



IMAT 2025
PROGRAM

TOLC MED 2024 (JULY) EXAM

TRANSLATED BY :
LOCOMOTIVE Group

PREPARED FOR :
IMAT Candidates

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A PLAN FOR THE 17TH OF SEPTEMBER



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TABLE OF CONTENTS

The TOLC-MED test is administered twice a year by the Italian Ministry of Education. While these exams are generally easier than the IMAT tests, they share the same syllabus and number of questions. To prepare effectively for the IMAT exams, it is advisable for students to practice with the TOLC-MED tests. We recommend that students solve tests from at least the past five years.

01 LOGIC



5 Questions
All types of question

02 GK



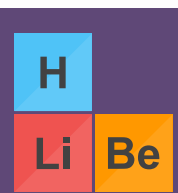
4 Questions
All types of questions

03 BIOLOGY



23 Questions
All topics

04 CHEMISTRY



15 Questions
All topics

05 PHYSICS



7 Questions
All topics

06 MATH



6 Questions
All topics



Reading Comprehension and Acquired Knowledge Test

1. What does the Greek term "Decameron", title of a work by Boccaccio, indicate?

- A) The ten days over which the action takes place
- B) The hundred short stories collected in the work
- C) The ten short stories told by the protagonists
- D) The ten young friends who are the protagonists of the work
- E) The ten rooms of the house in which the protagonists meet

2. Which alternative is consistent with the content of the following passage?

Animals are heterotrophic and, as such, must obtain from outside sources — for their energy needs — already-formed organic substances: proteins, sugars, and fats already present in organized form in food. The problem for animals is therefore not that of building up organic substances, as is typical of plants, but rather that of breaking such organic substances down into smaller molecules, so that they can pass from the outside world, crossing the cell membrane, into the inner world of the cell. To this end, food is subjected to a series of mechanical and biochemical treatments capable of isolating its constituent organic molecules.

- A) Proteins, sugars, and fats must become organic substances so that animals can feed on them
- B) Being heterotrophic, animals satisfy their energy needs thanks to cell membranes
- C) The dietary approach of animals and plants is opposite, since the former must take in already-formed organic substances from outside, while the latter must break them down
- D) Unlike plants, which build up organic substances, animals break them down, feeding exclusively on plants
- E) Animals must isolate the constituent organic molecules of food in order to feed on it

3. Which alternative correctly summarizes the following passage?

The 20th century inherits from the previous century the drive to continue along the path of expressive research increasingly independent of sensory experience and increasingly detached from the tradition of our Western civilization, within an by-now established freedom of themes. Discoveries and achievements generate one another with a speed and breadth previously unheard of: the universal language of art favors international movements. Painting and sculpture, the distinction between which becomes ever more blurred, produce images of every possible reality — psychic, rational, unconscious, existential, down to the purely random — at first in a position of competition, by analogy or contrast, with science and technology, and then increasingly asserting their independence from consumerist economics, their being "other" than everything else, to the point of achieving "behavioral values."



- A) The 20th century produces an alien art, detached from the preceding Western tradition and aimed at exploring the unconscious, the psychic, the existential, and the random. Its enemy is consumerism, but also science and technology
- B) In the 20th century, art heightens its character of research, novelty, boundary-crossing, and distance from sensory experience. Its longing for new realities leads it to assert itself as a domain entirely independent of everything else, culminating even in new behavioral values
- C) Perhaps it is in the achieved blurring between painting and sculpture that the hallmark of art's transformation in the 20th century lies: a reflection of the distancing from sensory experience and the entry of the psychic, the unconscious, and the random among artistic themes
- D) Bold expressive research, detachment from experience, a gaze on the existential as much as on the random. These are the themes of 20th-century art, caught between consumerism, science and technology, and searching for its own space. But what it expresses is anguish
- E) New behavioral values are what 20th-century art places at the center of attention. But it must claim a space of its own, even at the cost of taking it from science and technology. Its unreal creations are the vehicle for those values

4. Which of the following alternatives lists the events in the correct chronological order?

- A) Congress of Vienna – Expedition of the Thousand – First War of Independence against the Austrian Empire – Mazzini founds Young Italy – proclamation of the Kingdom of Italy
- B) First War of Independence against the Austrian Empire – Congress of Vienna – Mazzini founds Young Italy – Expedition of the Thousand – proclamation of the Kingdom of Italy
- C) Congress of Vienna – Mazzini founds Young Italy – First War of Independence against the Austrian Empire – Expedition of the Thousand – proclamation of the Kingdom of Italy
- D) First War of Independence against the Austrian Empire – Congress of Vienna – Expedition of the Thousand – Mazzini founds Young Italy – proclamation of the Kingdom of Italy
- E) Mazzini founds Young Italy – Expedition of the Thousand – proclamation of the Kingdom of Italy – First War of Independence against the Austrian Empire – Congress of Vienna

Logical Reasoning and Problem-Solving Test

5. To compose a code correctly, the following instructions must be followed: C is immediately to the right of T, and N is between E and C. E is to the right of C and immediately to the left of G. Z is to the right of G, as is X, though X is to the left of Z. Which sequence results from correctly executing the instructions, read from right to left?

- A) ZGXENCT
- B) ZXGENCT
- C) ZXGENTC
- D) TCNGEXZ
- E) TNCEGXZ



6. There are three boxes: D, E, and F. D weighs four times the sum of E and F, and E weighs 10 g less than F. If F weighs 0.04 kg, how many hectograms (hg) does D weigh?

- A) 28
- B) 2.8
- C) 280
- D) 0.28
- E) 0.028

7. Giacomo, Alessia, and Romina belong to the same family. The sum of Giacomo's and Romina's ages is 62 years, that of Alessia's and Giacomo's ages is 43 years, and the sum of Alessia's and Romina's ages is 55 years. How old is Romina?

- A) 25
- B) 35
- C) 37
- D) 27
- E) 18

8. Four friends, all doctors, meet at a conference and sit together at a single round table during lunch. Their names are Maria, Antonio, Cristina, and Giacomo, and their professions are, not in order: pediatrician, surgeon, neurologist, orthopedist. The surgeon sits to the left of Maria, while the neurologist sits opposite Antonio. Cristina and Giacomo sit next to each other, and a woman sits to the left of the orthopedist. What is the pediatrician's name?

- A) Maria
- B) Antonio
- C) Cristina
- D) Giacomo
- E) Either Antonio or Cristina, but it is impossible to determine

9. All CUZ are CW; no DE is CW; some DE are DR. If the preceding statements are true, then it is NOT certainly true that:

- A) no DE can be CUZ
- B) some DR can be CW
- C) no DR can be CUZ
- D) not all DR are certainly also DE
- E) some CW might not be CUZ



Biology Test

10. Which of the following statements about bioelements is FALSE?
- A) They do not represent the basic chemical elements of plant organisms
 - B) They can be present in high concentrations in living organisms
 - C) They can be present in low concentrations in living organisms
 - D) They can be present in trace amounts in living organisms
 - E) Carbon, oxygen, hydrogen, nitrogen, phosphorus, and sulfur represent about 99% of all living matter
11. Which of the following components has the smallest dimensions?
- A) Platelet
 - B) Ribosome
 - C) Mitochondrion
 - D) Red blood cell
 - E) Ovum (egg cell)
12. The cell wall of fungi is composed mainly of:
- A) peptidoglycans
 - B) cellulose
 - C) chitin
 - D) phospholipids
 - E) glycogen
13. Which of the following cellular structures is NOT present in prokaryotic cells?
- A) Ribosome
 - B) Capsule
 - C) Cell wall
 - D) Pili
 - E) Mitochondria
14. The average diameter of eukaryotic cells can approximately range between:
- A) 10-100 mm
 - B) 10-100 nm
 - C) 10-100 pm
 - D) 10-100 μm
 - E) 10-100 dm



15. Genomic DNA within the eukaryotic cell is found:

- A) in the nucleus, in the form of a single circular strand
- B) free in the cytoplasm
- C) in the nucleoid, associated with histone proteins
- D) in the cytoplasm, in the form of a single circular strand
- E) in the nucleus, associated with histone proteins

16. Indicate which of the following statements about mitochondrial DNA is true.

- A) It consists of a series of single-stranded linear molecules
- B) It contains about 23,000 genes
- C) It is transmitted only by the father
- D) It is smaller than nuclear DNA
- E) It is located in the nucleus of eukaryotic cells

17. The ribosomes of prokaryotic cells are composed of two subunits, one larger and one smaller, called respectively:

- A) 50S and 30S
- B) 60S and 40S
- C) 80S and 70S
- D) 40S and 20S
- E) 30S and 10S

18. The transport of substances between the nucleus and the cytoplasm through the nuclear membrane:

- A) does not occur
- B) occurs mainly through nuclear pores
- C) occurs by diffusion
- D) occurs through endocytosis
- E) occurs through voltage-gated channels

19. Which of the listed biomolecules is NOT present in the membrane of animal cells?

- A) Sterol
- B) Phospholipid
- C) Glycoprotein
- D) Nitrogenous base
- E) Glycolipid

20. Which of the following statements about enzymes is FALSE?

- A) They act specifically on a given substrate
- B) They are not consumed during the chemical reaction
- C) They lower the activation energy of a chemical reaction
- D) They are effective even in small amounts
- E) They decrease the rate at which the reaction occurs



21. Which of the following structures is present in "naked" viruses?

- A) Lysosomes
- B) Endoplasmic reticulum
- C) Golgi apparatus
- D) Lysosomes Capsid
- E) Mitochondria

22. Which of the following mechanisms is identified as PASSIVE transport?

- A) Uniport
- B) Endocytosis
- C) Diffusion
- D) Symport
- E) Exocytosis

23. How many physiological curves make up the vertebral column?

- A) 3 curves, 2 lordoses and 1 kyphosis
- B) 4 curves, 2 kyphoses and 2 lordoses
- C) 5 curves, 3 lordoses and 2 kyphoses
- D) 3 curves, 2 kyphoses and 1 lordosis
- E) 4 curves, 3 lordoses and 1 kyphosis

24. The process by which the nuclear division of cells occurs is called:

- A) Mitosis or karyokinesis
- B) Interphase
- C) Anaphase
- D) Telophase
- E) Metaphase

25. During meiosis, what does the phenomenon of crossing-over consist of?

- A) The reciprocal exchange of DNA segments between homologous chromosomes
- B) The division of the cytoplasm of the mother cell
- C) The disappearance of the nuclear envelope
- D) The condensation of chromatin
- E) The de-spiralization of chromosomes

26. The process of mitosis gives rise to which, and how many, daughter cells?

- A) Two haploid cells
- B) Four diploid cells
- C) Two diploid cells
- D) Four haploid cells
- E) One diploid cell



27. What happens during the S phase of the cell cycle?

- A) The cell enters quiescence
- B) Nuclear division
- C) Cell division
- D) DNA synthesis
- E) Synthesis of RNA and proteins, but not of DNA

28. Which part of the nervous system are emotions, memory, and learning mainly dependent on?

- A) The corpus callosum
- B) The spinal cord
- C) The pituitary gland
- D) The limbic system
- E) The brainstem

29. A man affected by familial hypercholesterolemia, a genetic disease with dominant inheritance, married to a healthy woman, has had an affected son and daughter and a healthy son and daughter. We can deduce that:

- A) the woman is heterozygous
- B) the disease is X-linked
- C) the disease is Y-linked
- D) the man is homozygous
- E) the man is heterozygous

30. Vascular plants absorb water from the soil mainly through:

- A) the ligule
- B) the root apex
- C) root hairs
- D) stem hairs
- E) hydathodes

31. Following a backcross, offspring are obtained consisting of 50% long-tailed mice (dominant trait) and 50% short-tailed mice (recessive trait). Identify which alternative represents the correct cross.

- A) $Aa \times aa$
- B) $aa \times aa$
- C) $Aa \times Aa$
- D) $Aa \times AA$
- E) $A \times a$



32. The systemic circulation originates:

- A) in the right ventricle, and carries oxygenated blood to the tissues
- B) in the left ventricle, and carries oxygenated blood to the tissues
- C) in the left ventricle, and carries blood to be oxygenated to the lungs
- D) in the right ventricle, and carries blood to be oxygenated to the lungs
- E) in the left atrium, and carries oxygenated blood to the tissues

Chemistry Test

33. What is the volume in liters of oxygen gas needed to react with 2 liters of methane according to the reaction $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$, measured under the same conditions of temperature and pressure?

- A) 1
- B) 2
- C) 4
- D) 5
- E) 6

34. Consider one mole of nitrogen with molecular formula N_2 . If its weight is 28 g, then we can say that:

- A) the atomic weight of nitrogen is 14 a.m.u.
- B) one mole of nitrogen under standard conditions occupies 224 liters
- C) one molecule of nitrogen weighs 28 grams
- D) the atomic mass of nitrogen is 28
- E) one mole of N_2 molecules weighs 14

35. Which of the following elements has the highest first ionization energy?

- A) Si
- B) S
- C) Al
- D) Mg
- E) Na

36. The gross (empirical) formula of calcium phosphate is:

- A) $\text{Ca}_3(\text{P}_5\text{O})_4$
- B) $3\text{Ca}(\text{PO}_4)_2$
- C) $\text{Ca}_3(\text{HPO}_4)_2$
- D) $\text{Ca}_3(\text{PO})_5$
- E) $\text{Ca}_3(\text{PO}_4)_2$



37. Which of the following chemical formulas is NOT possible?

- A) KMnO_4
- B) $\text{Ca}(\text{BO}_3)_2$
- C) NaClO_4
- D) $\text{Ca}(\text{H}_2\text{PO}_4)_2$
- E) PbCO_3

38. An increase in the boiling point of an aqueous solution depends on:

- A) only the osmotic pressure
- B) only the chemical nature of the solute
- C) only the number of solute particles in solution
- D) only the Van der Waals forces
- E) only the latent heat

39. The aluminum atom must:

- A) lose 5 electrons to achieve the octet
- B) lose 4 electrons to achieve the octet
- C) lose 3 electrons to achieve the octet
- D) gain 3 electrons to achieve the octet
- E) gain 4 electrons to achieve the octet

40. Identify the decomposition reaction:

- A) $\text{Cl}_2 + \text{H}_2 \rightarrow 2\text{HCl}$
- B) $2\text{Mg} + \text{SiO}_2 \rightarrow 2\text{MgO} + \text{Si}$
- C) $5\text{C} + 2\text{P}_2\text{O}_5 \rightarrow 5\text{CO}_2 + \text{P}_4$
- D) $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$
- E) $\text{NH}_4\text{Cl} + \text{KOH} \rightarrow \text{NH}_3 + \text{KCl} + \text{H}_2\text{O}$

41. An aqueous solution of glucose and sucrose is given. Knowing that the mole fraction of glucose is 0.07, which of the following options is correct?

- A) The sum of the mole fractions of water and sucrose equals 1
- B) The mole fraction of sucrose is 0.07 and that of water is 0.7
- C) The mole fraction of water is 1, since it is the solvent
- D) The mole fraction of sucrose is certainly greater than that of glucose, since sucrose is a disaccharide
- E) The mole fraction of sucrose is 0.08 and that of water is 0.85



42. Ethane is a saturated hydrocarbon; the C–C bond present in ethane is a:
- A) triple bond
 - B) double bond
 - C) nonpolar covalent bond
 - D) hydrogen bond
 - E) ionic bond
43. In traditional oxide nomenclature, the suffix "-ic" indicates the oxide:
- A) in which the metal has the higher oxidation number
 - B) in which the metal has oxidation number +1
 - C) with the higher oxygen content
 - D) in which oxygen is not present
 - E) in which the metal forms a homopolar covalent bond with oxygen
44. Which aspect of chemistry is governed by Hund's rule?
- A) The reactivity of alcohol functional groups
 - B) The progressive filling of degenerate orbitals
 - C) The transfer of electrons from one functional group to another in a chemical reaction
 - D) The representation of molecular structure through line diagrams
 - E) The electron affinity of organic molecules
45. Identify, among the following elements, the one that can form ionic bonds with chlorine.
- A) C
 - B) P
 - C) Mg
 - D) Se
 - E) F
46. Which of the following statements about saponification is correct?
- A) It is a synthesis reaction of bases
 - B) It is the synthesis reaction of triglycerides
 - C) It is a hydrolysis reaction of esters
 - D) It is the reduction reaction of fatty acids
 - E) It is the formation reaction of phospholipids
47. What is the traditional name of the oxoacid of phosphorus with formula $\text{H}_4\text{P}_2\text{O}_7$?
- A) Metaphosphorous acid
 - B) Metaphosphoric acid
 - C) Orthophosphorous acid
 - D) Pyrophosphoric acid
 - E) Orthophosphoric acid



Physics and Mathematics Test

48. A battery supplies a potential difference of 1.5 V. The current in the circuit is 30 mA. What is the resistance of the resistor in the circuit?

- A) 50 Ω
- B) 0.045 Ω
- C) 45 Ω
- D) 0.05 Ω
- E) 6 Ω

49. The water jet from a faucet takes 20 minutes to fill a 200-liter tank. What is the volumetric flow rate?

- A) about 0.00017 m³/s
- B) about 17 m³/s
- C) about 10 m³/s
- D) about 100 m³/s
- E) about 4,000 m³/s

50. A constant force of 30 N acts on an object for 10 seconds. What is the resulting impulse?

- A) 3 N
- B) 3 N·s
- C) 15 N·s
- D) 30 N
- E) 300 N·s

51. A vector is decomposed along two perpendicular directions, x and y. Its components along x and y are 3 and 4 respectively. What is the magnitude of the vector?

- A) 14
- B) 7
- C) 1
- D) 25
- E) 5



52. Which of the following statements about an electrical circuit with resistors and capacitors is incorrect?

- A) The equivalent capacitance of capacitors in series equals the product of the individual capacitances divided by their sum
- B) The equivalent resistance of resistors in series equals the sum of the individual resistances
- C) The equivalent capacitance of capacitors in series equals the sum of the individual capacitances
- D) The equivalent capacitance of capacitors in parallel equals the sum of the individual capacitances
- E) The equivalent resistance of resistors in parallel equals the product of the individual resistances divided by their sum

53. Which law of electrical circuits states that the algebraic sum of the currents flowing into a node is zero?

- A) Kirchhoff's third law
- B) Kirchhoff's second law
- C) Kirchhoff's first law
- D) Ohm's law
- E) Gauss's law

54. Which of the following formulas can be used to calculate the magnitude of the electric field E generated by a point charge Q in a vacuum?

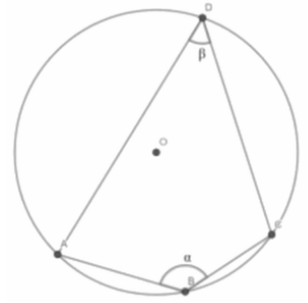
- A) $E = k_0 \cdot Q$
- B) $E = k_0 \cdot (Q / r)$
- C) $E = Q / r^2$
- D) $E = k_0 \cdot (Q / r^2)$
- E) $E = Q / r$

55. Which of the following equations represents a hyperbola with a focus at $(4, 0)$ and a vertex at $(3, 0)$?

- A) $x^2/9 - y^2/7 = 1$
- B) $y^2/9 + x^2/5 = 1$
- C) $x^2/9 - y^2/25 = 1$
- D) $x^2/3 - y^2/5 = 1$
- E) $y^2/8 - x^2/5 = 1$



56. Angle α measures 130° . What is the measure of angle β ? [see figure: a circle with an inscribed triangle; α is an inscribed/central angle and β is the angle at the top vertex]



- A) 45°
- B) 60°
- C) 25°
- D) 30°
- E) 50°

57. What is the expansion of the expression $(3ax - 5ay)^2$?

- A) $9a^2x^2 + 25a^2y^2$
- B) $9a^2x^2 - 15axy + 25a^2y^2$
- C) $9a^2x^2 - 25a^2y^2$
- D) $9a^2x^2 - 30x^2y^2 + 25a^2y^2$
- E) $9a^2x^2 - 30a^2xy + 25a^2y^2$

58. As the parameter k varies, which of the following equations represents a family of parallel lines with slope $m = 2$?

- A) $2y + 3x + 2k = 0$
- B) $3y - 6x - 4k = 0$
- C) $2y + 2kx + 5k = 0$
- D) $2ky + 3x + 2k = 0$
- E) $3ky + 8x - 4k = 0$

59. What is the ratio between the volume and the surface area of a cylinder with radius 6 cm and height 12 cm?

- A) 4 cm
- B) 1 cm
- C) 2 cm
- D) 1.5 cm
- E) 0.5 cm

60. Solve the following inequality: $-6x + (1/2 - x)(1/2 + x) - 9(-1)^2 < 0$

- A) $x < -5/2$
- B) $x < 5/2 \vee x > 7/2$
- C) $-7/2 < x < -5/2$
- D) $5/2 < x < 7/2$
- E) $x < -7/2 \vee x > -5/2$



• Answer

Total Points:/90

Correct answer:...../60

Wrong answer:...../60

Unanswered:...../60

Correct answer: +1.5 points

Wrong answer: -0.4

Unanswered: 0 points



- | | | |
|-------|-------|-------|
| 1. A | 26. C | 51. E |
| 2. E | 27. D | 52. C |
| 3. B | 28. D | 53. C |
| 4. C | 29. E | 54. D |
| 5. B | 30. C | 55. A |
| 6. B | 31. A | 56. E |
| 7. C | 32. B | 57. E |
| 8. A | 33. C | 58. B |
| 9. C | 34. A | 59. C |
| 10. A | 35. B | 60. E |
| 11. B | 36. E | |
| 12. C | 37. B | |
| 13. E | 38. C | |
| 14. D | 39. C | |
| 15. E | 40. D | |
| 16. D | 41. E | |
| 17. A | 42. C | |
| 18. B | 43. A | |
| 19. D | 44. B | |
| 20. E | 45. C | |
| 21. D | 46. C | |
| 22. C | 47. D | |
| 23. B | 48. A | |
| 24. A | 49. A | |
| 25. A | 50. E | |