Mock Exam

IMAT Mock Exam 1

IMAT (International Medical Admissions Test): the English-language admission test for medicine and surgery, dentistry and veterinary medicine at Italian state universities · Ertan Altınel

Name: _____ Date: _____

Before you start

- This mock follows the structure of the 2026 IMAT: 60 multiple-choice questions in 100 minutes, taken in a single session. You may answer the questions in any order.
- Sections: reading skills and knowledge acquired in studies (4 questions), logical reasoning and problem solving (5), biology (23), chemistry (15), physics and mathematics (13).
- Each question has five options and only one correct answer. **Scoring: correct answer** $+1.5$**, wrong answer** -0.4**, no answer** 0**.** The maximum score is 90.
- A blind guess loses a little on average, but answering is worthwhile as soon as you can rule out one option.
- No calculator is allowed. The answer key is on the last page.

Your answers

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

This mock exam was written independently for practice. It is not an official IMAT paper and is not endorsed by the Italian Ministry of University and Research or by the organisations that run the IMAT.

Section 1

Reading skills and knowledge acquired in studies

Questions 1–4

Read the following text and answer questions 1 and 2.

> In clinical trials, patients who receive an inactive pill often report real improvements in their symptoms. This placebo response is strongest for conditions whose symptoms are subjective, such as pain, nausea or fatigue, and weakest for outcomes that can be measured objectively, such as tumour size or blood cholesterol. Part of the apparent effect, however, is not caused by the pill at all. Many conditions improve naturally over time, and patients who join a trial when their symptoms are at their worst are likely to feel better later, whatever treatment they receive. To separate these influences, some trials include a third group that receives no treatment at all. Studies of this kind suggest that the placebo response is real but usually smaller than the improvement seen in placebo groups. Expectations also matter: in one study, patients who were told that their pill was expensive reported more pain relief than those who were told it was cheap, although the pills were identical.

1. Which of the following can be inferred from the text?

(A) Placebos tend to work as well as active drugs for treating pain.

(B) Placebo groups tend to improve more than the placebo alone explains.

(C) Expensive medicines tend to work better than cheaper medicines.

(D) Placebos tend to have no effect on outcomes that are measured objectively.

(E) Trials with a no-treatment group tend to find a larger placebo response.

2. According to the text, why do some trials include a group that receives no treatment?

(A) to tell the placebo effect apart from recovery that would happen anyway

(B) to make sure that the active drug has no side effects

(C) to reduce the total number of patients who need a placebo

(D) to find out whether patients prefer more expensive pills

(E) to measure outcomes such as tumour size more objectively

3. Which of the following pairs a scientist correctly with a discovery?

(A) William Harvey: the first vaccine against smallpox

(B) Gregor Mendel: the structure of DNA (deoxyribonucleic acid)

(C) Robert Koch: the discovery of penicillin

(D) Hans Krebs: the discovery of X-rays

(E) Karl Landsteiner: the ABO blood groups

4. Which organisation was established by the Treaty of Rome, signed in 1957?

(A) the European Central Bank

(B) the European Economic Community

(C) the North Atlantic Treaty Organization

(D) the United Nations

(E) the Council of Europe

Section 2
Logical reasoning and problem solving
Questions 5–9

5. Since new cycle lanes were built in a city, the number of cyclists injured in road accidents there each year has risen by 20%. The cycle lanes have therefore made cycling in the city more dangerous.

Which of the following, if true, most weakens this argument?

(A) Many drivers have complained that the cycle lanes have removed parking spaces.

(B) In a nearby town without cycle lanes, the number of injured cyclists has not changed.

(C) Some cyclists in the city still prefer to ride on the pavement.

(D) Building the cycle lanes cost considerably more than the city had planned.

(E) Since the lanes were built, the number of people cycling in the city has doubled.

6. All the students who passed the exam had attended the revision course. Some of the students who attended the revision course did not do the homework.

Which of the following **must** be true?

(A) Some of the students who passed the exam did not do the homework.

(B) Every student who did the homework passed the exam.

(C) Any student who sat the exam without attending the course failed it.

(D) Every student who attended the revision course passed the exam.

(E) No student who skipped the homework passed the exam.

7. A pharmacy sells a cream in two sizes: a 40 mL tube for €5 and a 100 mL tube for €13. A customer needs at least 300 mL of cream and wants to pay as little as possible. How much does she pay?

(A) €37.50 (B) €38 (C) €39

(D) €40 (E) €41

8. Anna, Ben, Carla, David and Elena run a race, and no two of them finish at the same time. Ben finishes after David but before Carla. Elena finishes immediately after Anna. Carla does not finish last. Who finishes third?

(A) Anna (B) David (C) Elena

(D) Carla (E) Ben

9. A nurse must give 500 mL of a solution over 4 hours using a drip set that delivers 20 drops per millilitre. To the nearest whole number, what drip rate is needed?

(A) 42 drops per minute

(B) 50 drops per minute

(C) 84 drops per minute

(D) 125 drops per minute

(E) 2500 drops per minute

Section 3
Biology
Questions 10–32

10. Which of the following pairs consists of two polymers that are both made only of glucose monomers?

(A) glycogen and triglycerides

(B) glycogen and sucrose

(C) cellulose and chitin

(D) starch and lactose

(E) starch and cellulose

11. Which of the following processes requires the hydrolysis of ATP (adenosine triphosphate)?

(A) the entry of glucose into red blood cells through carrier proteins

(B) the movement of sodium ions out of a neurone against their concentration gradient

(C) the entry of sodium ions into a neurone through voltage-gated channels

(D) the diffusion of oxygen from the alveoli into the blood capillaries

(E) the movement of water molecules through aquaporins in a cell membrane

12. Which of the following statements is/are correct?

1. Ribosomes are found both free in the cytoplasm and attached to the rough endoplasmic reticulum.
2. Mitochondria contain their own DNA (deoxyribonucleic acid) and ribosomes.
3. Lysosomes are found in prokaryotic cells.

(A) 2 only (B) 2 and 3 only (C) 1 only

(D) 1 and 2 only (E) 1, 2 and 3

13. Which of the following structures are found in both bacterial cells and plant cells?

1. cell wall
2. ribosomes
3. plasma membrane
4. mitochondria

(A) 1, 2 and 3 only

(B) 1 and 2 only

(C) 2, 3 and 4 only

(D) 2 and 3 only

(E) 1, 2, 3 and 4

14. Which of the following is a characteristic of competitive inhibition of an enzyme?

(A) The maximum rate of reaction is reduced, even at very high substrate concentrations.

(B) The inhibitor forms permanent covalent bonds with the active site.

(C) The inhibitor binds to an allosteric site and changes the shape of the active site.

(D) The inhibition can be overcome by increasing the substrate concentration.

(E) The inhibitor raises the activation energy without binding to the enzyme.

15. Which of the following statements about aerobic respiration in human cells is correct?

(A) Pyruvate is converted into lactate when oxygen is available.

(B) Most of the ATP (adenosine triphosphate) of the cell is made directly by the Krebs cycle.

(C) Carbon dioxide is released during the reactions of glycolysis in the cytoplasm.

(D) Glycolysis takes place inside the matrix of the mitochondria.

(E) Oxygen is the final electron acceptor of the electron transport chain.

16. During intense exercise, human muscle cells convert pyruvate into lactate. What is the main importance of this reaction?

(A) It regenerates NAD^+ (oxidised nicotinamide adenine dinucleotide) so that glycolysis can continue.

(B) It produces more ATP (adenosine triphosphate) per glucose than aerobic respiration.

(C) It supplies the oxygen that the electron transport chain in the mitochondria needs to keep working.

(D) It allows the muscle cell to produce ATP directly from lactate in its mitochondria.

(E) It produces carbon dioxide, which is then carried in the blood and removed from the body by the lungs.

17. In photosynthesis, where does the oxygen gas released by the plant come from?

(A) chlorophyll

(B) glucose

(C) carbon dioxide

(D) water

(E) ribulose bisphosphate

18. The body cells of an animal contain 8 chromosomes ($2n = 8$). How many chromatids are present in one of these cells at metaphase of mitosis?

(A) 8 (B) 16 (C) 24

(D) 32 (E) 64

19. Which of the following happens during meiosis but **not** during mitosis?

(A) separation of the sister chromatids of each chromosome

(B) condensation of the chromosomes at the start of division

(C) formation of a spindle made of microtubules

(D) replication of the DNA before the division begins

(E) pairing of homologous chromosomes and crossing over

20. In a plant, the allele for a tall stem (T) is dominant to the allele for a short stem (t), and the allele for purple flowers (P) is dominant to the allele for white flowers (p). The two genes are on different chromosomes. A plant that is heterozygous for both genes is crossed with a short plant with white flowers. What proportion of the offspring is expected to be tall with white flowers?

(A) $\frac{1}{16}$ (B) $\frac{3}{16}$ (C) $\frac{1}{4}$

(D) $\frac{1}{2}$ (E) $\frac{9}{16}$

21. A woman with blood group A and a man with blood group B have a child with blood group O. What is the probability that their next child will have blood group AB?

(A) 0 (B) $\frac{1}{4}$ (C) $\frac{1}{2}$

(D) $\frac{3}{4}$ (E) 1

22. Haemophilia A is an X-linked recessive condition. A woman whose father had haemophilia A and whose mother was not a carrier has children with a man who does not have the condition. What is the probability that a son of this couple has haemophilia A?

(A) 0 (B) $\frac{1}{8}$ (C) $\frac{1}{4}$

(D) $\frac{1}{2}$ (E) 1

23. Which of the following statements about DNA (deoxyribonucleic acid) replication is correct?

(A) Each new DNA molecule consists of two strands that have both been newly made.

(B) An RNA (ribonucleic acid) primer is needed on the leading strand only.

(C) DNA polymerase adds nucleotides only to the 3′ end of a growing strand.

(D) Okazaki fragments are formed on the leading strand only.

(E) Helicase joins the Okazaki fragments to each other.

24. A short section of the template strand of a gene has the base sequence 3′-TACGGA-5′. What is the base sequence of the messenger RNA (ribonucleic acid) transcribed from it?

(A) 5′-AUGCCU-3′ (B) 5′-ATGCCT-3′ (C) 5′-UCCGUA-3′

(D) 5′-UACGGA-3′ (E) 3′-AUGCCU-5′

25. Which of the following statements about the genetic code is correct?

(A) There are 20 codons, one for each amino acid.

(B) Each codon codes for more than one amino acid.

(C) Most amino acids are coded for by more than one codon.

(D) Each stop codon codes for the amino acid methionine.

(E) Codons are read in overlapping groups of three bases along the strand.

26. A point mutation changes the codon UAU, which codes for tyrosine, into UAA, which is a stop codon. What type of mutation is this?

(A) an insertion mutation

(B) a silent mutation

(C) a missense mutation

(D) a nonsense mutation

(E) a frameshift mutation

27. In the polymerase chain reaction (PCR), why is a heat-stable DNA (deoxyribonucleic acid) polymerase used?

(A) Each cycle includes a step at about 95 °C, which would denature most enzymes.

(B) The polymerase must join the primers to each other at a high temperature.

(C) The polymerase must break the hydrogen bonds between the two strands of DNA.

(D) Only heat-stable polymerases can copy RNA (ribonucleic acid) into DNA.

(E) The polymerase must cut the DNA at specific base sequences before copying.

28. Which of the following statements about the circulatory system of a healthy adult is/are correct?

1. The pulmonary artery carries deoxygenated blood.
2. The hepatic portal vein carries blood from the intestines to the liver.
3. The wall of the left ventricle is thinner than the wall of the right ventricle.

(A) 1 only (B) 1 and 2 only (C) 1 and 3 only

(D) 2 only (E) 1, 2 and 3

29. In a healthy kidney, in which part of the nephron is most of the filtered glucose reabsorbed?

(A) the proximal convoluted tubule

(B) the descending limb of the loop of Henle

(C) the collecting duct

(D) Bowman's capsule

(E) the glomerulus

30. During an action potential in a neurone, what causes the rapid depolarisation of the membrane?

(A) Chloride channels open and Cl^- ions move into the cell.

(B) Voltage-gated potassium channels open and K^+ ions move out of the cell.

(C) Voltage-gated sodium channels open and Na^+ ions move into the cell.

(D) Potassium channels open and K^+ ions move into the cell.

(E) The sodium–potassium pump actively moves Na^+ ions out of the cell.

31. Which of the following correctly matches a hormone with the gland that secretes it and one of its effects?

(A) thyroxine – pituitary gland – lowers the metabolic rate

(B) ADH (antidiuretic hormone) – adrenal gland – increases the volume of urine

(C) insulin – pancreas – lowers the blood glucose concentration

(D) glucagon – liver – lowers the blood glucose concentration

(E) adrenaline – thyroid gland – lowers the heart rate

32. Which of the following statements about the immune response is correct?

(A) Memory cells make the response to a second exposure faster and larger.

(B) Phagocytes produce a different specific antibody for each antigen they engulf.

(C) Antibodies are produced and secreted mainly by cytotoxic T lymphocytes.

(D) Vaccination gives passive immunity because it provides ready-made antibodies.

(E) Antibodies are polysaccharides, each with a variable region that binds an antigen.

SECTION 4

Chemistry

Questions 33–47

33. An atom has mass number 37 and contains 20 neutrons. Of which element is it an isotope?

(A) chlorine (B) calcium (C) argon

(D) potassium (E) rubidium

34. Which of the following ions has the electron configuration $1s^2\,2s^2\,2p^6\,3s^2\,3p^6$?

(A) Na^+ (B) F^- (C) Mg^{2+}

(D) Al^{3+} (E) Ca^{2+}

35. Which of the following statements about trends in the periodic table is correct?

(A) Atomic radius decreases across a period from left to right.

(B) Electronegativity increases down a group.

(C) Atomic radius decreases down a group.

(D) First ionisation energy generally decreases across a period.

(E) Metallic character increases across a period from left to right.

36. Which of the following molecules is polar?

(A) CO_2 (B) BF_3 (C) NH_3

(D) CCl_4 (E) CH_4

37. In which of the following pure substances are there hydrogen bonds between the molecules?

(A) hydrogen sulfide, H_2S

(B) ethanol, CH_3CH_2OH

(C) dimethyl ether, CH_3OCH_3

(D) hydrogen chloride, HCl

(E) methane, CH_4

38. What is the oxidation number of chromium in potassium dichromate, $K_2Cr_2O_7$?

(A) $+3$ (B) $+6$ (C) $+7$

(D) $+12$ (E) $+14$

39. What is the formula of iron(III) sulfate?

(A) $Fe_2(SO_3)_3$ (B) $FeSO_4$ (C) $Fe_3(SO_4)_2$

(D) $Fe_2(SO_4)_3$ (E) $Fe(SO_4)_3$

40. What mass of water is produced when 8.0 g of methane, CH_4, burns completely in excess oxygen?
(Relative atomic masses: H = 1, C = 12, O = 16)

(A) 9.0 g (B) 18 g (C) 22 g

(D) 32 g (E) 36 g

41. 50 mL of a 0.20 mol L^{-1} solution of hydrochloric acid is mixed with 150 mL of a 0.40 mol L^{-1} solution of hydrochloric acid. What is the concentration of the resulting solution?

(A) 0.070 mol L^{-1} (B) 0.20 mol L^{-1} (C) 0.25 mol L^{-1}

(D) 0.30 mol L^{-1} (E) 0.35 mol L^{-1}

42. A fixed mass of an ideal gas occupies 6.0 L at 27 °C and 100 kPa. What volume does it occupy at 127 °C and 200 kPa?

(A) 2.25 L (B) 3.0 L (C) 4.0 L

(D) 8.0 L (E) 14.1 L

43. What is the pH of a 0.0010 mol L^{-1} solution of sodium hydroxide at 25 °C?

(A) 3 (B) 11 (C) 12

(D) 13 (E) 14

44. Which of the following is a conjugate acid–base pair?

(A) HCl and Cl_2

(B) NH_4^+ and NH_3

(C) NaOH and Na^+

(D) H_2SO_4 and SO_4^{2-}

(E) H_3O^+ and OH^-

45. For the equilibrium $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$, the forward reaction is exothermic. Which change shifts the position of equilibrium to the right?

(A) adding more ammonia

(B) removing some nitrogen

(C) increasing the pressure

(D) increasing the temperature

(E) adding a catalyst

46. Which statement about the reaction $Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$ is correct?

(A) No electrons are transferred in this reaction.

(B) Copper(II) ions act as the reducing agent.

(C) Copper(II) ions are oxidised to copper atoms.

(D) Zinc is reduced and acts as the oxidising agent.

(E) Zinc is oxidised and acts as the reducing agent.

47. Which of the following compounds is an isomer of butan-1-ol, $CH_3CH_2CH_2CH_2OH$?

(A) butanoic acid, $CH_3CH_2CH_2COOH$

(B) propan-1-ol, $CH_3CH_2CH_2OH$

(C) butanal, $CH_3CH_2CH_2CHO$

(D) but-1-ene, $CH_2{=}CHCH_2CH_3$

(E) diethyl ether, $CH_3CH_2OCH_2CH_3$

Section 5
Physics and mathematics

Questions 48–60

48. What is the solution of the equation $\log_3(x+1) + \log_3(x-1) = 1$?

(A) $x = \sqrt{2}$ (B) $x = -2$ or $x = 2$ (C) $x = 2$

(D) $x = 4$ (E) $x = -2$

49. How many solutions does the equation $2\sin^2 x - \sin x = 0$ have in the interval $0 \leq x < 2\pi$?

(A) 2 (B) 4 (C) 5

(D) 6 (E) 8

50. A chord of a circle with radius 5 is at a distance of 3 from the centre of the circle. What is the length of the chord?

(A) 4 (B) $\sqrt{34}$ (C) 6

(D) 8 (E) $2\sqrt{34}$

51. A bag contains 4 red balls and 6 blue balls. Two balls are taken at random without replacement. What is the probability that the two balls are of different colours?

(A) $\frac{4}{15}$ (B) $\frac{2}{5}$ (C) $\frac{7}{15}$

(D) $\frac{12}{25}$ (E) $\frac{8}{15}$

52. Which set contains exactly the real numbers x that satisfy $|2x - 3| < 5$?

(A) $x < 4$ (B) $1 < x < 4$ (C) $x < -1$ or $x > 4$

(D) $-1 < x < 4$ (E) $-4 < x < 1$

53. A population of bacteria doubles every 20 minutes. Starting from 500 bacteria, how long does it take for the population to reach 64 000?

(A) 100 minutes (B) 120 minutes (C) 128 minutes

(D) 140 minutes (E) 160 minutes

54. A ball is thrown vertically upwards from the ground and lands back on the ground 4.0 s later. What maximum height does it reach?
(Take $g = 10\ \text{m s}^{-2}$ and ignore air resistance.)

(A) 20 m (B) 30 m (C) 40 m

(D) 60 m (E) 80 m

55. Two blocks of masses 2 kg and 3 kg are in contact on a smooth horizontal surface. A horizontal force of 10 N pushes the 2 kg block, which in turn pushes the 3 kg block. What is the force exerted by the 2 kg block on the 3 kg block?

(A) 2 N (B) 4 N (C) 5 N

(D) 6 N (E) 10 N

56. An electric motor with an efficiency of 75% lifts a load of mass 50 kg vertically through 12 m at constant speed in 20 s. What is the electrical power input to the motor?
(Take $g = 10\ \text{m s}^{-2}$.)

(A) 225 W (B) 300 W (C) 400 W

(D) 600 W (E) 8000 W

57. A layer of oil floats on water in a beaker. A solid block floats at rest at the boundary, with 40% of its volume in the oil and 60% in the water. What is the density of the block?
(Density of oil $= 800\ \text{kg m}^{-3}$; density of water $= 1000\ \text{kg m}^{-3}$)

(A) $600\ \text{kg m}^{-3}$ (B) $880\ \text{kg m}^{-3}$ (C) $900\ \text{kg m}^{-3}$

(D) $920\ \text{kg m}^{-3}$ (E) $1000\ \text{kg m}^{-3}$

58. How much energy is needed to change 0.50 kg of ice at 0 °C into water at 20 °C?
(Specific latent heat of fusion of ice $= 334\ \text{kJ kg}^{-1}$; specific heat capacity of water $= 4200\ \text{J kg}^{-1}\,\text{K}^{-1}$)

(A) 42 kJ (B) 125 kJ (C) 167 kJ

(D) 209 kJ (E) 376 kJ

59. A 6 Ω resistor and a 3 Ω resistor are connected in parallel. This combination is connected in series with a 4 Ω resistor across a 12 V battery of negligible internal resistance. What is the current in the 6 Ω resistor?

(A) $\frac{2}{3}$ A (B) $\frac{12}{13}$ A (C) 1 A

(D) $\frac{4}{3}$ A (E) 2 A

60. Two point charges at a distance d apart repel each other with a force of magnitude F. Each charge is doubled and the distance between them is increased to $2d$. What is the magnitude of the new force?

(A) $\frac{F}{2}$ (B) F (C) $2F$

(D) $4F$ (E) $8F$

End of the test

Answer key and scoring

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

Scoring. Score $+1.5$ for each correct answer, -0.4 for each wrong answer and 0 for each question left blank. The maximum score is 90.

Sections. Questions 1–4: reading skills and knowledge acquired in studies; 5–9: logical reasoning and problem solving; 10–32: biology; 33–47: chemistry; 48–60: physics and mathematics. Work out your score for each section as well as the total, so that you can see where to focus.

Send your score and your section results to Ertan Altınel on WhatsApp (+90 505 543 35 27)
to talk about which topics to work on next.

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