# MDCAT (NUMS entry test) — 2018 · Solved Past Paper

**Body:** National University of Medical Sciences (NUMS) · **Post:** MDCAT (NUMS entry test) · **Year:** 2018 · **Questions:** 100 in the original paper — **87 solved and verified**, 13 excluded as defective (Q10, Q22, Q23, Q24, Q30, Q35, Q44, Q48, Q51, Q56, Q61, Q62, Q82) · **Price:** Free

> **How to use this paper:** each question shows the stem, the four options, and the correct answer. Click “Why each option?” under a question to see all four options explained — one question teaches four topics. General Knowledge answers are as of the 2018 sitting.

**Source note:** mdcatguide.com compilation, 'NUMS PAST PAPERS 2012–2020 — COMPLETE COLLECTION — 9 YEARS', NUMS 2018 section (pp. 52–66), served via noteslelo.pk (100 MCQs; 120 minutes, no negative marking; accessed 14 Nov 2026). Held Sunday 18 November 2018, 10:00 am (NUMS-MDCAT for MBBS/BDS 2018, for ICT/AJK/Gilgit-Baltistan colleges). The quick answer grid (p. 63) and the complete key with detailed explanations (pp. 64–66) agree with each other but both default to 'A' for about 70% of the questions and are wrong on 37 of the 87 served answers; every answer was verified independently against textbook fact. Subjects follow served content: Physics Q1–20, Chemistry Q21–Q58 and Q60, Q62–Q63, Q65, Biology Q59, Q61, Q64, Q66–Q100 — the reproduction serves NO English question despite its cover promising 14 and its 'English' header over Q42–Q55 (all chemistry), disclosed in the file. 37 printed-key corrections; 13 DEFECTIVE-excluded (Q10, Q22, Q23, Q24, Q30, Q35, Q44, Q48, Q51, Q56, Q61, Q62, Q82). Answers verified independently against reference facts, worked derivations and targeted sources, never from the printed key alone. Decisions by the assistant under the owner's 8 Nov 2026 delegation.

# 1 Physics

The dimension of pressure is

- A. $ML^{-1}T^{-2}$ ✓ **Correct answer**
- B. $MLT^{-2}$
- C. $ML^{2}T^{-2}$
- D. $M^{-1}LT^{2}$

**A.** Correct: pressure is force per unit area, $(MLT^{-2})/(L^{2}) = ML^{-1}T^{-2}$.

**B.** Wrong: that is the dimension of force.

**C.** Wrong: that is the dimension of energy.

**D.** Wrong: that is not the dimension of pressure.

# Question 2 Physics

The escape velocity from the surface of the earth is approximately

- A. 7.9 km/s
- B. 11.2 km/s ✓ **Correct answer**
- C. 3.0 km/s
- D. 6.4 km/s

**A.** Wrong: that is the orbital velocity of a satellite near the earth.

**B.** Correct: the escape velocity from the earth is about 11.2 km/s.

**C.** Wrong: far below the escape velocity.

**D.** Wrong: far below the escape velocity.

# Question 3 Physics

The work done by a force is zero when the angle between force and displacement is

- B. 45°
- C. 90° ✓ **Correct answer**
- D. 180°

**A.** Wrong: at 0° the work is maximum (W = Fd).

**B.** Wrong: at 45° the work is Fd/√2, not zero.

**C.** Correct: W = Fd cos θ, and cos 90° = 0.

**D.** Wrong: at 180° the work is −Fd, not zero.

## Question 4 Physics

The frequency of a simple pendulum depends on

- A. Mass of bob
- B. Length of pendulum ✓ **Correct answer**
- C. Amplitude of swing
- D. Material of bob

**A.** Wrong: the period of a pendulum does not depend on the mass.

**B.** Correct: T = 2π√(l/g), so the frequency depends on the length (and g).

**C.** Wrong: for small swings the period does not depend on the amplitude.

**D.** Wrong: the material does not affect the period.

## Question 5 Physics

Which of the following is a vector quantity?

- A. Speed
- B. Mass
- C. Temperature

eleration ✓ **Correct answer**

**A.** Wrong: speed is a scalar (magnitude only).

**B.** Wrong: mass is a scalar.

**C.** Wrong: temperature is a scalar.

**D.** Correct: acceleration has magnitude and direction.

## Question 6 Physics

The first law of thermodynamics is a statement of conservation of

- A. Momentum
- B. Charge
- C. Energy ✓ **Correct answer**
- D. Mass

**A.** Wrong: momentum conservation is a separate law.

**B.** Wrong: charge conservation is a separate law.

**C.** Correct: the first law states that energy is conserved ($\Delta U = Q - W$).

**D.** Wrong: mass conservation is not the first law of thermodynamics.

## Question 7 Physics

In photoelectric effect, the threshold frequency is the minimum frequency of light required to

- A. Heat the metal
- B. Eject electrons from metal ✓ **Correct answer**
- C. Ionize the metal
- D. Reflect from metal

e threshold frequency is about ejecting electrons, not heating.

**B.** Correct: below the threshold frequency no electrons are ejected, however intense the light.

**C.** Wrong: the photoelectric effect ejects electrons from the surface, it does not ionize the metal.

**D.** Wrong: reflection has nothing to do with the threshold frequency.

## Question 8 Physics

A wave transfers

- A. Matter
- B. Energy ✓ **Correct answer**
- C. Both matter and energy
- D. Neither matter nor energy

**A.** Wrong: a wave does not carry matter from place to place.

**B.** Correct: a wave transfers energy through the medium.

**C.** Wrong: a wave transfers energy, not matter.

**D.** Wrong: a wave does transfer energy.

## Question 9 Physics

The unit of magnetic flux density is

- A. Weber
- B. Tesla ✓ **Correct answer**
- C. Henry
- D. Farad

**A.** Wrong: the weber is the unit of magnetic flux.

magnetic flux density (B) is measured in tesla.

**C.** Wrong: the henry is the unit of inductance.

**D.** Wrong: the farad is the unit of capacitance.

## Question 10 Physics

The speed of light in vacuum is approximately

- A. 3×10■ m/s
- B. 3×10■ m/s
- C. 3×10¹■ m/s
- D. 3×10■ m/s

**No answer is given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** The exponent is lost in the source (blank/missing glyph), so this option cannot be read.

**B.** The exponent is lost in the source, so this option cannot be read.

**C.** Only a partial "1" survives; the exponent cannot be read.

**D.** The exponent is lost in the source, so this option cannot be read. (DEFECTIVE-excluded: the exponents of all four options are lost in the source, so the question cannot be served complete. The printed key records B; the speed of light is 3×10^8 m/s. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## Question 11 Physics

Which of the following is NOT a fundamental force in nature?

- A. Gravitational force
- B. Electromagnetic force
- C. Frictional force ✓ **Correct answer**

ak nuclear force

**A.** Wrong: gravity is one of the four fundamental forces.

**B.** Wrong: electromagnetism is one of the four fundamental forces.

**C.** Correct: friction is not fundamental; it arises from electromagnetic interactions between surfaces.

**D.** Wrong: the weak force is one of the four fundamental forces.

## Question 12 Physics

The slope of a velocity-time graph gives

- A. Displacement
- B. Speed
- C. Acceleration ✓ **Correct answer**
- D. Distance

**A.** Wrong: displacement is the area under a velocity-time graph, not its slope.

**B.** Wrong: speed is not the slope of a velocity-time graph.

**C.** Correct: acceleration is the rate of change of velocity, dv/dt, the slope of the graph.

**D.** Wrong: distance is the area under a speed-time graph, not its slope.

## Question 13 Physics

At what angle of projection is the horizontal range of a projectile maximum?

- A. 30°
- B. 45° ✓ **Correct answer**
- C. 60°
- D. 90°

e range at 30° is less than the maximum.

**B.** Correct: R = (u² sin 2θ)/g is maximum when sin 2θ = 1, that is θ = 45°.

**C.** Wrong: the range at 60° equals the range at 30°, less than the maximum.

**D.** Wrong: at 90° the projectile goes straight up and the range is zero.

## Question 14 Physics

The SI unit of capacitance is

- A. Ohm
- B. Henry
- C. Farad ✓ **Correct answer**
- D. Tesla

**A.** Wrong: the ohm is the unit of resistance.

**B.** Wrong: the henry is the unit of inductance.

**C.** Correct: capacitance is measured in farads.

**D.** Wrong: the tesla is the unit of magnetic flux density.

## Question 15 Physics

Radioactivity was discovered by

- A. Marie Curie
- B. Ernest Rutherford
- C. Henri Becquerel ✓ **Correct answer**
- D. J.J. Thomson

**A.** Wrong: Marie Curie studied radioactivity and named it, but Becquerel discovered it.

**B.** Wrong: Rutherford studied the radiations, but did not discover radioactivity.

Becquerel discovered radioactivity in 1896, from uranium salts fogging photographic plates.

**D.** Wrong: Thomson discovered the electron, not radioactivity.

## Question 16 Physics

Which type of electromagnetic radiation has the highest frequency?

- A. Radio waves
- B. Infrared
- C. X-rays
- D. Gamma rays ✓ **Correct answer**

**A.** Wrong: radio waves have the lowest frequency of the four.

**B.** Wrong: infrared is below visible light in frequency.

**C.** Wrong: X-rays are high frequency, but gamma rays are higher.

**D.** Correct: gamma rays have the highest frequency in the electromagnetic spectrum.

## Question 17 Physics

The principle of superposition states that the resultant displacement is

- A. Product of individual displacements
- B. Sum of individual displacements ✓ **Correct answer**
- C. Difference of individual displacements
- D. Average of individual displacements

**A.** Wrong: superposition adds displacements, it does not multiply them.

**B.** Correct: the resultant displacement is the vector sum of the individual displacements.

**C.** Wrong: superposition is a sum, not a difference.

superposition is a sum, not an average.

## Question 18 Physics

The moment of inertia depends on

- A. Mass only
- B. Distribution of mass only
- C. Both mass and its distribution ✓ **Correct answer**
- D. Speed of rotation

**A.** Wrong: the distribution of the mass about the axis matters as well.

**B.** Wrong: the amount of mass matters as well.

**C.** Correct: $I = \Sigma mr^2$, so it depends on both the mass and how far it is from the axis.

**D.** Wrong: the moment of inertia does not depend on how fast the body rotates.

## Question 19 Physics

Ohm's law states that current is proportional to

- A. Resistance
- B. Voltage ✓ **Correct answer**
- C. Power
- D. Frequency

**A.** Wrong: current is inversely proportional to resistance.

**B.** Correct: V = IR, so at constant resistance the current is proportional to the voltage.

**C.** Wrong: current is not proportional to power.

**D.** Wrong: frequency has nothing to do with Ohm's law.

# 20 Physics

Which of the following has zero resistance at very low temperatures?

- A. Conductor
- B. Semiconductor
- C. Superconductor ✓ **Correct answer**
- D. Insulator

**A.** Wrong: an ordinary conductor keeps a small resistance even at very low temperatures.

**B.** Wrong: a semiconductor's resistance rises as it gets colder.

**C.** Correct: below its critical temperature a superconductor has zero resistance.

**D.** Wrong: an insulator has very high resistance.

# Question 21 Chemistry

On hydrogen atom spectrum, series of _____ within visible region, is

- A. Lyman series
- B. Balmer series ✓ **Correct answer**
- C. Paschen series
- D. Bracket series

**A.** The printed key: wrong. The Lyman series lies in the ultraviolet region, not the visible region.

**B.** Correct: the Balmer series is the hydrogen series in the visible region.

**C.** Wrong: the Paschen series lies in the infrared region.

**D.** Wrong: the Brackett series lies in the infrared region.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above. The options are filed as printed ("Lymen series", "Baimer series"); the spellings are

the config. Filed option A read "Lymen series" (misprint in the source reproduction); corrected to "Lyman series" as documented in the reviewed file. Filed option B read "Baimer series" (misprint in the source reproduction); corrected to "Balmer series" as documented in the reviewed file.

## Question 22 Chemistry

At standard conditions Question not clear

- A. 1:1
- B. 1:2
- C. 2:3
- D. 3:2

**No answer is given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** The stem is missing, so no ratio can be determined.

**B.** The stem is missing, so no ratio can be determined.

**C.** The stem is missing, so no ratio can be determined.

**D.** The stem is missing, so no ratio can be determined. (DEFECTIVE-excluded: the source itself prints "Question not clear" in place of the stem; the question is unrecoverable. The printed key records A. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## Question 23 Chemistry

For a chemical reaction A, B, the Question not clear

- A. 43 KJ/mole
- B. 37 KJ/mole
- C. 25 KJ/mole
- D. 19 KJ/mole

**s given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** The stem is missing, so no energy value can be determined.

**B.** The stem is missing, so no energy value can be determined.

**C.** The stem is missing, so no energy value can be determined.

**D.** The stem is missing, so no energy value can be determined. (DEFECTIVE-excluded: the source itself prints "Question not clear" in place of the stem; the question is unrecoverable. The printed key records A. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## Question 24 Chemistry

By raising the temperature 1° Question not clear

- A. Hydration
- B. Neutralization
- C. Hydrolysis
- D. Ionization

**No answer is given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** The stem is missing, so no process can be identified.

**B.** The stem is missing, so no process can be identified.

**C.** The stem is missing, so no process can be identified.

**D.** The stem is missing, so no process can be identified. (DEFECTIVE-excluded: the source itself prints "Question not clear" in place of the stem; the question is unrecoverable. The printed key records A. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

# 25 Chemistry

s-sp³ overlap occurs in _____ molecules

- A. Cl2
- B. CH4 ✓ **Correct answer**
- C. HF
- D. HI

**A.** The printed key: wrong. The Cl–Cl bond is p–p overlap, not s–sp³.

**B.** Correct: each C–H bond in methane is the overlap of a hydrogen 1s orbital with a carbon sp³ orbital.

**C.** Wrong: the H–F bond is s–p overlap (hydrogen 1s with fluorine 2p).

**D.** Wrong: the H–I bond is s–p overlap.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above. The options are filed as printed ("Cl2", "CH4", "HF", "HI").

# Question 26 Chemistry

ΔH = is the change in enthalpy at constant _____

- A. Volume
- B. Pressure ✓ **Correct answer**
- C. Temperature
- D. Mass

**A.** The printed key: wrong. The heat at constant volume is the change in internal energy (ΔE), not enthalpy.

**B.** Correct: enthalpy change ΔH is the heat absorbed or evolved at constant pressure.

**C.** Wrong: enthalpy is not defined by constant temperature.

nthalpy is not defined by constant mass.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above.

## Question 27 Chemistry

As the concentration of reactant increases, the rate of reacts also increases, it is because:

- A. K.E. increase in molecules
- B. Oscillation increases between molecules
- C. Collisions frequency increases ✓ **Correct answer**
- D. Temperature of molecules increases

**A.** The printed key: wrong. Raising the concentration does not raise the kinetic energy of the molecules.

**B.** Wrong: oscillation has nothing to do with the rate increase.

**C.** Correct: more reactant molecules in the same volume means more frequent collisions, so more effective collisions per second.

**D.** Wrong: raising the concentration does not raise the temperature.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above. Option C is filed as "Collisions frequency increases"; a watermark fragment interleaved in the option cell in the source is stripped.

## Question 28 Chemistry

The equation shows the reaction between element X and dilute hydrochloric acid. What types of bonding are present in element X and in compound XCl2? 2X(s) + 2HCl(aq) → ( ) ( )

- A. Covalent covalent
- B. Covalent ionic
- C. Metallic covalent

:allic ionic ✓ **Correct answer**

**A.** The printed key: wrong. X cannot be covalent: it displaces hydrogen from dilute acid, so it is a metal.

**B.** Wrong: X is a metal, so its bonding is metallic, not covalent.

**C.** Wrong: XCl2 is a salt, so its bonding is ionic, not covalent.

**D.** Correct: X is a metal (metallic bonding) and XCl2 is an ionic compound.

**Note:** Note: the printed key records A; it is corrected to D here, with the evidence above. The reaction's products are blanked in the source and are filed as "( ) ( )".

## Question 29 Chemistry

If the value of Kc is very large then it shows that _____ completed.

- A. Forward reaction ✓ **Correct answer**
- B. Reverse reaction
- C. Equilibrium is maintained
- D. Kc is moderate

**A.** Correct: a very large Kc means the equilibrium lies far to the right, so the forward reaction is effectively completed.

**B.** Wrong: a very large Kc means the forward reaction dominates, not the reverse.

**C.** Wrong: a very large Kc does not mean the equilibrium is merely maintained.

**D.** Wrong: a very large Kc is not moderate.

## Question 30 Chemistry

For stable molecular geometry, each carbon atom of _____ undergoes

- A. Sp hybridization

hybridization

- C. Sp3 hybridization
- D. Dsp2 hybridization

**No answer is given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** The molecule the blank refers to is missing, so no hybridisation can be determined.

**B.** The molecule the blank refers to is missing, so no hybridisation can be determined.

**C.** The molecule the blank refers to is missing, so no hybridisation can be determined.

**D.** The molecule the blank refers to is missing, so no hybridisation can be determined. (DEFECTIVE-excluded: the stem's blank has no referent — the molecule is not named — so the question has no determinate answer. The printed key records A. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## Question 31 Chemistry

If the absolute temperature of a gas is reduced to one half and the pressure is doubled, the volume of gas will be:

- A. Increased four times
- B. Decreased four times ✓ **Correct answer**
- C. Remained unchanged
- D. Reduced to one half

**A.** The printed key: wrong. Halving the temperature shrinks the volume; doubling the pressure shrinks it again.

**B.** Correct: $V \propto T/P$, so $V' = (T/2)/(2P) = V/4$.

**C.** Wrong: both changes shrink the volume.

**D.** Wrong: the volume falls to one quarter, not one half.

the printed key records A; it is corrected to B here, with the evidence above.

## Question 32 Chemistry

Change in extensive property is proportional to the change in _____ of material

- A. Temperature
- B. Volume
- C. Quantity ✓ **Correct answer**
- D. Pressure

**A.** The printed key: wrong. Temperature is an intensive property; it does not scale with amount.

**B.** Wrong: volume is itself an extensive property, not the thing an extensive property scales with.

**C.** Correct: an extensive property (mass, volume, energy) is proportional to the quantity of material.

**D.** Wrong: pressure is an intensive property.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above.

## Question 33 Chemistry

Which of the following has the highest electrical conductivity?

- A. Aqueous sugar solution
- B. Solid graphite ✓ **Correct answer**
- C. Solid sodium chloride
- D. Gaseous carbon dioxide

**A.** The printed key: wrong. Sugar is a non-electrolyte; its solution does not conduct.

**B.** Correct: graphite conducts electricity through its delocalised electrons.

lid NaCl has no free ions, so it does not conduct.

**D.** Wrong: a gas of neutral molecules does not conduct.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above.

## Question 34 Chemistry

The oxidation number of nitrogen in the HNO3 is _____

- A. 4+
- B. 5+ ✓ **Correct answer**
- C. 6+
- D. 7+

**A.** The printed key: wrong. Nitrogen in nitric acid is not +4 (that is the oxidation number in NO2).

**B.** Correct: in HNO3, H is +1 and each O is −2, so N + 1 + 3(−2) = 0 gives N = +5.

**C.** Wrong: nitrogen does not reach +6 in HNO3.

**D.** Wrong: nitrogen does not reach +7 in HNO3.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above. The stem is filed as "HNO3"; the source prints "HNO" with the subscript lost, and the option set forces HNO3 (no other HNOx gives a listed value).

## Question 35 Chemistry

X is a salt that decomposed in water What is the reason for decomposition?

- A. This potential oxidizes salt
- B. This potential reduces salt
- C. This potential reduces water
- D. This potential oxidizes water

**s given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** The salt and the potential are never stated, so no reason can be determined.

**B.** The salt and the potential are never stated, so no reason can be determined.

**C.** The salt and the potential are never stated, so no reason can be determined.

**D.** The salt and the potential are never stated, so no reason can be determined. (DEFECTIVE-excluded: the stem names no salt and no potential, so the question has no determinate answer. The printed key records A. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## Question 36 Chemistry

The number of moles in 44g of CO2 is

- A. 0.5
- B. 1 ✓ **Correct answer**
- C. 2
- D. 4

**A.** Wrong: 44 g is the full molar mass of CO2, not half of it.

**B.** Correct: the molar mass of CO2 is 44 g/mol, so 44 g is 1 mol.

**C.** Wrong: 2 mol of CO2 would be 88 g.

**D.** Wrong: 4 mol of CO2 would be 176 g.

**Note:** Note: the stem is filed as "CO2"; the source prints "CO" with the subscript lost, and 44 g = 1 mol forces CO2.

## 37 Chemistry

Which of the following is the strongest acid?

- A. CH3COOH
- B. HCl ✓ **Correct answer**
- C. H2SO4
- D. H3PO4

**A.** Wrong: acetic acid is a weak acid (pKa about 4.8).

**B.** Correct: hydrochloric acid is the strongest of the four by dissociation constant (pKa about −7), ahead of sulphuric acid (pKa1 about −3).

**C.** The printed key: wrong. Sulphuric acid is strong, but its first dissociation constant is smaller than that of HCl.

**D.** Wrong: phosphoric acid is a weak acid (pKa1 about 2.1).

**Note:** Note: the printed key records C; it is corrected to B here, with the evidence above. The options are filed as printed with lost subscripts ("CH COOH", "H SO", "H PO"); the restorations (CH3COOH, H2SO4, H3PO4) are in the config. Filed option A read "CH COOH" (misprint in the source reproduction); corrected to "CH3COOH" as documented in the reviewed file. Filed option C read "H SO" (misprint in the source reproduction); corrected to "H2SO4" as documented in the reviewed file. Filed option D read "H PO" (misprint in the source reproduction); corrected to "H3PO4" as documented in the reviewed file.

## Question 38 Chemistry

The pH of a neutral solution at 25°C is

- A. 0
- B. 7 ✓ **Correct answer**
- C. 14
- D. 1

pH 0 is strongly acidic.

**B.** Correct: at 25°C a neutral solution has [H+] = [OH−] = $10^{-7}$ mol/L, so pH 7.

**C.** Wrong: pH 14 is strongly alkaline.

**D.** Wrong: pH 1 is strongly acidic.

## Question 39 Chemistry

Alkenes undergo which type of reaction preferentially?

- A. Substitution
- B. Addition ✓ **Correct answer**
- C. Elimination
- D. Rearrangement

**A.** Wrong: substitution is the characteristic reaction of alkanes and arenes, not alkenes.

**B.** Correct: alkenes preferentially undergo addition across the double bond.

**C.** Wrong: elimination removes atoms to form a double bond; it is not the characteristic reaction of alkenes.

**D.** Wrong: rearrangement is not the characteristic reaction of alkenes.

## Question 40 Chemistry

The hybridization of carbon in benzene is

- A. sp
- B. $sp^2$ ✓ **Correct answer**
- C. $sp^3$
- D. $sp^3d$

**A.** Wrong: sp hybridisation is linear (as in ethyne), not benzene.

each carbon in benzene is $sp^2$ hybridised, with one p orbital left for the delocalised π system.

**C.** Wrong: $sp^3$ is tetrahedral (as in methane), not benzene.

**D.** Wrong: $sp^3d$ is trigonal bipyramidal, not benzene.

## Question 41 Chemistry

Which of the following is an example of a noble gas?

- A. Fluorine
- B. Nitrogen
- C. Argon ✓ **Correct answer**
- D. Chlorine

**A.** Wrong: fluorine is a halogen, not a noble gas.

**B.** Wrong: nitrogen is not a noble gas.

**C.** Correct: argon is a noble gas (group 18).

**D.** Wrong: chlorine is a halogen, not a noble gas.

## Question 42 Chemistry

In acidic medium, oxidation action of potassium permanganate depends upon

- A. Mn2+
- B. KMnO4
- C. MnO4- ✓ **Correct answer**
- D. Mn4+

**A.** The printed key: wrong. Mn2+ is the product the permanganate ion is reduced to in acidic medium, not the species the oxidising action depends on.

**B.** Wrong: KMnO4 is the compound as a whole; the oxidising action depends on its ion.

acidic medium the permanganate ion $MnO_4^-$ is the oxidising agent (it is reduced to $Mn^{2+}$).

**D.** Wrong: $Mn^{4+}$ (as in $MnO_2$) is not the active species in acidic permanganate oxidation.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above. The options are filed as printed ("KMn3+", "MnO 3"); the restorations (KMnO4, MnO4-) are in the config. Filed option B read "KMn3+" (misprint in the source reproduction); corrected to "KMnO4" as documented in the reviewed file. Filed option C read "MnO 3" (misprint in the source reproduction); corrected to "MnO4-" as documented in the reviewed file.

## Question 43 Chemistry

The energy required to remove the outermost electron from gaseous atom is called:

- A. Electro negativity
- B. Electro positivity
- C. Ionization potential ✓ **Correct answer**
- D. Electron affinity

**A.** The printed key: wrong. Electronegativity is the tendency to attract a shared pair of electrons, not the energy to remove one.

**B.** Wrong: electropositivity is the tendency to lose electrons, not the energy required to remove one.

**C.** Correct: the energy needed to remove the outermost electron from a gaseous atom is the ionisation potential (ionisation energy).

**D.** Wrong: electron affinity is the energy released when an electron is added, not removed.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above. Option D is filed as printed ("Electron affecinity"); the spelling is corrected in the config. Filed option D read "Electron affecinity" (misprint in the source reproduction); corrected to "Electron affinity" as documented in the reviewed file.

## 44 Chemistry

Which sequence of reaction conditions should be used to produce the compound below from benzene?

- A. AlCl3/Cl2, H2/Rh/C
- B. Cl2/UV light, H2/Rh/C
- C. H2/Rh/C; AlCl3/Cl2
- D. HCl; H2/Rh/C

**No answer is given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** The target compound is not shown, so no sequence can be judged.

**B.** The target compound is not shown, so no sequence can be judged.

**C.** The target compound is not shown, so no sequence can be judged.

**D.** The target compound is not shown, so no sequence can be judged. (DEFECTIVE-excluded: the compound to be produced is shown by a diagram that is absent from the source; the question cannot be answered without it. The printed key records C. The option texts are filed tidied from the garbled print, their subscripts lost in the source. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## Question 45 Chemistry

Cyanohydrins can be synthesized from ketones through

- A. Nucleophilic addition reaction ✓ **Correct answer**
- B. Uni-molecular nucleophilic substitution reaction
- C. Electrophilic substitution reaction
- D. Bimolecular nucleophilic substitution reaction

**A.** Correct: a cyanohydrin forms when cyanide adds to the carbonyl carbon of a ketone — nucleophilic addition.

anohydrin formation is addition, not substitution.

**C.** Wrong: the cyanide ion is a nucleophile, not an electrophile.

**D.** Wrong: cyanohydrin formation is addition, not substitution.

## Question 46 Chemistry

Which of the following elements does not belong to elements?

- A. Uranium
- B. Samarium
- C. Thorium
- D. Osmium ✓ **Correct answer**

**A.** The printed key: wrong. Uranium is an f-block actinide, so it belongs to the f-block.

**B.** Wrong: samarium is an f-block lanthanide.

**C.** Wrong: thorium is an f-block actinide.

**D.** Correct: osmium is a d-block transition metal, the only one of the four that does not belong to the f-block.

**Note:** Note: the printed key records A; it is corrected to D here, with the evidence above. The stem is filed as printed; its qualifier is lost in the source, and the evident reading is "does not belong to f-block elements" — under every plausible reading (f-block, radioactive, inner transition) Osmium is the odd one out.

## Question 47 Chemistry

Gasoline is a mixture of hexane and _____.

- A. Methane
- B. Butane
- C. Decane

ptanes ✓ Correct answer

**A.** The printed key: wrong. Methane is a gas, not a liquid component of gasoline.

**B.** Wrong: butane is a minor light component, not the standard named partner of hexane in gasoline.

**C.** Wrong: decane is a heavier hydrocarbon, not the standard named partner of hexane in gasoline.

**D.** Correct: gasoline is a mixture of hydrocarbons including hexane and heptane.

**Note:** Note: the printed key records A; it is corrected to D here, with the evidence above.

## Question 48 Chemistry

What is the name of the following compound?

- A. 1-ethyl-3, 4-dimethylcycloheptane
- B. 2-ethyl-4, 5-dimethylcyclohexane
- C. 1-ethyl-3, 4- dimethylcyclohexane
- D. 4-ethyl-1, 2- dimethylcyclohexane

**No answer is given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** The compound's structure is not shown, so no name can be determined.

**B.** The compound's structure is not shown, so no name can be determined.

**C.** The compound's structure is not shown, so no name can be determined.

**D.** The compound's structure is not shown, so no name can be determined. (DEFECTIVE-excluded: the compound to be named is shown by a structure that is absent from the source; the question cannot be answered without it. The printed key records A. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## 49 Chemistry

Bakelite is a polymer of formaldehyde and _____

- A. Phenol ✓ **Correct answer**
- B. Ethanol
- C. Butanol
- D. Methanol

**A.** Correct: Bakelite is a phenol–formaldehyde resin.

**B.** Wrong: Bakelite is not made from ethanol.

**C.** Wrong: Bakelite is not made from butanol.

**D.** Wrong: Bakelite is not made from methanol.

**Note:** Note: option C is filed as printed ("Beutanol"); the spelling is corrected in the config. Filed option C read "Beutanol" (misprint in the source reproduction); corrected to "Butanol" as documented in the reviewed file.

## Question 50 Chemistry

To avoid the formation of toxic ocmpounds with _____ substance is used for disinfecting water?

- A. KMnO4
- B. Chloramines ✓ **Correct answer**
- C. O3
- D. Alums

**A.** The printed key: wrong. Potassium permanganate is used to remove iron and manganese from water, not as a substitute for chlorine disinfection.

**B.** Correct: chloramine is used instead of chlorine to disinfect water, because chlorine reacts with organic matter to form toxic chlorinated compounds.

one is a disinfectant, but the standard textbook substitute for chlorine named here is chloramine.

**D.** Wrong: alum is a coagulant for clarifying water, not a disinfectant.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above. The stem is filed with "compounds" (source prints "ocmpounds"); the blank is evidently "chlorine". Options A and C are filed as printed ("KMNO 4", "O 3"); the restorations (KMnO4, O3) are in the config. Filed option A read "KMNO 4" (misprint in the source reproduction); corrected to "KMnO4" as documented in the reviewed file. Filed option C read "O 3" (misprint in the source reproduction); corrected to "O3" as documented in the reviewed file.

## Question 51 Chemistry

Question not clear

- A. Formaldehyde
- B. Acetaldehyde
- C. Benzaldehyde
- D. Trimethyalacetaldehyde

**No answer is given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** The stem is missing, so no aldehyde can be identified.

**B.** The stem is missing, so no aldehyde can be identified.

**C.** The stem is missing, so no aldehyde can be identified.

**D.** The stem is missing, so no aldehyde can be identified. (DEFECTIVE-excluded: the source itself prints "Question not clear" in place of the stem; the question is unrecoverable. The printed key records A. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## 52 Chemistry

Which one of the following is called animal starch?

- A. Amylose
- B. Cellulose
- C. Glycogen ✓ **Correct answer**
- D. Glycine

**A.** The printed key: wrong. Amylose is a component of plant starch, not animal starch.

**B.** Wrong: cellulose is a structural polysaccharide of plants.

**C.** Correct: glycogen is the storage polysaccharide of animals, called animal starch.

**D.** Wrong: glycine is an amino acid, not a starch.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above.

## Question 53 Chemistry

Enzymes are _____ that catalyze chemical living organisms and are very specific in their action

- A. Proteins ✓ **Correct answer**
- B. Vitamins
- C. Lipids
- D. Minerals

**A.** Correct: enzymes are proteins that catalyse chemical reactions in living organisms.

**B.** Wrong: vitamins are not enzymes.

**C.** Wrong: lipids are not enzymes.

**D.** Wrong: minerals are not enzymes.

## 54 Chemistry

HCOOH is the structure of

- A. Acetic acid
- B. Formic acid ✓ **Correct answer**
- C. Valeric acid
- D. Caproic acid

**A.** The printed key: wrong. Acetic acid is CH3COOH, not HCOOH.

**B.** Correct: HCOOH is formic acid (methanoic acid).

**C.** Wrong: valeric acid is C4H9COOH.

**D.** Wrong: caproic acid is C5H11COOH.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above.

## Question 55 Chemistry

The reaction CH3CHO + [O] shows the formation of _____

- A. Acetic acid ✓ **Correct answer**
- B. Picric acid
- C. Oxalic acid
- D. Formic acid

**A.** Correct: oxidation of acetaldehyde (CH3CHO) gives acetic acid (CH3COOH).

**B.** Wrong: picric acid is a nitration product of phenol, not an oxidation product of acetaldehyde.

**C.** Wrong: oxalic acid is not the oxidation product of acetaldehyde.

**D.** Wrong: formic acid has one carbon; the product here has two.

the stem is filed as the oxidation of acetaldehyde to acetic acid; the source prints the reaction with its subscripts lost ("CHCH + H O + 3{O}"), the only reading consistent with the options and the keyed answer. Option B is filed as printed ("Pictric acid"); the spelling is corrected in the config. Filed option B read "Pictric acid" (misprint in the source reproduction); corrected to "Picric acid" as documented in the reviewed file.

## Question 56 Chemistry

In composition of natural gas 0.17% is constituted by:

- A. Methane
- B. Ethane
- C. Butan e
- D. Nitrogen

**No answer is given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** Natural gas is mostly methane, about 85%, not 0.17%.

**B.** Ethane is several percent of natural gas, not 0.17%.

**C.** Butane is a minor component, but it is not 0.17% of natural gas.

**D.** Nitrogen is about 1–2% of natural gas, not 0.17%. (DEFECTIVE-excluded: no listed component is 0.17% of natural gas, so the question as printed has no correct option. The printed key records A. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## Question 57 Chemistry

By fermentation process of starch and by the catalytic a enzyme _____ is produced.

- A. Methyl alcohol
- B. Ethyl alcohol ✓ **Correct answer**
- C. Acetyl alcohol

**A.** The printed key: wrong. Fermentation of starch produces ethyl alcohol, not methyl alcohol.

**B.** Correct: starch is hydrolysed to glucose, which yeast ferments to ethyl alcohol (ethanol).

**C.** Wrong: there is no such fermentation product.

**D.** Wrong: methanol is not produced by fermentation of starch.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above. Option C is filed as printed ("Acethyl alcohol"); the spelling is corrected in the config. Filed option C read "Acethyl alcohol" (misprint in the source reproduction); corrected to "Acetyl alcohol" as documented in the reviewed file.

## Question 58 Chemistry

Methyl ketones can be characterized by performing:

- A. Iodoform test ✓ **Correct answer**
- B. Schiff's test
- C. Benedict reagent test
- D. Tollen's test

**A.** Correct: methyl ketones give a positive iodoform test (yellow $CHI_3$ precipitate with $I_2/NaOH$).

**B.** Wrong: Schiff's test detects aldehydes, not methyl ketones.

**C.** Wrong: Benedict's test detects reducing sugars, not methyl ketones.

**D.** Wrong: Tollen's test detects aldehydes, not methyl ketones.

**Note:** Note: option A is filed as printed ("Iodeform test"); the spelling is corrected in the config. Filed option A read "Iodeform test" (misprint in the source reproduction); corrected

n test" as documented in the reviewed file.

# Question 59 Biology

In RNA, which of the base is replaced by uracil?

- A. Cytosine
- B. Adenine
- C. Guanine
- D. Thymine ✓ **Correct answer**

**A.** The printed key: wrong. Cytosine is present in both DNA and RNA.

**B.** Wrong: adenine is present in both DNA and RNA.

**C.** Wrong: guanine is present in both DNA and RNA.

**D.** Correct: in RNA, uracil replaces thymine; DNA has thymine where RNA has uracil.

**Note:** Note: the printed key records A; it is corrected to D here, with the evidence above.

# Question 60 Chemistry

In the atmosphere, CO2 is about _____%

- A. 0.01
- B. 0.03 ✓ **Correct answer**
- C. 0.05
- D. 0.09

**A.** The printed key: wrong. Carbon dioxide is about three times that fraction of the atmosphere.

**B.** Correct: carbon dioxide is about 0.03% (about 0.04% in recent measurements) of the atmosphere.

**C.** Wrong: that is higher than the atmospheric carbon dioxide fraction.

at is three times the atmospheric carbon dioxide fraction.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above. The stem is filed as "In the atmosphere, CO2 is about ___%"; the source prints "CO is about 2", the subscript displaced and "%" lost.

## Question 61 Biology

Chlorophyll, a naturally occurring macromolecule contain

- A. Mo+
- B. Al
- C. Fe
- D. B

**No answer is given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** Chlorophyll does not contain molybdenum.

**B.** Chlorophyll does not contain aluminium.

**C.** Iron is needed for chlorophyll synthesis, but it is not contained in the chlorophyll molecule.

**D.** Chlorophyll does not contain boron. (DEFECTIVE-excluded: the central metal of chlorophyll is magnesium, which is not among the options, so the question as printed has no correct option. The printed key records A. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## Question 62 Chemistry

The reactions of below diagram with RMgX leads to the for of

- A. RCHOHR
- B. RCHOHCH3

I2CH2OH

- D. RCH2CH2OH

**No answer is given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** The diagram the question refers to is not shown, so no product can be determined.

**B.** The diagram the question refers to is not shown, so no product can be determined.

**C.** The diagram the question refers to is not shown, so no product can be determined.

**D.** The diagram the question refers to is not shown, so no product can be determined. (DEFECTIVE-excluded: the reaction diagram the question refers to is absent from the source; the question cannot be answered without it. The printed key records A. Options C and D print identically in the source. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## Question 63 Chemistry

Alkyl halides can also be obtained by halogenation of _____.

- A. Alcohols
- B. Alkenes
- C. Alkanes ✓ **Correct answer**
- D. Ketones

**A.** The printed key: wrong. Alcohols give alkyl halides with HX or PX3, not by halogenation.

**B.** Wrong: halogenation of alkenes gives vicinal dihalides, not alkyl halides.

**C.** Correct: free-radical halogenation of alkanes gives alkyl halides.

**D.** Wrong: halogenation of ketones gives halo-ketones, not alkyl halides.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above.

## 64 Biology

Which of the following is necessary for the normal development of leaves and bark of the plants.

- A. Sodium
- B. Aluminium
- C. Calcium ✓ **Correct answer**
- D. Beryllium

**A.** The printed key: wrong. Sodium is not required for the development of leaves and bark.

**B.** Wrong: aluminium is not a plant nutrient for leaves and bark.

**C.** Correct: calcium is needed for cell-wall formation and the normal development of leaves and bark.

**D.** Wrong: beryllium is not a plant nutrient.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above. The stem is filed with "normal" (source prints "mornal").

## Question 65 Chemistry

Which of the following fertilizers has maximum percentage of nitrogen in solid state?

- A. Ammonia
- B. Urea ✓ **Correct answer**
- C. Di ammonium hydrogen phosphate
- D. Ammonium nitrate

**A.** The printed key: wrong. Ammonia is a gas, not a solid fertilizer, and the question asks for the solid state.

**B.** Correct: urea is 46% nitrogen, the richest of the solid nitrogen fertilizers listed (ammonium nitrate is 35%, diammonium hydrogen phosphate about 18%).

is only about 18% nitrogen.

**D.** Wrong: it is 35% nitrogen, less than urea.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above.

## Question 66 Biology

The central dogma of molecular biology states that information flows from

- A. Protein → RNA → DNA
- B. DNA → RNA → Protein ✓ **Correct answer**
- C. RNA → DNA → Protein
- D. Protein → DNA → RNA

**A.** Wrong: information does not flow from protein to RNA to DNA.

**B.** Correct: the central dogma is DNA → RNA → protein (transcription then translation).

**C.** Wrong: that reverses the central dogma.

**D.** Wrong: information does not flow from protein to DNA.

## Question 67 Biology

Which of the following is NOT a component of the cell membrane?

- A. Phospholipids
- B. Cholesterol
- C. Glycoproteins
- D. Cellulose ✓ **Correct answer**

**A.** Wrong: phospholipids are the main component of the cell membrane.

**B.** Wrong: cholesterol is a component of animal cell membranes.

**C.** Wrong: glycoproteins are components of the cell membrane.

Cellulose is a component of the plant cell wall, not of the cell membrane.

## Question 68 Biology

The site of protein synthesis in a cell is the

- A. Nucleus
- B. Mitochondria
- C. Ribosome ✓ **Correct answer**
- D. Golgi apparatus

**A.** Wrong: the nucleus holds the DNA; proteins are not made there.

**B.** Wrong: mitochondria make ATP, not most proteins.

**C.** Correct: ribosomes are the sites of protein synthesis.

**D.** Wrong: the Golgi apparatus modifies and packages proteins, it does not synthesise them.

## Question 69 Biology

Meiosis results in cells that are

- A. Diploid identical to parent
- B. Haploid genetically identical
- C. Haploid genetically unique ✓ **Correct answer**
- D. Diploid genetically unique

**A.** Wrong: meiosis produces haploid cells, not diploid ones identical to the parent.

**B.** Wrong: meiosis produces haploid cells, but crossing over and independent assortment make them genetically unique.

**C.** Correct: meiosis halves the chromosome number and, through crossing over and independent assortment, produces genetically unique haploid cells.

erosis produces haploid cells, not diploid ones.

## Question 70 Biology

Which of the following is a prokaryote?

- A. Amoeba
- B. Yeast
- C. Bacteria ✓ **Correct answer**
- D. Algae

**A.** Wrong: Amoeba is a eukaryotic protozoan.

**B.** Wrong: yeast is a eukaryotic fungus.

**C.** Correct: bacteria are prokaryotes, with no true nucleus.

**D.** Wrong: algae are eukaryotes.

## Question 71 Biology

The powerhouse of the cell is the

- A. Nucleus
- B. Ribosome
- C. Mitochondria ✓ **Correct answer**
- D. Chloroplast

**A.** Wrong: the nucleus is the control centre, not the powerhouse.

**B.** Wrong: the ribosome makes proteins, not energy.

**C.** Correct: mitochondria generate most of the cell's ATP, so they are called the powerhouse of the cell.

**D.** Wrong: the chloroplast is the site of photosynthesis, not the powerhouse.

## 72 Biology

Photosynthesis occurs in which organelle?

- A. Mitochondria
- B. Chloroplast ✓ **Correct answer**
- C. Nucleus
- D. Vacuole

**A.** Wrong: mitochondria carry out respiration, not photosynthesis.

**B.** Correct: photosynthesis takes place in the chloroplast.

**C.** Wrong: the nucleus does not carry out photosynthesis.

**D.** Wrong: the vacuole stores materials; it does not carry out photosynthesis.

## Question 73 Biology

Which of the following is NOT a function of the kidney?

- A. Filtration of blood
- B. Regulation of blood pH
- C. Production of bile ✓ **Correct answer**
- D. Osmoregulation

**A.** Wrong: filtering the blood is a function of the kidney.

**B.** Wrong: regulating blood pH is a function of the kidney.

**C.** Correct: bile is produced by the liver, not the kidney.

**D.** Wrong: osmoregulation is a function of the kidney.

## Question 74 Biology

The immune cells responsible for antibody production are

- B. B lymphocytes ✓ **Correct answer**
- C. Macrophages
- D. Neutrophils

**A.** Wrong: T lymphocytes carry out cell-mediated immunity; they do not produce antibodies.

**B.** Correct: B lymphocytes (plasma cells) produce antibodies.

**C.** Wrong: macrophages engulf pathogens; they do not produce antibodies.

**D.** Wrong: neutrophils engulf pathogens; they do not produce antibodies.

## Question 75 Biology

Which vitamin deficiency causes scurvy?

- A. Vitamin A
- B. Vitamin B
- C. Vitamin C ✓ **Correct answer**
- D. Vitamin D

**A.** Wrong: vitamin A deficiency causes night blindness.

**B.** Wrong: vitamin B deficiency causes beriberi and related disorders.

**C.** Correct: scurvy is caused by vitamin C deficiency.

**D.** Wrong: vitamin D deficiency causes rickets.

## Question 76 Biology

The basic structural and functional unit of the kidney is the

- A. Glomerulus
- B. Nephron ✓ **Correct answer**

- D. Loop of Henle

**A.** Wrong: the glomerulus is only part of the nephron.

**B.** Correct: the nephron is the structural and functional unit of the kidney.

**C.** Wrong: Bowman's capsule is only part of the nephron.

**D.** Wrong: the loop of Henle is only part of the nephron.

## Question 77 Biology

Insulin is secreted by which cells of the pancreas?

- A. Alpha cells
- B. Beta cells ✓ **Correct answer**
- C. Delta cells
- D. Acinar cells

**A.** Wrong: alpha cells secrete glucagon.

**B.** Correct: the beta cells of the islets of Langerhans secrete insulin.

**C.** Wrong: delta cells secrete somatostatin.

**D.** Wrong: acinar cells secrete digestive enzymes.

## Question 78 Biology

Most bacteria require vitamins for which of the purpose?

- A. Source of energy
- B. Growth factors ✓ **Correct answer**
- C. Source of carbon
- D. Source of electron donors

ed key. wrong. Bacteria do not use vitamins as a source of energy.

**B.** Correct: bacteria require vitamins as growth factors (coenzyme precursors) for growth.

**C.** Wrong: bacteria do not use vitamins as a source of carbon.

**D.** Wrong: bacteria do not use vitamins as electron donors.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above.

## Question 79 Biology

Which of the following is a secondary immune response characteristic?

- A. Slow response
- B. Weaker antibody production
- C. Faster and stronger response ✓ **Correct answer**
- D. Only IgM production

**A.** Wrong: a slow response is characteristic of the primary response, not the secondary.

**B.** Wrong: the secondary response produces more antibody, not less.

**C.** Correct: on re-exposure, memory cells give a faster and stronger response with more antibody.

**D.** Wrong: the secondary response is mainly IgG, not IgM only.

## Question 80 Biology

Freeing of an object from all living organisms, bacteria and their spores, fungi and their spores

- A. Sterilization ✓ **Correct answer**
- B. Disinfection
- C. Decontamination
- D. Immunization

Sterilisation is the freeing of an object from all living organisms, including bacteria and their spores and fungi and their spores.

**B.** Wrong: disinfection kills most pathogens but not necessarily all spores.

**C.** Wrong: decontamination is a general term for removing contaminants, not the complete freeing from all living organisms.

**D.** Wrong: immunisation protects a person against disease; it does not free an object of organisms.

**Note:** Note: the stem is filed as "Freeing of an object from all living organisms, bacteria and their spores, fungi and their spores"; the source prints "Freeding" and cuts off at "their sp".

## Question 81 Biology

The process by which various components of cells including its organelle can be isolated is called

- A. Homogenization
- B. Cell fractionation ✓ **Correct answer**
- C. Cell fixation
- D. Cell electrophoresis

**A.** The printed key: wrong. Homogenisation breaks the cells open; it does not separate their components.

**B.** Correct: cell fractionation (differential centrifugation after homogenisation) isolates the cell's components and organelles.

**C.** Wrong: fixation preserves cells for study; it does not isolate their components.

**D.** Wrong: electrophoresis separates charged molecules; it does not isolate organelles.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above.

led as printed ("Cel fractionation"); the spelling is corrected in the config. Filed option B read "Cel fractionation" (misprint in the source reproduction); corrected to "Cell fractionation" as documented in the reviewed file.

## Question 82 Biology

Which of the following correctly shows structures which are found in a eukaryotic cell? (yes = present; No = absent) Nuclear membrane / Mitochondria / Ribosomes — a No No No, b No Yes No, c Yes No No, d Yes No Yes, e Yes Yes Yes

- A. No no no
- B. No yes no
- C. Yes no no
- D. Yes no yes

**No answer is given for this question, and none is taught.** NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

**A.** Wrong: a eukaryotic cell has a nuclear membrane, mitochondria and ribosomes.

**B.** Wrong: a eukaryotic cell has a nuclear membrane and ribosomes as well as mitochondria.

**C.** Wrong: a eukaryotic cell has mitochondria and ribosomes as well as a nuclear membrane.

**D.** Wrong: a eukaryotic cell has mitochondria. (DEFECTIVE-excluded: the table's correct row is "e Yes Yes Yes" (nuclear membrane, mitochondria and ribosomes are all present in a eukaryotic cell), but there is no option E; none of the four printed options is correct. The printed key records A. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

## Question 83 Biology

Which of the following terms is used to describe the membrane of central vacuole?

oplast ✓ **Correct answer**

- B. Myoplast
- C. Periplast
- D. Epitonoplast

**A.** Correct: the membrane of the central vacuole is the tonoplast.

**B.** Wrong: there is no such membrane of the vacuole.

**C.** Wrong: the periplast is not the vacuole membrane.

**D.** Wrong: there is no such membrane of the vacuole.

**Note:** Note: option A is filed as printed ("Tonopisat"); the spelling is corrected in the config. Filed option A read "Tonopisat" (misprint in the source reproduction); corrected to "Tonoplast" as documented in the reviewed file.

## Question 84 Biology

The major portion of (NH2)2CO is secreted by

- A. Sweat
- B. Saliva
- C. Urine ✓ **Correct answer**
- D. Stool

**A.** The printed key: wrong. Only a small amount of urea leaves in sweat.

**B.** Wrong: only a trace of urea is secreted in saliva.

**C.** Correct: (NH2)2CO is urea, and the major portion of urea is excreted in urine.

**D.** Wrong: urea is not mainly excreted in stool.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above. The stem is filed as "(NH2)2CO"; the source prints "(NH) CO" with the subscripts displaced.

led as printed ("SalMa"), the spelling is corrected in the config. Filed option B read "Salvia" (misprint in the source reproduction); corrected to "Saliva" as documented in the reviewed file.

## Question 85 Biology

In white blood cells, monocytes have a short life period of _____ hours

- A. 10 – 20 ✓ **Correct answer**
- B. 21 – 30
- C. 31 – 35
- D. 36 – 40

**A.** Correct: monocytes circulate in the blood for about 10–20 hours before entering the tissues.

**B.** Wrong: monocytes do not circulate for 21–30 hours.

**C.** Wrong: monocytes do not circulate for 31–35 hours.

**D.** Wrong: monocytes do not circulate for 36–40 hours.

## Question 86 Biology

The fungal cell wall contains

- A. Peptidoglycan
- B. Chitin ✓ **Correct answer**
- C. Suberin
- D. Cutin

**A.** The printed key: wrong. Peptidoglycan is the bacterial cell wall material, not fungal.

**B.** Correct: fungal cell walls are made of chitin.

**C.** Wrong: suberin is a waxy material in plant bark, not in fungal walls.

ıtin is a waxy material on plant leaves, not in fungal walls.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above.

## Question 87 Biology

DNA synthesis takes place in _____ phase of the cell

- A. G0
- B. G1
- C. G2
- D. S ✓ **Correct answer**

**A.** The printed key: wrong. G0 is the resting phase; no DNA synthesis takes place there.

**B.** Wrong: G1 is the growth phase before DNA synthesis.

**C.** Wrong: G2 is the phase after DNA synthesis.

**D.** Correct: DNA is synthesised in the S (synthesis) phase of the cell cycle.

**Note:** Note: the printed key records A; it is corrected to D here, with the evidence above.

## Question 88 Biology

The RNA found in Ribosomes is

- A. M RNA
- B. R RNA ✓ **Correct answer**
- C. T RNA
- D. Polysome

**A.** The printed key: wrong. mRNA carries the message to the ribosome; it is not the RNA of the ribosome itself.

**B.** Correct: the RNA found in ribosomes is ribosomal RNA (rRNA).

NA brings amino acids to the ribosome; it is not the RNA of the ribosome.

**D.** Wrong: a polysome is a group of ribosomes on one mRNA, not a type of RNA.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above.

## Question 89 Biology

The outermost boundary in most of the leaf cell is:

- A. Cell wall ✓ **Correct answer**
- B. Cell membrane
- C. Tonoplast
- D. Unit membrane

**A.** Correct: the outermost boundary of a plant (leaf) cell is the cell wall.

**B.** Wrong: the cell membrane lies inside the cell wall.

**C.** Wrong: the tonoplast is the vacuole membrane, inside the cell.

**D.** Wrong: the unit membrane is the membrane structure itself, not the outermost boundary.

## Question 90 Biology

In human, cell _____ is responsible for producing hydrogen peroxides

- A. Lysosomes
- B. Mitochondria
- C. Peroxisomes ✓ **Correct answer**
- D. Glyoxisomes

**A.** The printed key: wrong. Lysosomes digest material; they do not produce hydrogen peroxide.

**B.** Wrong: mitochondria produce ATP; hydrogen peroxide is handled by peroxisomes.

eroxisomes produce hydrogen peroxide (and then break it down with catalase).

**D.** Wrong: glyoxisomes are plant organelles for fat conversion, not hydrogen peroxide production in humans.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above.

## Question 91 Biology

The soluble part of the blood is called

- A. Karyolymph
- B. Nucleoplasm
- C. Protoplasm
- D. Serum ✓ **Correct answer**

**A.** The printed key: wrong. Karyolymph is the fluid of the nucleus, not of the blood.

**B.** Wrong: nucleoplasm is the fluid of the nucleus.

**C.** Wrong: protoplasm is the living substance of the cell.

**D.** Correct: the soluble (fluid) part of the blood, after clotting, is the serum.

**Note:** Note: the printed key records A; it is corrected to D here, with the evidence above.

## Question 92 Biology

The animals that feed on organic debris from decomposing plants and animals are called

- A. Herbivores
- B. Carnivores
- C. Omnivores
- D. Detritivores ✓ **Correct answer**

ed key: wrong. Herbivores feed on living plants, not on decomposing debris.

**B.** Wrong: carnivores feed on other animals, not on debris.

**C.** Wrong: omnivores feed on plants and animals, not specifically on debris.

**D.** Correct: detritivores feed on organic debris (detritus) from decomposing plants and animals.

**Note:** Note: the printed key records A; it is corrected to D here, with the evidence above. The stem is filed with "plants" (source prints "platns").

## Question 93 Biology

Pinacocytes forms _____.

- A. Pores
- B. Ostia
- C. Epidermis ✓ **Correct answer**
- D. Spongocoel

**A.** The printed key: wrong. The pores (ostia) of a sponge are formed by porocytes, not pinacocytes.

**B.** Wrong: ostia are the pores themselves, formed by porocytes.

**C.** Correct: pinacocytes are the flat cells that form the outer layer (epidermis, pinacoderm) of a sponge.

**D.** Wrong: the spongocoel is the central cavity of a sponge, not formed by pinacocytes.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above.

## Question 94 Biology

Actinia is the biological name of

anemone ✓ **Correct answer**

- B. Corals
- C. Obelia
- D. Jellyfish

**A.** Correct: Actinia is a genus of sea anemones.

**B.** Wrong: corals are not Actinia.

**C.** Wrong: Obelia is a hydroid, not Actinia.

**D.** Wrong: jellyfish are not Actinia.

**Note:** Note: options A and C are filed as printed ("Sea apemone", "Obella"); the spellings are corrected in the config. Filed option A read "Sea apemone" (misprint in the source reproduction); corrected to "Sea anemone" as documented in the reviewed file. Filed option C read "Obella" (misprint in the source reproduction); corrected to "Obelia" as documented in the reviewed file.

## Question 95 Biology

The simplest form in kingdom Animalia belongs to

- A. Eumetazoa
- B. Bilateria
- C. Parazoa ✓ **Correct answer**
- D. Protostomia

**A.** The printed key: wrong. Eumetazoa are the animals with true tissues, more advanced than the simplest.

**B.** Wrong: Bilateria are bilaterally symmetrical animals, more advanced than the simplest.

**C.** Correct: the Parazoa (the sponges) are the simplest animals, without true tissues.

**D.** Wrong: Protostomia are a large group of bilaterians, more advanced than the simplest.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above.

## Question 96 Biology

The porifera are pore-bearing animals, commonly called

- A. Corals
- B. Sponges ✓ **Correct answer**
- C. Hydras
- D. Anemones

**A.** The printed key: wrong. Corals are cnidarians, not poriferans.

**B.** Correct: Porifera are the sponges.

**C.** Wrong: hydras are cnidarians.

**D.** Wrong: anemones are cnidarians.

**Note:** Note: the printed key records A; it is corrected to B here, with the evidence above.

## Question 97 Biology

The process by which plants lose water through leaves is called

- A. Transpiration ✓ **Correct answer**
- B. Evaporation
- C. Osmosis
- D. Diffusion

**A.** Correct: the loss of water vapour from plants through their leaves is transpiration.

**B.** Wrong: evaporation is the general physical process; the plant process is transpiration.

**C.** Wrong: osmosis is the movement of water across a membrane, not loss through leaves.

**D.** Wrong: diffusion is the general movement of molecules, not the plant process.

# 98 Biology

High level of _____ and _____ in the blood, contributing factors in the formation of kidney stones.

- A. Calcium, oxalate ✓ **Correct answer**
- B. Calcium, magnesium
- C. Calcium, sodium
- D. Sodium, sulphate

**A.** Correct: high levels of calcium and oxalate in the blood (and urine) form calcium oxalate kidney stones, the commonest kind.

**B.** Wrong: magnesium does not combine with calcium to form the common kidney stone.

**C.** Wrong: sodium does not combine with calcium to form the common kidney stone.

**D.** Wrong: sodium sulphate is not the common kidney stone.

**Note:** Note: the stem is filed with "blood" (source prints "bblood").

# Question 99 Biology

Identify the correct order?

- A. Organ>function>cell>tissue
- B. Cell>organ>tissue>function
- C. Cell>tissue>organ>system ✓ **Correct answer**
- D. Tissue>organ>cell>function

**A.** The printed key: wrong. That order is not the order of biological organisation.

**B.** Wrong: tissue comes before organ, and "function" is not a level of organisation.

**C.** Correct: the levels of organisation are cell, tissue, organ, organ system.

**D.** Wrong: cell comes before tissue.

the printed key records A; it is corrected to C here, with the evidence above.

# Question 100 Biology

Blood containing CO2 is _____

- A. Red color
- B. Blue color
- C. Reddish purple color ✓ **Correct answer**
- D. Reddish blue color

**A.** The printed key: wrong. Bright red is oxygenated arterial blood, not blood rich in carbon dioxide.

**B.** Wrong: blood is never blue.

**C.** Correct: blood rich in carbon dioxide (venous blood) is dark red, reddish purple.

**D.** Wrong: venous blood is reddish purple, not reddish blue.

**Note:** Note: the printed key records A; it is corrected to C here, with the evidence above. The stem is filed as "Blood containing CO2 is ___"; the source prints "Blood containing CO is 2", the subscript displaced, and the blank is evidently the colour.

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