D** (each new double helix contains one original strand and one newly synthesised strand)

**Çözüm:** Çift sarmal açılır; her eski iplik yeni bir tamamlayıcı iplik için kalıp olur. Meselson–Stahl deneyi bunu doğrulamıştır.

> **Tuzak:** B, korunumlu modeldir; C dağınık modeldir.

**46** **Doğru cevap: C** (1/4)

**Çözüm:** Her çocuk için P(Aa) = 1/2; doğumlar bağımsızdır: 1/2 · 1/2 = 1/4.

> **Tuzak:** tek bir çocuğun olasılığını (1/2, A) vermek.

**47** **Doğru cevap: E** (Prophase)

**Çözüm:** Profazda kromatin kısalıp kalınlaşır, kromozomlar görünür hale gelir; çekirdek zarı dağılır ve iğ iplikleri oluşmaya başlar. G1, S, G2 interfaz evreleridir.

**48** **Doğru cevap: A** (It converts light energy into chemical energy stored in glucose)

**Çözüm:** 6 $CO_2$ + 6 $H_2O$ + ışık → $C_6H_{12}O_6$ + 6 $O_2$. Kloroplastlarda gerçekleşir; $CO_2$ tüketir, $O_2$ açığa çıkarır.

> **Tuzak:** B ve E hücresel solunumun özellikleridir.

**49** **Doğru cevap: D** (a secondary consumer)

**Çözüm:** Çimen üretici, çekirge birincil tüketici (otobur), kurbağa ikincil tüketici, yılan üçüncül, şahin dördüncül tüketicidir.

> **Tuzak:** zincirde üçüncü sırada olduğu için "üçüncül" (C) demek; üretici tüketici sayılmaz.

**50** **Doğru cevap: B** (The autonomic nervous system)

**Çözüm:** Otonom sinir sistemi (sempatik ve parasempatik) kalp, düz kas ve bezleri istemsiz olarak denetler.

> **Tuzak:** A, iskelet kaslarının istemli hareketlerini yönetir.

## Kimya · Soru 51–60

**51** **Doğru cevap: E** (remains constant until all the ice has melted)

**Çözüm:** Hal değişimi sırasında verilen ısı (erime ısısı) moleküller arası kuvvetleri yenmeye harcanır; saf maddenin sıcaklığı sabit kalır.

> **Tuzak:** ısı verilince sıcaklığın her zaman arttığını sanmak (A).

**52** **Doğru cevap: C** (A solution of sugar in water)

**Çözüm:** Çözeltiler homojendir: bileşim her yerde aynıdır ve bileşenler ayırt edilemez. Diğerleri heterojendir.

> **Tuzak:** E; demir ve kükürt tozları gözle ayırt edilebilir ve mıknatısla ayrılabilir.

**53** **Doğru cevap: A** (3)

**Çözüm:** l = 1 bir p alt kabuğudur; $m_l$ = −1, 0, +1 → üç orbital ($2p_x$, $2p_y$, $2p_z$).

> **Tuzak:** E, bu orbitallerdeki en fazla elektron sayısıdır.

**54** **Doğru cevap: D** ($H_2O$)

**Çözüm:** $H_2O$ açısaldır; O–H bağ dipolleri birbirini götürmez. $CO_2$ doğrusal, $CH_4$ ve $CCl_4$ düzgün dörtyüzlü, $BF_3$ düzlem üçgen: polar bağları olsa bile simetrileri nedeniyle apolardırlar.

> **Tuzak:** polar bağı polar molekülle karıştırmak (A, C).

**55** **Doğru cevap: B** (72 g)

**Çözüm:** n($H_2$) = 5 mol, n($O_2$) = 2 mol. 2 mol $O_2$ için 4 mol $H_2$ yeter → $O_2$ sınırlayıcıdır, 1 mol $H_2$ artar. 4 mol $H_2O$ · 18 = 72 g.

**Tuzak:** kütleleri toplayıp 74 g (A) bulmak; artan 2 g $H_2$ suya dönüşmez.

**56** **Doğru cevap: E** (29.25 g $dm^{-3}$)

**Çözüm:** g $dm^{-3}$ = mol $dm^{-3}$ · g/mol = 0,50 · 58,5 = 29,25.

**Tuzak:** bölmek (B = 58,5/0,5).

**57** **Doğru cevap: C** (1.0 mol)

**Çözüm:** n = PV/(RT) = (1,00 · 24,6)/(0,082 · 300) = 24,6/24,6 = 1,0 mol.

**Tuzak:** 22,4 L kuralını 0 °C dışında uygulamak.

**58** **Doğru cevap: A** (basic)

**Çözüm:** Fenolftalein asidik ve nötr ortamda renksizdir, pH ≈ 8,2'nin üzerinde pembe olur.

**Tuzak:** turnusol ile karıştırmak (turnusol asitte kırmızı, bazda mavidir).

**59** **Doğru cevap: D** (Potassium nitrate)

**Çözüm:** Nötralleşme: $K^+$ ve $NO_3^-$ → $KNO_3$, potasyum nitrat.

**Tuzak:** A, $NO_2^-$ (nitrit) iyonudur ve $HNO_2$'den türer; B, $N^{3-}$ içerir.

**60** **Doğru cevap: B** (It has six $sp^2$-hybridised carbon atoms in a planar ring, with delocalised π electrons)

**Çözüm:** Benzen düzlemseldir; tüm C–C bağları eşit uzunluktadır ve π elektronları halka boyunca dağılmıştır (aromatiklik). Bu yüzden alkenler gibi kolay katılma tepkimesi vermez.

**Tuzak:** C ve E siklohekzanın özellikleridir.

## Fizik · Soru 61–65

**61** **Doğru cevap: D** (Inverse-square law)

**Çözüm:** I = P/($4\pi r^2$): enerji giderek büyüyen küre yüzeyine dağılır. Uzaklık iki katına çıkarınca şiddet dörtte birine iner.

**Tuzak:** azalan her ilişkiyi üstel sanmak (C).

**62** **Doğru cevap: B** (20 m)

**Çözüm:** En tepede v = 0. $v^2 = v_o^2 - 2gh$ → $h = v_o^2/(2g)$ = 400/20 = 20 m.

**Tuzak:** 2'yi unutup 40 m (A) bulmak.

**63** **Doğru cevap: E** ($-2 \cdot 10^5$ J)

**Çözüm:** İş–enerji teoremi: $W = \Delta K = 0 - \frac{1}{2} \cdot 1000 \cdot 20^2 = -2 \cdot 10^5$ J. Fren kuvveti harekete zıt olduğu için iş negatiftir.

**Tuzak:** işareti unutmak (A).

**64** **Doğru cevap: A** (about 84 kJ)

**Çözüm:** Q = m c ΔT = 2,0 · 4186 · 10 ≈ 83 700 J ≈ 84 kJ (≈ 20 kcal). ΔT Celsius ve kelvinde aynıdır.

**Tuzak:** kütleyi unutmak (C) ya da 10'un kuvvetinde kayma (B).

**65** **Doğru cevap: C** (Zero)

**Çözüm:** Orta noktada iki yükün alanları eşit büyüklükte ($kq/(d/2)^2$) ve zıt yönlüdür (her biri yükten dışarı doğru): vektörel toplam sıfır.

**Tuzak:** alanları vektör değil sayı gibi toplamak (A).

HERAND ACADEMY & CONSULTANCY

# İtalya'da eğitim yolculuğunuzun her adımında yanınızdayız

Herand Academy, 2020'den bu yana yabancı uyruklu öğrenci sınavları alanında, 2023'ten bu yana da yurt dışı eğitim danışmanlığında öğrencilere ve ailelere rehberlik ediyor. İstanbul'daki merkezimizden İtalya'daki temsilcilerimize uzanan ekibimizle, sınav hazırlığından üniversiteye kayda, vizeden İtalya'ya varışa kadar tüm süreci tek elden yönetiyoruz.

## Neden Herand Academy?

1

### Akademik rehberlik

Prof. Dr. Deniz Herand liderliğinde, öğrencilere ve ailelere akademik danışmanlık ve doğru bölüm–üniversite seçimi.

2

### Uçtan uca destek

Sınav hazırlığı, sınav kaydı, üniversite başvurusu ve kayıt, vize ve burs işlemleri: hepsi tek ekipte.

3

### İtalya'da yerinde ekip

Trieste, Roma ve Napoli'deki temsilcilerimiz öğrencilerimizi İtalya'da karşılıyor ve ilk adımlarında destek oluyor.

4

### Sınav gününde yanınızda

IMAT sınavında ekibimiz sınav yerinde bulunuyor ve velilerimizin sorularını anında yanıtlıyor.

5

### Şeffaf ve adım adım takip

Her öğrenciye özel iletişim grubu üzerinden başvuru durumunu ve tüm gelişmeleri anlık olarak takip edebilirsiniz.

6

### MEB'e bağlı kurs

CEnT-S hazırlık kursumuz, Millî Eğitim Bakanlığı'na bağlı özel öğretim kursu olarak yürütülüyor.

HERAND ACADEMY & CONSULTANCY

# Hizmetlerimiz ve Paketlerimiz

İtalya'da lisans eğitimi için ihtiyaç duyacağınız her adımda yanınızdayız.

### CEnT-S Konu Anlatımı Paketi SINAV HAZIRLIK

CEnT-S'in tüm bölümleri için konu anlatımı, soru çözümü ve deneme sınavlarıyla kapsamlı hazırlık programı.

### İtalya Üniversite Danışmanlığı BAŞVURU

Üniversite ve bölüm seçimi, başvuru dosyasının hazırlanması, sınav kayıtları (CEnT-S, IMAT) ve üniversiteye kayıt süreci.

### İngilizce Tıp (IMAT) Danışmanlığı TIP

İtalya'daki İngilizce tıp programları için ailelere bilgilendirme, başvuru desteği ve sınav gününde yerinde destek.

### Yüksek Lisans Danışmanlığı YÜKSEK LİSANS

İtalya'da yüksek lisans programları için program seçimi, başvuru, kabul ve vize sürecinin tamamında danışmanlık.

### Bocconi Üniversitesi Danışmanlığı ÖZEL DANIŞMANLIK

Milano'daki Bocconi Üniversitesi başvuruları için kişiye özel danışmanlık.

### Vize ve Burs İşlemleri VİZE · BURS

Öğrenci vizesi dosyasının hazırlanması ve İtalya'daki burs (DSU) başvurularında destek.

### İtalya'da Karşılama ve Yerleşim İTALYA'DA

Trieste, Roma ve Napoli'deki temsilcilerimizle varışta karşılama ve şehre uyum sürecinde destek.

**İtalya'da okumak için ilk adımı birlikte atalım.**

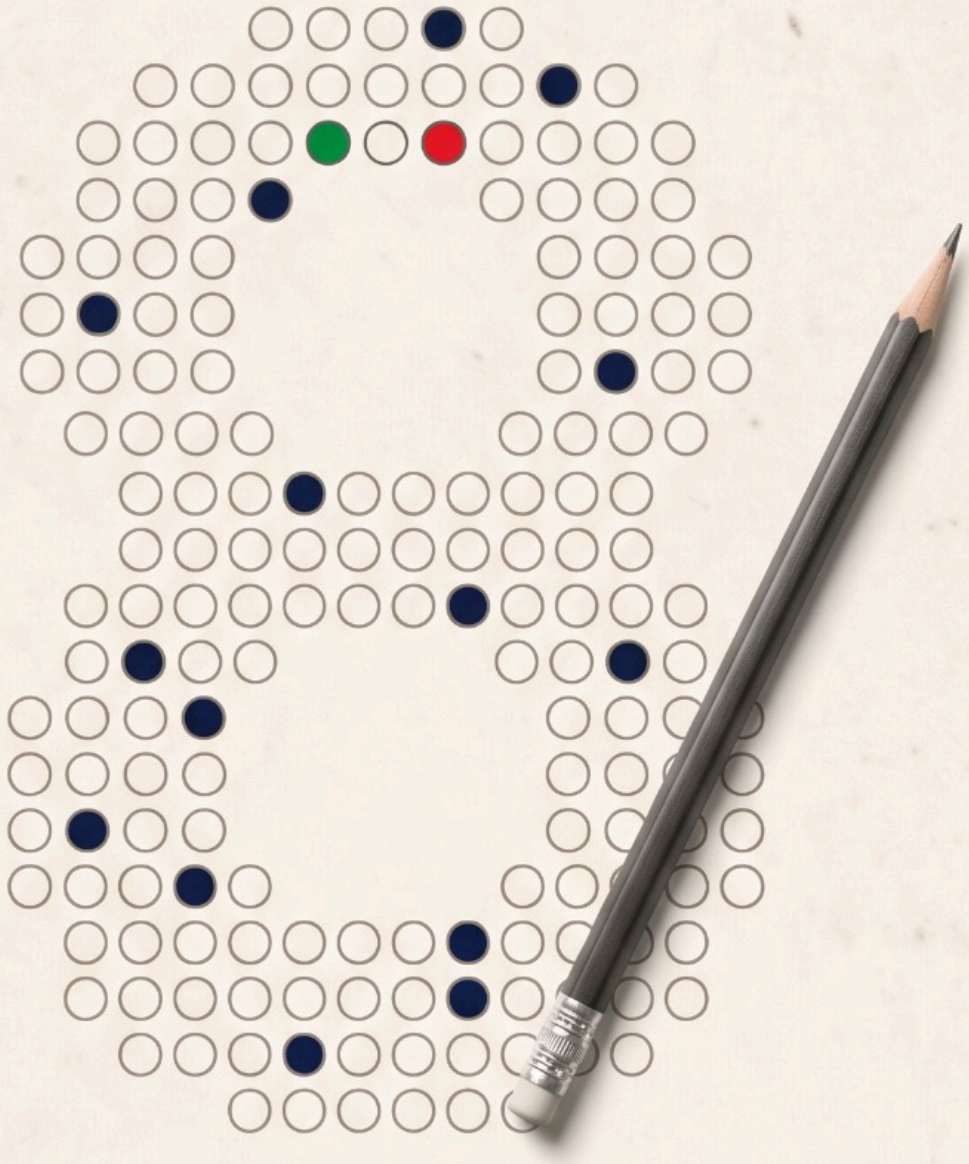

| | |
|---|---|
| Telefon | +90 534 033 12 91 |
| Web | herandacademy.com |
| Instagram | @herand_academy |
| Adres | Halkalı, İstanbul<br>Marmara Üniversitesi, İstanbul |

İTALYA'DA ÜNİVERSİTEYE GİRİŞ SINAVI

# CENT-S

## *8 deneme sınavı*

520 soru
Cevap anahtarı
Türkçe çözümler



Çıkmış sorular ve sınavda çıkma ihtimali yüksek sorular

*Prof. Dr. Deniz Herand*

HERAND ACADEMY