

IMAT

International Medical Admissions Test④

FOR DEGREE COURSE IN INTERNATIONAL
MEDICINE&SURGERY

The total number of questions is 60 and the duration is 100 minutes.

The scoring will be grades out of 90 Points.

The correct answers will be multiplied by +1.5 and the wrong ones by -0.4.

2025-26 Academic year

1. Which Italian director is best known for the 1960 film *La Dolce Vita*, a landmark of world cinema that introduced the term “paparazzi” to popular culture?

- A) Luchino Visconti
- B) Roberto Rossellini
- C) Federico Fellini
- D) Michelangelo Antonioni
- E) Vittorio De Sica

2. Although the European Union (EU) is primarily known as an economic and political union, it also plays a role in cultural preservation. Through programmes like Creative Europe, it funds projects that support linguistic diversity, artistic exchange, and heritage conservation. This reflects the EU’s recognition that cultural identity contributes to cohesion among member states.

The passage suggests that the EU’s cultural initiatives:

- A) Are unrelated to its political goals.
- B) Aim to strengthen unity among member states.
- C) Replace national cultural policies entirely.
- D) Focus exclusively on economic benefits.
- E) Are limited to the preservation of ancient monuments.

3. Which novel was written by Victor Hugo and tells the story of Jean Valjean, a former prisoner trying to rebuild his life in 19th-century France?

- A) War and Peace
- B) Les Misérables
- C) Crime and Punishment
- D) Madame Bovary
- E) The Hunchback of Notre-Dame

4. What was the name of the 1917 British declaration supporting a Jewish homeland in Palestine?

- A) Balfour Declaration
- B) Versailles Treaty
- C) Camp David Accords
- D) Sykes–Picot Agreement
- E) Oslo Accords

Logical reasoning and problem-solving

5. Several coastal cities have implemented strict fishing limits to restore declining fish populations. In the first two years, total fish catches decreased, but by the third year, catches increased beyond pre-restriction levels. Local economies, initially hurt by the reduced catch, benefited from higher market prices due to improved fish quality and scarcity. Environmental groups point out that increased populations also help maintain marine ecosystems.

Therefore, such restrictions are a model for sustainable fisheries worldwide.

What is the main conclusion of this argument?

- A) Fishing limits can temporarily harm local economies.
- B) Higher market prices improve the livelihoods of fishers.
- C) Restricting fishing is an effective model for sustainable fisheries.
- D) Marine ecosystems benefit from larger fish populations.
- E) Sustainable fishing is important for global food supply.

6. A patient needs 0.8 g of a drug per day. The drug comes in 200 mg tablets, taken in equal doses every 6 hours. A pack contains 40 tablets. How many days will 2 packs last?

- A) 9 days
- B) 10 days
- C) 20 days
- D) 25 days
- E) 30 days

7. Sophie has two different mixtures of pineapple juice and mango juice.

- **Mixture 1: 40% pineapple juice and 60% mango juice**
- **Mixture 2: 70% pineapple juice and 30% mango juice**

Sophie wants to use these two mixtures to make 6 litres of a juice mixture which is 50% pineapple juice and 50% mango juice.

How much of mixture 2 does Sophie need to use?

- A) 1 litre
- B) 2 litres
- C) 3 litres
- D) 4 litres
- E) 5 litres

8. Read the sentence below. Which part of the sentence contains a meaning error?

"After winning the marathon in record time, Julia was disappointed with her performance and celebrated enthusiastically with her friends."

- A) After winning the marathon
- B) in record time
- C) was disappointed with her performance
- D) and celebrated enthusiastically
- E) with her friends

9. A 250 g bag of mixed dried fruits lists the contents on the packet as follows:

dried fruit	content
apricots	20–30%
figs	10–20%
dates	5–15%
raisins	30–40%
prunes	10–20%

As they are my favourite, I eat all the apricots in the packet and then re-weigh it. I find that the apricot content was the minimum it could have been whilst being consistent with the labelling.

What is the largest possible raisin content of the dried fruits remaining in the bag after I have eaten the apricots?

- A) 40%
- B) 48%
- C) 50%
- D) 57%
- E) 60%

Biology

10. During cell division, a student notices that the genetic material has condensed into visible, X-shaped structures. He wonders whether gene expression is occurring at this time.

What's the most accurate conclusion?

- A) Gene expression continues at full speed during mitosis
- B) The condensed X structures are centrioles directing microtubules
- C) These are chromosomes, and transcription is largely inactive
- D) The structures are chromatin being actively transcribed
- E) These are nucleoli, and they drive cytokinesis

11. What best describes the role of cholesterol in animal cell membranes?

- A) Forms pores for diffusion
- B) Facilitates ATP production
- C) Increases permeability to ions
- D) Maintains membrane fluidity
- E) Tags proteins for degradation

12. In human cells there are normally 46 chromosomes. During which stage of the cell cycle would a human cell temporarily have 92 chromosomes?

- A) G1 phase
- B) Anaphase I
- C) Anaphase II
- D) Anaphase of mitosis
- E) Telophase I

13. Which polysaccharide is the main energy storage carbohydrate in plants?

- A) Glycogen
- B) Sucrose
- C) Amylopectin
- D) Starch
- E) Cellulose

14. During oxidative phosphorylation, the energy from the electron transport chain is used to:

- A) Directly phosphorylate ADP to ATP
- B) Pump protons into the mitochondrial matrix
- C) Pump protons into the intermembrane space
- D) Split glucose into pyruvate
- E) Reduce NAD^+ to NADH

15. In a dipeptide, the peptide bond is formed between:

- A) The R groups of two amino acids
- B) The amino group of one and the carboxyl group of the other
- C) Two carboxyl groups
- D) Two amino groups
- E) A hydroxyl group and a carboxyl group

16. In aerobic respiration, oxidation of NADH yields more ATP than oxidation of FADH₂ because:

- A) NADH donates electrons to Complex I, while FADH₂ donates them later in the chain
- B) NADH is produced in greater amounts than FADH₂
- C) FADH₂ is used mainly in anaerobic respiration
- D) NADH has a higher energy content due to more hydrogen atoms
- E) FADH₂ cannot be oxidized in mitochondria

17. Which of the following steps is NOT typically part of recombinant DNA technology?

- A) Cutting DNA with restriction endonucleases
- B) Ligating DNA fragments with DNA ligase
- C) Introducing recombinant DNA into a host cell
- D) Amplifying DNA using PCR
- E) Breaking phosphodiester bonds using RNA polymerase

18. Which of the following best describes the role of mutations in evolution?

- A) Mutations always decrease an organism's fitness
- B) Mutations create new genetic variation, which can be acted upon by evolutionary processes
- C) Mutations are the primary cause of genetic drift
- D) Mutations occur only in response to environmental changes
- E) Mutations only occur in somatic cells

19. Which molecule is regenerated at the end of the Calvin cycle to allow the fixation of additional CO₂?

- A) 3-phosphoglycerate (3-PGA)
- B) Glyceraldehyde-3-phosphate (G3P)
- C) Ribulose-1,5-bisphosphate (RuBP)
- D) NADP⁺
- E) ATP

20. In a population of wild rabbits living in a grassland, coat color is determined by a single gene with two alleles: B (brown) and b (white). Brown fur offers camouflage, reducing predation risk. White rabbits are more visible to predators but blend better in winter snow.

Climate change has led to shorter winters and longer summers in the region. Over the last 20 years, field studies show the frequency of B has increased significantly.

Meanwhile, a farmer in a nearby region has been breeding rabbits for white fur to sell as pets. He selectively breeds only the whitest rabbits from each generation.

Which of the following statements best explains the observed changes in both populations?

- A) The wild population shows natural selection for the B allele, while the farmed population shows artificial selection for the b allele.
- B) The wild population shows artificial selection for the B allele, while the farmed population shows natural selection for the b allele.
- C) Both populations show natural selection, but for different alleles.
- D) Both populations show artificial selection, but for different alleles.
- E) The change in allele frequencies is purely due to random genetic drift in both populations.

21. During skeletal muscle contraction, which event directly exposes the myosin-binding sites on actin filaments?

- A) ATP hydrolysis by myosin heads
- B) Release of calcium ions from the sarcoplasmic reticulum
- C) Binding of calcium to troponin
- D) Sliding of actin filaments past myosin filaments
- E) Depolarization of the sarcolemma

22. Which event directly causes the semilunar valves to close during the cardiac cycle?

- A) Atrial contraction raises atrial pressure above ventricular pressure
- B) Ventricular pressure falls below arterial pressure
- C) Ventricular pressure rises above atrial pressure
- D) Atrial pressure falls below ventricular pressure
- E) Arterial pressure rises above atrial pressure

23. A doctor taps below a patient's kneecap, triggering the knee-jerk reflex. Which of the following is NOT involved in the reflex arc?

- A) Sensory neuron
- B) Motor neuron
- C) Interneuron in the spinal cord
- D) Brain cortex
- E) Muscle spindle receptor

24. Which of the following statements about cell theory and cell types are correct?

- 1. All living organisms are composed of one or more cells**
- 2. Eukaryotic cells lack a defined nucleus**
- 3. Cells arise from non-living organic molecules**
- 4. Bacteria and archaea are examples of prokaryotic organisms**
- 5. Prokaryotic cells do not contain membrane-bound organelles**

- A) 1, 4, and 5 only
B) 1 and 3 only
C) 2, 3, and 4 only
D) 1, 2, and 5 only
E) All statements are correct

25. Which of the following occurs in eukaryotic but not prokaryotic transcription?

- A) Addition of a 5' cap
B) Use of RNA polymerase
C) Complementary base pairing
D) Use of a promoter sequence
E) Elongation in the 5'→3' direction

26. In a dihybrid cross ($AaBb \times AaBb$), what proportion of offspring are expected to be homozygous recessive for both traits?

- A) 1/4
B) 1/8
C) 1/16
D) 3/16
E) 9/16

27. In a population, 16% of individuals have a recessive phenotype for a trait controlled by a single gene. What is the frequency of the dominant allele?

- A) 0.16
B) 0.4
C) 0.6
D) 0.84
E) 0.8

28. Below is a table showing the genetic code, the corresponding mRNA codon, and the anticodon:

Genetic Code			ATG
Codon (mRNA)	AUG		
Anticodon		UUC	

According to the table above, what should be the nucleotide sequence in the non-template strand of DNA?

- A) ATG AAG TAC
- B) TAC TTG ATG
- C) TAC AAG TAC
- D) ATG TAC AAG
- E) TAC AAG ATG

29. Which cytoskeletal component is primarily responsible for maintaining cell shape, resisting tension, and anchoring organelles in place?

- A) Actin filaments
- B) Intermediate filaments
- C) Microtubules
- D) Centrioles
- E) Flagella

30. Sunny's mother visits the internal medicine outpatient clinic for a check-up. Dr. Alp requests a urine test from her.

In the biochemistry laboratory, the urine test results show an excessive amount of glucose in her urine.

Based on this result, Dr. Alp considers that his patient may have:

- 1. Insufficient insulin secretion from the pancreas**
- 2. Failure of glucose reabsorption in the kidney**
- 3. Inadequate stimulation of the pancreas by the pituitary gland**
- 4. Dysfunction of insulin-sensitive receptors in the cell membrane**

Which of the above could be possible causes?

- A) 1, 2
- B) 2, 3
- C) 1, 2, 4
- D) 1, 3, 4
- E) 2, 3, 4

31. A scientist studies glucose uptake in muscle cells. She finds that glucose enters the cell down its concentration gradient but only when a specific membrane protein is functional. Which of the following best describes this type of transport?

- A) Simple diffusion
- B) Facilitated diffusion
- C) Primary active transport
- D) Secondary active transport
- E) Osmosis

32. Which of the following best describes the semiconservative model of DNA replication?

- A) Each daughter DNA molecule consists of two newly synthesized strands.
- B) Each daughter DNA molecule consists of one parental strand and one newly synthesized strand.
- C) The parental DNA molecule remains intact, and an entirely new DNA molecule is synthesized alongside it.
- D) Each daughter DNA molecule consists of random segments of old and new DNA interspersed along both strands.
- E) Both strands of the parental DNA are degraded and replaced by newly synthesized strands.

Chemistry

33. Which compound contains an ester functional group?

- A) $\text{CH}_3\text{CH}_2\text{OH}$
- B) $\text{CH}_3\text{COOCH}_3$
- C) CH_3CONH_2
- D) $\text{CH}_3\text{CH}_2\text{NH}_2$
- E) $\text{CH}_3\text{CH}_2\text{CH}_3$

34. What is the oxidation number of hydrogen in sodium hydride (NaH)?

- A) +1
- B) 0
- C) -1
- D) +2
- E) -2

35. Which metal oxide will produce a strong base when dissolved in water?

- A) Al_2O_3
- B) CO_2
- C) K_2O
- D) SO_3
- E) ZnO

36. A sealed container holds 1.00 mol of an ideal gas at a temperature of 300 K and pressure of 2.00 atm.

What is the volume of the gas?

(Use $R = 0.0821 \text{ L}\cdot\text{atm}/\text{mol}\cdot\text{K}$)

- A) 10.2 L
- B) 11.4 L
- C) 12.3 L
- D) 13.8 L
- E) 15.6 L

37. A student dissolves 4.90 g of NaCl ($M = 58.5 \text{ g/mol}$) in 250 cm^3 of water to prepare a solution.

What is the concentration of the solution in mol/dm^3 ?

- A) $0.20 \text{ mol}/\text{dm}^3$
- B) $0.25 \text{ mol}/\text{dm}^3$
- C) $0.30 \text{ mol}/\text{dm}^3$
- D) $0.34 \text{ mol}/\text{dm}^3$
- E) $0.40 \text{ mol}/\text{dm}^3$

38. Which ion has the largest radius among the following?

- A) O^{2-}
- B) Mg^{2+}
- C) Al^{3+}
- D) Na^+
- E) F^-

39. Which of the following best explains why solid ionic compounds are brittle?

- A) Ions are mobile and easily shift positions.
- B) The electrostatic attraction allows flexibility.
- C) Layers of ions shift and like charges repel, causing fracture.
- D) Covalent bonds within the lattice are weak.
- E) Electrons move freely, weakening the structure.

40. The graph below shows the boiling points of the hydrogen halides: HF, HCl, HBr, and HI.

Hydrogen Halide	Boiling Points (°C)
HF	19°C
HCl	-85°C
HBr	-67°C
HI	-35°C

Which of the following best explains why HF has a significantly higher boiling point than the other hydrogen halides?

- A) HF has a much larger molar mass, increasing London dispersion forces.
- B) HF molecules form strong hydrogen bonds, unlike the others.
- C) HF is a strong acid and thus harder to boil.
- D) The H-F bond is weaker than the H-Cl bond, requiring more energy to break.
- E) HF has more electrons, increasing van der Waals forces.

41. Which of the following reactions is a redox reaction?

- A) $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- B) $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$
- C) $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
- D) $\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl}$
- E) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$

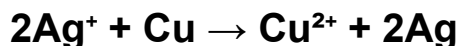
42. Which best describes the pH at the equivalence point of a titration between a weak acid and a strong base?

- A) Less than 7
- B) Equal to 7
- C) Greater than 7
- D) Cannot be determined without concentration
- E) Zero

43. Which of the following is the correct electron configuration of calcium (Ca)?

- A) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$
- B) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
- C) $1s^2 2s^2 2p^6 3s^2 3p^6$
- D) $1s^2 2s^2 2p^6 3s^2 3p^4$
- E) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2$

44. In the reaction:



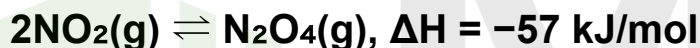
How many grams of silver (Ag, M = 107.9 g/mol) are formed when 3.00 g of Cu (M = 63.5 g/mol) reacts completely?

- A) 4.25 g
- B) 5.09 g
- C) 10.2 g
- D) 3.60 g
- E) 6.34 g

45. Which statement is true?

- A) C–C bonds are stronger than C≡C
- B) C=C bonds are shorter than C≡C
- C) Bond strength increases with bond order
- D) Triple bonds are weaker than single bonds
- E) Single bonds have highest energy

46. Consider the reversible reaction:



Which of the following conclusions are correct?

- 1. The forward reaction is exothermic.
 - 2. Decreasing temperature favors formation of NO₂.
 - 3. The equilibrium constant increases as temperature decreases.
 - 4. The catalyst increases the rate of both forward and reverse reactions equally.
- A) 1 and 3 only
 - B) 2 and 4 only
 - C) 1, 3 and 4 only
 - D) 1, 2 and 4 only
 - E) 1, 2, 3 and 4

47. A student adds a piece of metal M into a solution of CuSO₄ and observes that metallic copper forms on the surface of metal M. Later, it is found that the blue color of the Cu²⁺ ion fades gradually.

Which conclusion is most appropriate based on this observation?

- A) Metal M is less reactive than copper.
- B) Copper oxidizes metal M in this reaction.
- C) Metal M is acting as an oxidizing agent.
- D) Metal M is more reactive than copper and is oxidized.
- E) No redox reaction occurs in this process.

48. A box contains 5 red balls, 4 blue balls, and 3 green balls. Two balls are drawn at random without replacement.

What is the probability that both balls are of the same color?

- A) $\frac{19}{66}$
- B) $\frac{5}{33}$
- C) $\frac{2}{11}$
- D) $\frac{1}{6}$
- E) $\frac{7}{22}$

49. The average of 4 numbers is 58. If one number, 64, is removed, what is the average of the remaining numbers?

- A) 50
- B) 52
- C) 54
- D) 56
- E) 58

50. In triangle ABC, D and E are points on sides AB and AC respectively such that DE is parallel to BC. If $AD : AB = 2 : 5$, what is the ratio of the area of triangle ADE to triangle ABC?

- A) 4 : 25
- B) 2 : 5
- C) 8 : 27
- D) 3 : 9
- E) 1 : 5

51. Given that $\sin(\theta) + \cos(\theta) = \frac{5}{4}$, where $0 < \theta < \frac{\pi}{2}$, find the exact value of $\sin(2\theta)$.

- A) $\frac{5}{8}$
- B) $\frac{3}{4}$
- C) $\frac{7}{8}$
- D) $\frac{9}{16}$
- E) $\frac{25}{32}$

52. Simplify the expression below as a single power of 3:

$$\frac{3^{2x+1} \cdot 9^{x-2}}{27^{x-3} \cdot 3^{x-4}}$$

- A) 3^4
- B) 3^5
- C) 3^{10}
- D) 3^{x+3}
- E) 3^{2x+1}

53. A sector of a circle has radius 6 cm and central angle 60° . What is the area of the sector?

- A) $6\pi \text{ cm}^2$
- B) $9\pi \text{ cm}^2$
- C) $12\pi \text{ cm}^2$
- D) $\pi \text{ cm}^2$
- E) $36\pi \text{ cm}^2$

54. Solve for all real values of x that satisfy the inequality: $|2x - 5| > x + 1$

- A) $x < -2$ or $x > \frac{4}{3}$
- B) $x < -1$ or $x > 6$
- C) $x < 2$ or $x > 4$
- D) $x < \frac{4}{3}$ or $x > 6$
- E) $x < \frac{4}{3}$ or $x > 5$

55. Which statement expresses the second law of thermodynamics?

- A) Energy cannot be created or destroyed.
- B) Heat cannot spontaneously flow from a colder body to a hotter body.
- C) The internal energy of an ideal gas depends only on its temperature.
- D) For adiabatic changes $PV^\gamma = \text{constant}$
- E) The total energy of the universe decreases over time.

56. An object is moving at a constant speed of 3 m/s on a rough horizontal surface. A 50 N force is applied to balance the friction. What is the power output of this force?

- A) 15 W
- B) 50 W
- C) 100 W
- D) 150 W
- E) 300 W

57. An object moves in a horizontal circle of radius 4 m at 10 m/s. Its centripetal acceleration is:

- A) 2.5 m s^{-2}
- B) 20 m s^{-2}
- C) 25 m s^{-2}
- D) 40 m s^{-2}
- E) 50 m s^{-2}

58. A 2.0 kg object initially at rest is acted upon by a force that delivers an impulse of 10 N·s. What is its final velocity?

- A) 2.0 m/s
- B) 3.5 m/s
- C) 5.0 m/s
- D) 10.0 m/s
- E) 20.0 m/s

59. A car of mass 1,000 kg is traveling at 20 m/s when brakes are applied. If the car stops in 4.0 s, what is the average power dissipated?

- A) 25,000 W
- B) 40,000 W
- C) 50,000 W
- D) 75,000 W
- E) 100,000 W

60. Two parallel plate capacitors, $C_1 = 4 \mu\text{F}$ and $C_2 = 6 \mu\text{F}$, are connected in series to a 12 V battery. Which of the following statements is incorrect?

- A) The equivalent capacitance is less than either C_1 or C_2 .
- B) Both capacitors store the same amount of charge.
- C) The voltage across C_1 is greater than that across C_2 .
- D) The total energy stored in the system is given by $(1/2) \times C \times V^2$, where C is the equivalent capacitance.
- E) The capacitor with the larger capacitance has a larger voltage across it.

–THE END–