PROVE UFFICIALI DEGLI ANNI PASSATI

IMAT 2025

A B C D E

FAC-SIMILE DA SVOLGERE

Risposte in ordine casuale e foglio delle risposte

WHAT'S IN THIS DOCUMENT

Prova di ammissione IMAT 2025, pubblicata dal Ministero dell'Università e della Ricerca (accessoprogrammato.mur.gov.it). Versioni, soluzioni e commenti di TestBuddy, che non è collegata al Ministero.

- The questions laid out by TestBuddy, with the answers in random order
- The answer sheet
- The answer key

Reading skills and knowledge acquired during studies	2 questions
Questions	39 questions
Logical reasoning and problem-solving	2 questions
Biology	3 questions
Chemistry	7 questions
Physics and Mathematics	6 questions
Total	**59 questions**

HOW TO USE IT

1 · TIMED

Give yourself about a minute and a half per question, no notes, as in the exam.

2 · CHECK

Mark the wrong answers and read why each one is wrong, not only the right one.

3 · REVIEW

Go back to the topics where you made most mistakes and redo the questions in the app.

READING SKILLS AND KNOWLEDGE ACQUIRED DURING STUDIES

1 **"Other serious conditions (the frequency cannot be determined based on available data): yellowing of the skin or the whites of the eyes (indicative of severe liver cell damage or jaundice), or symptoms such as fever, rash, and kidney enlargement. These may sometimes be accompanied by painful urination and lower back pain (signs of severe kidney inflammation), which can potentially progress to kidney failure."**
From the informational leaflet for Teva Pantoprazolo
Which of the following statements is the correct interpretation of the information contained in this excerpt?

- A Using this medication could lead to serious kidney problems.
- B Those with kidney failure may benefit from using this medication.
- C Using this medication always leads to yellowing of the skin.
- D Using this medication could lead to pancreatic problems.
- E Using this medication never leads to urinary tract problems.

2 **"The Information and Communication Technology sector in Apulia is in full recovery. After the 2.4% decline recorded in 2020, the Apulian digital market -- valued just under three billion -- is regaining ground, resuming the steady growth seen in recent years. Despite the difficulties companies face in finding all the specific professionals, whom the university system can only partially train, the upward trend has resumed.**
As demonstrated by the results of Exprivia, active in ICT and listed on the MTA market of the Milan Stock Exchange, in the first quarter, the revenue of this big player -- total revenues in 2020 at 167.8 million, 2,400 professionals distributed in 7 countries worldwide -- grew by 5.4% compared to the same period in 2020, rising from 38 to 41 million. Profitability has grown and continues to grow, which in 2020 was 12.7 percent. 'Companies,' explains Gianni Sebastiano, Investor Relator of the group led by Domenico Favuzzi, 'are recovering profitability because they are revising their processes. The more digitalization you put into processes, the more you impact efficiency and costs: this is the great lesson of the pandemic.' The Apulian company aims to consolidate the growth recorded in recent months in all the markets in which it operates as a system integrator: public administration, banks, aerospace, local health, telemedicine."
from "Il Sole 24 ore" 28 June 2021
Indicate which of the following statements is not correct:

- A the growth of the Apulian digital sector is due to, among other reasons, revisions in company processes.
- B despite shortages in the number of adequate professionals, the Apulian digital sector has recorded increased profitability over the past year.
- C the pandemic was one the factors that led to the digitalization of company processes.
- D the pandemic ensured the growth of the Apulian digital sector because companies in the sector transformed into digital companies.
- E the digitalization of company processes is one of the principle causes for the economic growth of the sector.

QUESTIONS

3 **"This animal catches a man and straightway kills him; after he is dead, it weeps for him with a lamentable voice and many tears. Then, having done lamenting, it cruelly devours him. It is thus with the hypocrite, who, for the smallest matter, has his face bathed with tears, but shows the heart of a tiger and rejoices in his heart at the woes of others, while wearing a pitiful face."**
The Notebooks of Leonardo da Vinci
Which animal is the author talking about in this text?

- A Boa
- B Tiger
- C Panther
- D Crocodile
- E Lion

4 **In 1955, Dr. Vincent Zigas discovered that kuru, a deadly inflammation of the brain widespread among the indigenous people of New Guinea, was caused by a practice linked to a local funeral rite: eating the brains of deceased relatives. Another encephalopathy that resembles kuru is Creutzfeldt-Jakob disease, which is not only found in New Guinea. Creutzfeldt-Jakob is rare and a difficult-to-diagnose problem, as it is sometimes confused with diseases like Alzheimer's. Both kuru and Creutzfeldt-Jakob are caused by an infectious protein, the prion, present in the tissues of the affected individuals even after death.**
G. Maga Batteri spazzini e virus che curano Zanichelli
Only one of the following statements is coherent with the excerpt:

- A Creutzfeldt-Jakob Disease is widespread in New Guinea as a result of the practice of consuming the brains of deceased relatives
- B Kuru, Creutzfeldt-Jakob Disease and Alzheimer’s are diseases whose diagnoses can be confused with each other
- C the prion is a bacterium which develops after death inside tissue proteins
- D Alzheimer’s is recognizable as a development of Creutzfeldt-Jakob Disease
- E Vincent Zigas discovered a cure for the negative effects of prions

LOGICAL REASONING AND PROBLEM-SOLVING

5 **Consider this statement:**
The number two is a prime number.
Which of the following statements is deducible from the given statement?

- A No number is a prime number.
- B At least one number is not a prime number.
- C All numbers are prime numbers.
- D At least one prime number exists.
- E No prime numbers exist.

6 **From the given statements**
If today is Saturday, then I am a philosopher
I am not a philosopher
Which conclusion can be deduced?

- A Today is Saturday.
- B None of the other choices is correct.
- C Today is Friday.
- D Today is not Saturday.
- E I am a philosopher.

QUESTIONS

7 **Alberto, Beatrice, Carlo, and Daniela are dining at the same square table, each seated on one side of the table. Alberto is seated to the left of Beatrice but not to the right of Carlo. Which of the following statements can be deduced?**

A Daniela is seated to the right of Carlo.
B Daniela is seated to the left of Beatrice.
C Alberto is seated to the left of Carlo.
D Beatrice is seated across from Alberto.
E Carlo is seated across from Beatrice.

8 **Three pills — coloured blue, red, and green, respectively, — are each placed individually inside three small boxes of the same colours — blue, red, and green — in such a way that no pill is inside the box of its own colour. Additionally, the blue pill is not in the green box. Which pill is in which box?**

A The blue pill is in the green box, the green pill is in the red box, the red pill is in the blue box.
B The green pill is in the blue box, the red pill is in the green box, the blue pill is in the red box.
C The blue pill is in the blue box, the green pill is in the green box, the red pill is in the red box.
D The red pill is in the blue box, the green pill is in the green box, the blue pill is in the red box.
E The green pill is in the blue box, the red pill is in the blue box, the blue pill is in the green box.

9 **At this moment, an analogue clock is showing exactly 3:00 PM. After the minute hand has completed 1.75 full rotations from its current position, what time will the clock indicate?**

A 4:45 PM
B 5:00 PM
C 3:35 PM
D 4:30 PM
E 1:25 PM

BIOLOGY

10 **During lactic fermentation, pyruvic acid is:**

- A phosphorylated
- B dephosphorylated
- C reduced
- D oxidised
- E decarboxylated

11 **Which of the following statements about glycolysis is correct?**

- A Phosphofructokinase catalyses the conversion of fructose 1,6-bisphosphate to dihydroxyacetone phosphate.
- B In the first part, $FADH_2$ is formed.
- C Triose phosphate isomerase catalyses the conversion of dihydroxyacetone phosphate to 1,3-bisphosphoglycerate.
- D When a molecule of glucose is converted to pyruvate in glycolysis, CO_2 is produced.
- E When a molecule of glucose is converted to pyruvate in glycolysis, 2 NAD^+ are reduced.

12 **Each acetyl-CoA molecule that enters the Krebs cycle produces:**

- A 3 NADH, 1 $FADH_2$, 1 GTP and 2 molecules of CO_2
- B 3 NADH, 1 $FADH_2$, 2 GTP and 3 molecules of CO_2
- C 2 NADH, 2 $FADH_2$, 2 GTP and 2 molecules of CO_2
- D 3 NADH, 1 $FADH_2$, 1 GTP and 3 molecules of CO_2
- E 1 NADH, 3 $FADH_2$, 1 GTP and 2 molecules of CO_2

QUESTIONS

13 **Oxidative phosphorylation is a metabolic pathway:**

A through which the amino group resulting from the degradation of amino acids is eliminated
B which represents the final stage of the anabolism of amino acids, carbohydrates, and fatty acids
C through which fatty acid synthesis occurs
D through which fatty acids are broken down by removing two carbon atoms at a time
E through which the energy stored in reduced coenzymes is used for the synthesis of ATP

14 **Cytochromes are:**

A inhibitors of oxidative phosphorylation
B transporters of hydrogen atoms in the respiratory chain
C present in the respiratory chain
D cofactors of glycolysis
E enzymes that synthesize ATP

15 **Collagen is a protein that is:**

A extracellular
B abundant in the thick filament
C intracellular
D membranous
E nuclear

16 **Muscle contraction is triggered by an increase in the concentration of calcium ions that bind to:**

A troponin
B myosin
C actin
D tropomyosin
E vimentin

17 **Which of the following statements about myosin and actin is CORRECT?**

A The binding of ATP to the actin-myosin complex promotes the formation of the complex.
B The binding of calcium to troponin is necessary for the dissociation of the actin-myosin complex.
C The binding of ATP to the actin-myosin complex promotes the dissociation of the complex.
D Actin has ATPase activity.
E Tropomyosin has ATPase activity.

18 **The Bohr effect is observed in tissues that are oxidizing large amounts of nutrients, generating hydrogen ions, and releasing CO_2 into the blood. This results in:**

A an increase in the total number of red blood cells
B a decrease in oxygenated haemoglobin molecules
C an increase in protein synthesis
D the denaturation of haemoglobin
E an increase in oxygenated haemoglobin molecules

19 **Which of the following compounds corresponds to the statement "a substance that increases the speed of a reaction and is found unchanged at the end of it"?**

A Effector
B Modulator
C Cofactor
D Cholesterol
E Catalyst

20 **In competitive inhibition:**

A the inhibitor binds to the allosteric site and prevents the substrate from binding to the enzyme
B the inhibitor prevents the release of products from the active site
C the inhibitor binds to the substrate, preventing a reaction with the enzyme
D the inhibitor binds to the enzyme-cholesterol complex
E the inhibitor and the substrate compete for the active site of the enzyme

21 **Which of the following classes of digestive enzymes is involved in the digestion of proteins?**

A Peptidase
B Isomerase
C Transaminase
D Lipase
E Amylase

22 **Oxidative phosphorylation involves:**

A both membrane proteins and mobile molecules
B exclusively mitochondrial matrix proteins
C only nuclear proteins
D exclusively integral membrane proteins
E exclusively peripheral proteins

23 **How are the reduced coenzymes that are formed during biological oxidation reoxidized?**

A Through the process of beta oxidation
B By direct action of oxygen
C With the synthesis of hormones
D Through the passage of electrons in ATP synthase
E Through the respiratory chain

24 **Which high-energy reserve compound contains phosphate groups and is present in muscles?**

A Creatinine phosphate
B Glucose 1-phosphate
C Carnitine phosphate
D Phosphofructokinase
E Creatine phosphate

25 **Which of the following metabolic processes occurs mainly in the liver?**

A Glycolysis
B Urea cycle
C The Krebs Cycle
D Transamination
E β-oxidation of fatty acids

26 **It is more advantageous for humans to store energy as triglycerides in adipose tissue rather than as proteins in muscles because triglycerides in adipose tissue contain:**

A more calories and less water
B fewer calories and more water
C more calories and more water
D more oxygen and less nitrogen
E fewer calories and less water

27 **Lysosomes are organelles:**

A whose malfunction is currently not believed to be associated with diseases
B that form by budding from the Golgi apparatus
C equipped with enzymes that function optimally at a pH above 7
D that form by budding from the smooth endoplasmic reticulum
E responsible for the synthesis of proteins destined for secretion

28 **Which of the following statements is correct?**

A The rough endoplasmic reticulum contains the DNA necessary for protein synthesis.
B All cellular organelles possess a small amount of DNA.
C The nucleus, mitochondria and chloroplasts all contain DNA.
D Only the nucleus contains DNA while mitochondria and chloroplasts contain RNA.
E Prokaryotes have a well-defined nucleus containing DNA.

29 **What is the main function of the plasma membrane in cells?**

A Synthesizing proteins
B Facilitating cell movement
C Containing the cell's genetic material
D Providing energy to the cell
E Regulating exchanges between the inside and outside of the cell

30 **Which reactions are defined as exergonic?**

A Reactions that occur only in the presence of light
B Reactions that release energy and occur spontaneously
C Reactions that produce chemical energy without the consumption of reactants
D Reactions that require heat to proceed
E Reactions that always involve the synthesis of new compounds

31 **What is the main role of osteoblasts?**

A Producing collagen and minerals for the bone matrix
B Regulating blood pH
C Breaking down damaged bone tissue
D Resorbing minerals from the bone
E Transporting nutrients in the bone marrow

32 **Insulin:**

A stimulates glucose uptake in muscle
B inhibits fatty acid synthesis
C stimulates the breakdown of glycogen
D is a steroid hormone
E is secreted by the adrenal gland

CHEMISTRY

33 **The equation of state for ideal gases is:**

A $nV = PRT$
B $V = RT/(Pn)$
C $PV = nRT$
D $V = Pn/(RT)$
E $Pn = VRT$

34 **In which of these compounds does Cl have an oxidation number of +3:**

A Cl_2
B $HClO_3$
C HCl
D $HClO$
E $HClO_2$

35 **An oxidation number cannot be:**

A a positive number
B a number with a decimal point
C an irrational number
D zero
E a negative number

36 **What kind of solid is NaCl?**

A Ionic
B Metallic
C Amorphous
D Molecular
E Covalent network

37 **In the periodic table, the atomic radius increases going:**

A from left to right and from top to bottom
B from right to left and from top to bottom
C from right to left and from bottom to top
D from left to right and from bottom to top
E from top to bottom but horizontally in a very irregularly way

38 **A pure covalent bond is a bond that forms between:**

- A two atoms with very different electronegativity
- B two identical ions
- C two atoms of the same element
- D two atoms with no electronegativity
- E two atoms with quite similar electronegativity

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39 **The pH of an aqueous solution of a monoprotic weak acid with the constant $K_a = 1.0 \times 10^{-5}$ and concentration 0.001 M is:**

- A 5.5
- B 8
- C 4
- D 3
- E 10^{-8}

QUESTIONS

40 **What is the pH of a 0.7 M aqueous solution of KBr?**

A 10^{-7}
B 7
C $10^{-0.7}$
D 0.7
E 13.3

42 **The activation energy of a reaction represents:**

A the difference between the energy of the products and that of the reactants
B the energy that is released only in the initial phase of any reaction in solution
C the energy released during the progress of a reaction
D the difference between the kinetic energy and the potential energy of the reactants
E the energy barrier that the reactants must overcome to transform into products

43 **In benzene:**

A all the carbon atoms are sp^2 hybridized and the molecule has a chair or boat structure
B all the carbon atoms are sp hybridized
C three carbon atoms are sp^3 hybridized and three atoms are sp^2 hybridized
D all the carbon atoms are sp^2 hybridized and the molecule has a planar structure
E all the carbon atoms are sp^3 hybridized and the molecule has a planar structure

44 **Glycogen:**

A is a storage molecule present in both animal and plant cells
B is a disaccharide
C is a homopolysaccharide
D is a heteropolysaccharide
E is a polypeptide

45 **The compound $FeCO_3$ is:**

A none of the other answers is correct
B ferrous carbonate
C iron pentacarbonyl
D ferric carbonate
E iron oxide

46 **How many electrons can occupy an orbital?**

A Just one
B Four
C Two with antiparallel spins
D Two with parallel spins
E Three

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47 **Which of the following statements about amino acids is true?**

A They contain an amine group and a carboxyl group
B They are one of the main constituents of carbohydrates
C They are normally poorly soluble in water
D They have no acid/base activity
E They dissolve well in hexane

PHYSICS AND MATHEMATICS

48 **What is the solution to the inequality $\sqrt{2x} < 1 + x$?**

- A $\forall x \neq 0$
- B R
- C $\forall x > 0$
- D $\forall x \geq 0$
- E $\varnothing$

49 **Which of the following inequalities is satisfied for every real value of x ?**

- A $2\sin^2 x - \sin x - 1 > 0$
- B $\tan^2 x - 2\tan x + 1 > 0$
- C $\sin^2 x + \sin x - 2 \leq 0$
- D $\cos^2 x - \cos x - 2 \geq 0$
- E $2\cos^2 x + \cos x - 1 < 0$

50 **What does the Cartesian product of a set A and a set B correspond to?**

- A The set consisting of the products of corresponding numerical elements of A and B
- B The representation of the union set of A and B
- C The set of all possible ordered pairs having as the first component an element of A and as the second component an element of B
- D The representation of the intersection set of A and B
- E The representation of the difference set of A and B

51 **The trinomial $a^2 - 4ab + 4b^2$ is equal to:**

- A $a^2 - b^2$
- B $(a - 2b)^2$
- C $(a + 2b)^2$
- D $a^2 + b^2$
- E $2(a + b)^2$

52 **In a rectangle ABCD the base AB is $5/4$ of the height BC and the perimeter is 72 cm. What are the dimensions of the rectangle?**

A AB = 20 m; BC = 16 m
B AB = 18 m; BC = 16 m
C AB = 20 m; BC = 18 m
D AB = 10 m; BC = 8 m
E AB = 12 m; BC = 10 m

53 **For which values of a is the equation $3x + a = 3$ determined?**

A For no value of a
B For $a \neq -3$
C For $a \neq 0$
D For any value of a
E For $a \neq 3$

QUESTIONS

54 **Given the equation $(a+3)x=5$, which of the following values of a is impossible?**

A $a=3$
B $a=-5$
C $a=5$
D $a=-3$
E $a=0$

55 **Two cars, A and B, are moving in uniform rectilinear motion with speeds of 120 km/h and 80 km/h, respectively. If at the initial moment A is 500 meters behind B, after one minute:**

A A will never overtake B
B A will overtake B after a much longer time than one minute
C A has overtaken B
D A has exactly reached B
E A has not yet overtaken B

56 **An electric circuit consists of 100 branches connected in parallel. Each branch has 10 resistors in series, each with a value of R. What is the equivalent resistance?**

A $R/10$
B $10R$
C $R/100$
D R
E $100R$

57 **Which of these particles move in a straight horizontal metal wire carrying a current from left to right?**

A Only the electrons moving from right to left
B Only the electrons moving from left to right
C Only the protons moving from right to left
D The electrons moving from left to right and the protons from right to left
E Only protons moving from left to right

58 **An astronaut takes a spacewalk at a distance from the Earth's surface equal to three times the Earth's radius. What fraction of g corresponds to the acceleration experienced by the astronaut?**

A $1/6$
B $1/4$
C $1/3$
D $1/16$
E $1/9$

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59 **A car with a mass of 2.0×10^3 kg travels in a straight line at a constant speed on a flat road. Its speed is 15 m/s. At a certain moment ($t = 0$) it accelerates with a constant acceleration of 2.0 m/s^2, in the same direction as the velocity. The constant friction force is 2000 N. The forces F1 e F2 exerted by the engine in the first and second segments, respectively, are:**

A $F1 = 2000$ N, $F2 = 6000$ N
B $F1 = F2 = 2000$ N
C $F1 = 0$, $F2 = 6000$ N
D $F1 = 0$, $F2 = 4000$ N
E $F1 = 30 \times 10^3$ N, $F2 = 4000$ N

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60 **A stationary liquid exerts on the walls of the container that holds it:**

A forces in any direction relative to the walls
B forces equal to zero
C forces always parallel to the walls at every point
D no forces on the walls, only pressure
E forces always perpendicular to the walls at every point

ANSWER SHEET

Fill in one box per question, as in the exam. The key is on the next page.

1	A B C D E	21	A B C D E	42	A B C D E
2	A B C D E	22	A B C D E	43	A B C D E
3	A B C D E	23	A B C D E	44	A B C D E
4	A B C D E	24	A B C D E	45	A B C D E
5	A B C D E	25	A B C D E	46	A B C D E
6	A B C D E	26	A B C D E	47	A B C D E
7	A B C D E	27	A B C D E	48	A B C D E
8	A B C D E	28	A B C D E	49	A B C D E
9	A B C D E	29	A B C D E	50	A B C D E
10	A B C D E	30	A B C D E	51	A B C D E
11	A B C D E	31	A B C D E	52	A B C D E
12	A B C D E	32	A B C D E	53	A B C D E
13	A B C D E	33	A B C D E	54	A B C D E
14	A B C D E	34	A B C D E	55	A B C D E
15	A B C D E	35	A B C D E	56	A B C D E
16	A B C D E	36	A B C D E	57	A B C D E
17	A B C D E	37	A B C D E	58	A B C D E
18	A B C D E	38	A B C D E	59	A B C D E
19	A B C D E	39	A B C D E	60	A B C D E
20	A B C D E	40	A B C D E		

ANSWER KEY

Valid for this TestBuddy version: the answers are in a different order from the official paper.

1	A	21	A	42	E
2	D	22	A	43	D
3	D	23	E	44	C
4	B	24	E	45	B
5	D	25	B	46	C
6	D	26	A	47	A
7	A	27	B	48	D
8	B	28	C	49	C
9	A	29	E	50	C
10	C	30	B	51	B
11	E	31	A	52	A
12	A	32	A	53	D
13	E	33	C	54	D
14	C	34	E	55	C
15	A	35	C	56	A
16	A	36	A	57	A
17	C	37	B	58	D
18	B	38	C	59	A
19	E	39	C	60	E
20	E	40	B		

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